

Proposal for a Balanced and Stable International Monetary System

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GCI Working Paper
No. 3-2022

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Abstract

This paper proposes a new model of the international monetary system that could potentially make the system balanced and stable. We call it an “organic system”. The organic system is a shared international monetary system managed by all member countries and stands on their respective national currencies. 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 the organic currency. We utilize a 3-dimensional simulation of trade and investment involving 5 countries, 20 products, and a 12-month or 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; reforming the international monetary system; balanced and stable international monetary system; international currency; central bank digital currency; auto-balancing exchange rate; eliminate global imbalances.

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

The international monetary system (IMS) which is the lifeblood of our 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. Crises occur regularly 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). The main problem in our current IMS is imbalances and instability. Both stem from the very core of the current system that there is almost no rational way to significantly reduce or eliminate them without reconstructing the system itself.

First, global imbalances

For decades, the balance sheets of most countries in the world have been very unbalanced. Some of them have a very large surplus in the long term while the remaining have deficits. This makes the world economy unbalanced and unstable. Imbalances accumulate energy. When some economic structures are unable to withstand this energy, some of them fault and a crisis occurs. According to Caballero & Krishnamurthy (2008) and Obstfeld & Rogoff (2010), global imbalances in the 2000s had a strong relationship with the global crisis that made the US the epicenter. Various other research results show more or less the same results (Merrouche & Nier, 2010) and (Chinn, Eichengreen, & Ito, 2011) in various parts of the world.

There are two main causes of global imbalances. *First* is the asymmetric 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 causes the US (the center) in deficit so that US dollars circulate abroad. Meanwhile, other countries must have a surplus to accumulate foreign exchange (FX) reserves, to carry out international transactions, and so that their monetary systems are stable. This 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 peripherals. The United States' confidence to provide global liquidity is shrinking as its share of the global economy shrinks ([Eichengreen, 2006](#)) and ([Farhi, Gourinchas, & Rey, 2011](#)). *Second*, the exchanges rate are mostly inaccurate (misaligned) where some peripheral countries lower their currency exchange rates to increase exports as much as possible to gain economic growth. 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 so that the monetary system is stable. But, in reality, most of them are in deficit due to this practice. As a result, global imbalances are also intensifying among the peripheral countries themselves and tend to be long-term. Based on [The World Bank \(2020\)](#) data, from 1965 – 2019, about a third of the countries in the world had a trade surplus and the other two-thirds had a deficit. Almost all countries that recently experienced crises are peripheral countries with deficit balance sheets. Many efforts conducted by various international bodies such as the IMF, WTO, and many “elite multilateral” bodies such as the G5, G7, G10, G20, and others did little to reduce the imbalances ([Ocampo, 2017, pp. 87-107](#)).

Second, instability

Our current IMS is naturally unstable and makes the world economy unstable too. There are two main causes. *First*, the global imbalances as mentioned above cause the system to be naturally unstable. The worst instability occurs in deficit peripheral countries where their monetary systems are vulnerable. Since the crisis is contagious, the entire world economy has finally become vulnerable too. The *second* is exchange rate fluctuations 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 data released by [BIS \(2019\)](#) and [WTO \(2019\)](#) 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. According to [De Long, Shleifer, Summers, & Waldmann \(1990\)](#) and [Barberis, Shleifer, & Vishny \(1998\)](#) speculation tends to follow sentiment and overshoot excessively so making prices more volatile. Under these conditions, the financial system and exchange rates are naturally unstable. It would be strange if under these conditions they were stable.

A new brand of IMS

We propose a new brand of IMS that might potentially be able to solve the two problems above comprehensively and permanently. 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 transactions between member countries. Non-member countries cannot use organic currency. Then domestic transactions continue to use their respective national currencies. The relationship between international (organic) and national currencies is organic (to be part) and hybrid (interconvertible). The exchange rate between the organic currency and the national currency uses an “auto-balancing” system that fully follows the economic fundamentals of each country and a neutral 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 that we made 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 each member country tend to be relatively balanced. Thus, this system could naturally eliminate global imbalances comprehensively and permanently. The auto-balancing exchange rate fully follows the economic fundamentals of each member country so that it is not affected by noise transactions or speculations. Speculations do not affect the exchange rate. Thus, 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 deeper coordination between the main countries in the world, namely the US, the Euro, China, Japan, and others ([Stiglitz & Greenwald, 2010](#)), ([Farhi, Gourinchas, & Rey, 2011](#)), ([Ocampo, 2017](#)), and many others. Included in the light reforms is the strengthening of the IMF's SDR (Special Drawing Rights) as the main supplement to FX reserves and international liquidity ([IMF, 2010](#)) and ([IMF, 2011](#)).

As for radical ideas, there are more. Among them 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 currencies of the richest countries in the world or OECD to later become the world currency. Meanwhile, [Moore \(2004\)](#) proposed dollarization and euroization, namely countries in the world adopt dollars and euros as their currencies as small countries did. 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, [Pope & Selten \(2011\)](#), without elaborating on the details, also recommended a single currency for all countries in the world, which they called the single world currency (SWC).

The radical idea closest to the organic model is bancor. [Keynes \(1969\)](#) built 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 formed the International Currency Union (ICU). The ICU then established International Clearing Bank (ICB). The ICB functions as the world's central bank and regulates the central banks of member countries in terms of international transactions and external balance sheets. 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 bancor into a real international currency used by the public requires further research. Bancor value is pegged to gold. The bancor exchange rate with the national currencies of all countries is fixed with adjustments. Exchange rate adjustments are made when there is an imbalance. Member countries receive a bancor allocation of one year of international trade out of an average of 3-5 years outside of wartime. 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 be charged an interest fee of 1%. Member countries that have a surplus or deficit of more than $\frac{1}{2}$ of the quota will be charged an interest fee of 2%. The ICB also asked them to adjust the exchange rate so that the surplus and deficit would 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.

Several other ideas continue or are similar to Keynes. Among them is [Davidson \(2004\)](#) who declares to continue Keynes's ideas. Davidson is more moderate 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 \(2008\)](#) who propose a global reserve system or "global greenback" which is also similar to how bancor works. The global reserve system is milder than the bancor and can start on a regional scale.

2 The Organic System

2.1 Governance

Member countries establish a union. The union then establishes an intergovernmental body such as the United Nations of International Monetary (UNIM). Ideally, the UNIM coordinates or 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) or uses the name of each country 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.

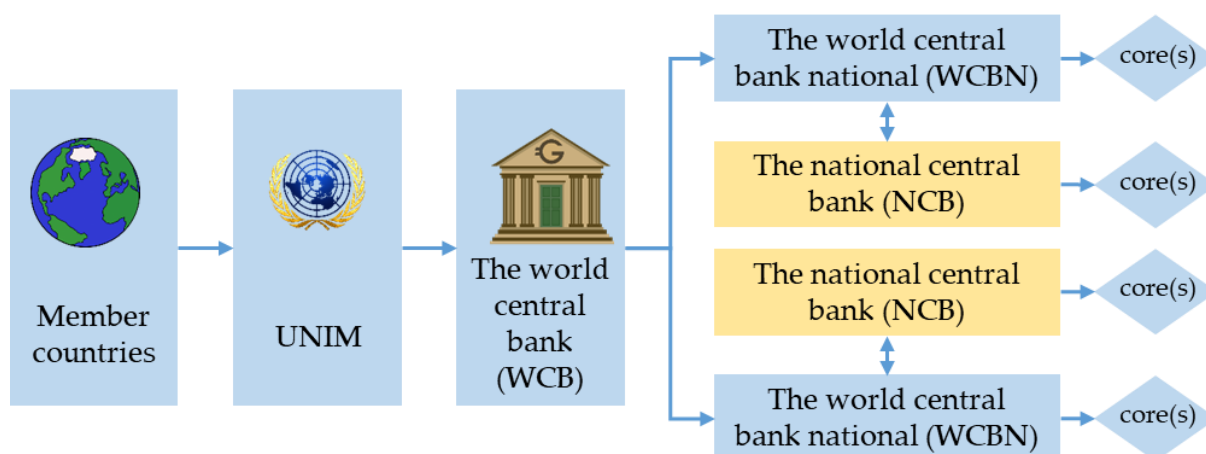


Figure 1 the organizational structure of the organic system

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. This is the subject of future discussion.

The organic model is a closed system, that only member countries can utilize the utilities. While the membership is open, all countries can join. Therefore, the system is naturally 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:

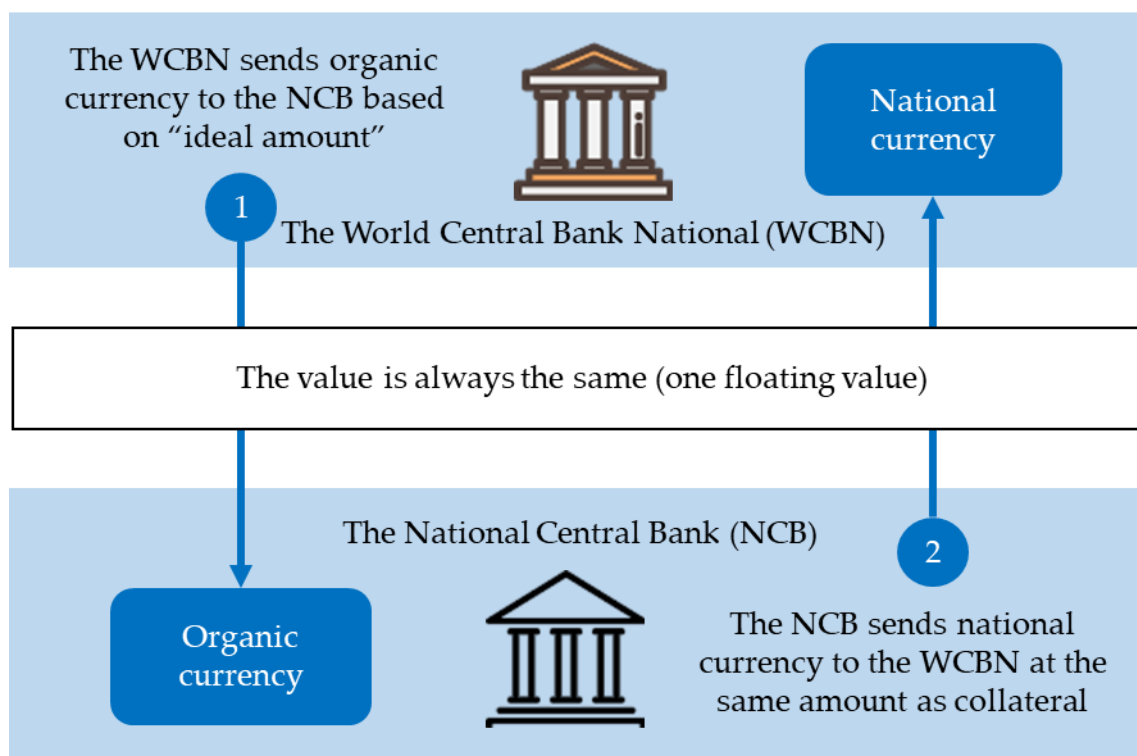


Figure 2 Issuance of organic currency from world central banks to national central banks

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:

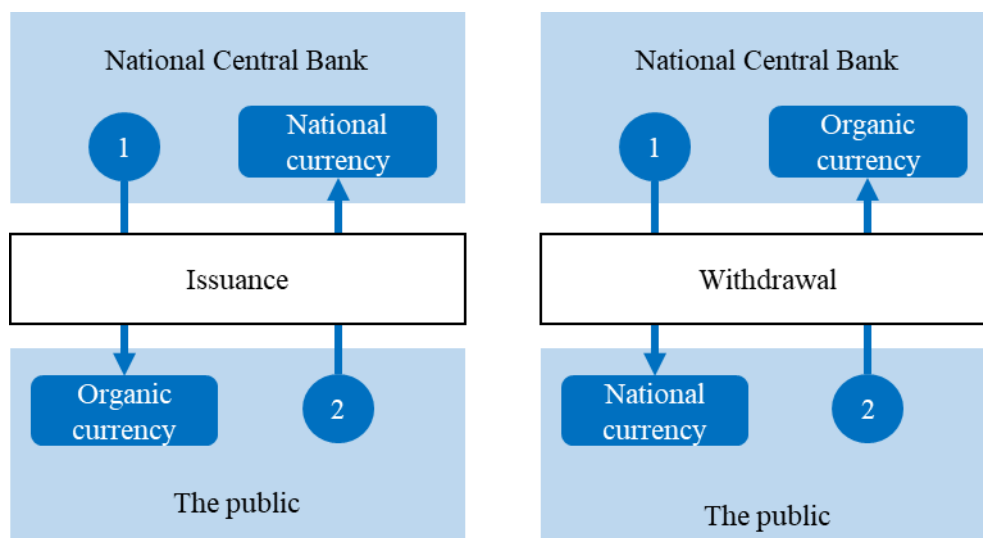


Figure 3 Distribution of organic currency from national central banks to the public

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 and is included in the state budget.
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 and is included in the state budget.

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 uses direct control to control the circulation of organic currency. *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, that is, 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. There is no intervention 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 use of organic currency in excess of 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 use of organic currency above the ideal amount will only reduce the use 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 manage the national monetary system.

2.3 Zero depreciation and appreciation targeted

All currencies in the world, national and international, depreciate. There are two main causes. *First*, all currencies are attached to the national budget of each country. Almost all governments in the world use deficit budgets to boost growth. As a result, the currency depreciates. *Second*, targeted depreciation is used to maintain competitiveness. Since 1999, Alan Greenspan has set a benchmark of 2% depreciation on the US dollar ([Brown, 2016](#)). Since the US dollar is an international currency benchmark, almost all countries in the world use the same benchmark, or below, to maintain competitiveness. In this way, all the currencies in the world depreciate.

Meanwhile, the organic currency is not connected to the state budget of any country and is not related to the competitiveness of any country. Thus, the organic currency can be made neither depreciating nor appreciating at all. This will make the organic currency a more reliable unit of value and measurement. The value of the organic currency will be stable, not decreasing and not increasing in a year, 10 years, or even 100 years. In this way, the organic currency can become the most reliable measurement and store of value that no money on earth has achieved before. To achieve such long-term “super stability”, we can use the global price index as a benchmark, instead of gold or other commodities because any commodity is still fluctuating. The global price index is the most stable value in the world because it is the sum of all prices in all countries.

2.4 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 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 uses semi-automated technology; day-to-day 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 will continue to run with some centers working while others are not. Almost all day-to-day activities of the organic system are decentralized in each country's WCBN and NCB and each runs the supercomputers, which are the cores. The following is an outline of the (semi) decentralized system in the organic system:

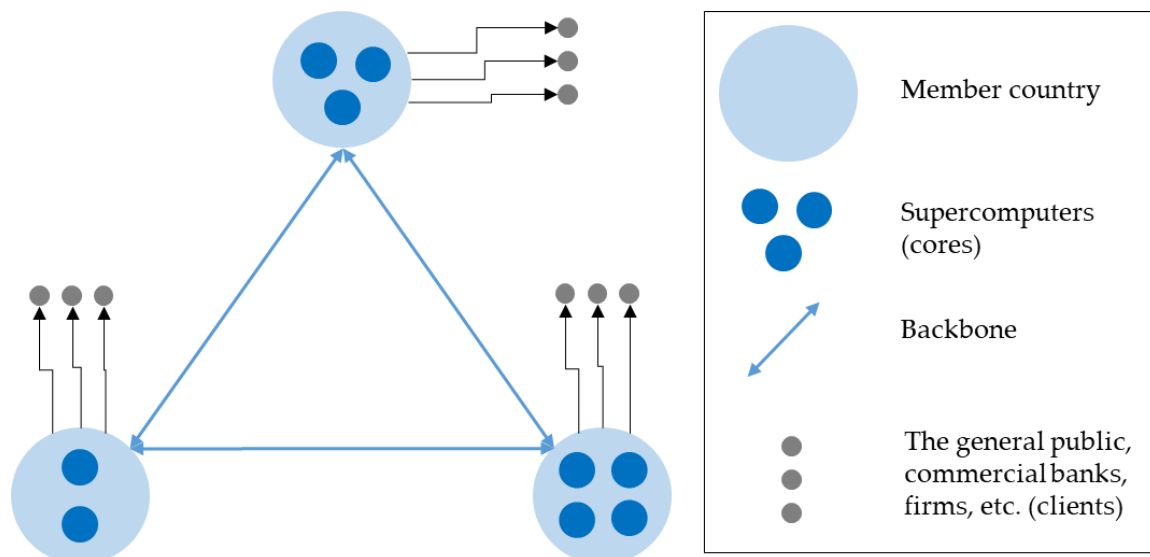


Figure 4 Decentralization in the organic system

Cores

There are two types of core in the organic system. *First*, member states, WCBN, and NCB are organizationally the cores. All of them are equal and proportional based on voting rights. *Second*, each WCBN and NCB operates at least one supercomputer. Technically, the supercomputers are the cores of the system. The software in all supercomputers is parallel. Thus, the damage or disruption in one or more cores can be backed up by other cores.

Main network

All supercomputers 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 account, saving, 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 enter this field. It is also open to future discussion.

2.5 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 system. To achieve this, the organic system uses its own exchange rate, which is called “auto-balancing”. Auto-balancing consists of a “true exchange rate” and a “balancing factor”. The true exchange rate is a combination of the quantity theory of money (QTM) and the basic law of international trade (BLIT). A detailed explanation of how this equation is formed is in (Rahman, 2022a, pp. 323-347) and (Rahman, 2022c). Here is the auto-balancing exchange rate equation:

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

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 BS : Surplus balance sheet

Deficit BS : Deficit balance sheet

First component

The above equation contains two components. The *first component*, namely $(PI)/(PX)$, 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 the same. 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 in the country, both tradable and non-tradable, and all goods and services abroad, both tradable and non-tradable. While the true exchange rate only counts exported and imported goods and services or tradable.

The first component can also be written 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 makes the average price of tradable goods and services at home and abroad equal. So the difference in the cost or price of goods and services between countries becomes irrelevant because the average is always the same. Regardless of the price of various tradable goods and services at home and abroad, the average is always the same.
2. When the average price is the same while the composition is different, then the prices of some goods and services must be different. These differences are comparative advantages. And when the average price is the same, then the comparative advantages of each country tend to be relatively equal. A simulation has been made to prove this hypothesis ([Rahman, 2022c](#)).
3. When comparative advantages are relatively equal, then the trade tends to be relatively balanced too, not excessive surplus and not an excessive deficit.

Many empirical research results prove the above hypothesis, 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. In our simulations afterward, we will prove that when exchange rates are aligned, or when the average price of tradable goods and services is parity, then (1) the comparative advantages of each country tend to be relatively balanced, and (2) the trade tends to be relatively balanced too, and vice versa.

Second component

Please note that the first component above can eliminate major imbalances but 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 $(GDP + \text{Surplus } BS) / (GDP + \text{Deficit } BS)$, is a balancing factor for the balance sheet (or net international investment position – NIIP). 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 equation 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. We will prove this in the simulations below.

3 The Simulations

3.1 A 3-dimensional simulation 5x20x12

To simplify how the organic system works, we created a 3-dimensional simulation of trade and investment consisting of five countries, 20 products, and in a span of 12 months (a year) or a 5x20x12 model. This simulation can test how the organic system works on trade balance between countries, investment/capital balance, current accounts, balance sheets, FX reserves, and exchange rate stability.

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. The cost or 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 equation. Each country gets an allocation of FX reserves 3,000 I\$ (international dollars). This amount is about 3 months of international trade.

3.2 Making the system balanced

We want to test whether this system can create balance 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 IS under autobalancing exchange rate					Price in IS 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	14.76	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. Then we want to test whether the true (aligned) exchange rate makes the comparative advantages of all countries tend to be balanced or not. For this reason, we compare two types of exchange rates, i.e. true (aligned) exchange rate (column C) and misaligned exchange rate (column D), namely Indonesia undervalued 20%, Malaysia undervalued 10%, Thailand normal, Philippines overvalued 10%, and Singapore overvalued by 20%. The green cell means the item 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.

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 so that the comparative advantages of all countries also tend to be relatively equal. This is consistent with our hypothesis that when the average price of tradable domestic goods is the same as the average price of tradable goods 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 difference in competitiveness or comparative advantages between true exchange rates and misaligned exchange rates is clearly visible.

Second, when competitiveness is relatively balanced, then the trade also tends to be relatively balanced

Our next hypothesis is when comparative advantages are relatively balanced, the trade also tends to be relatively balanced. As shown in the image below, with the true exchange rates, trade between Indonesia, Malaysia, Thailand, the Philippines, and Singapore tends to be relatively balanced.

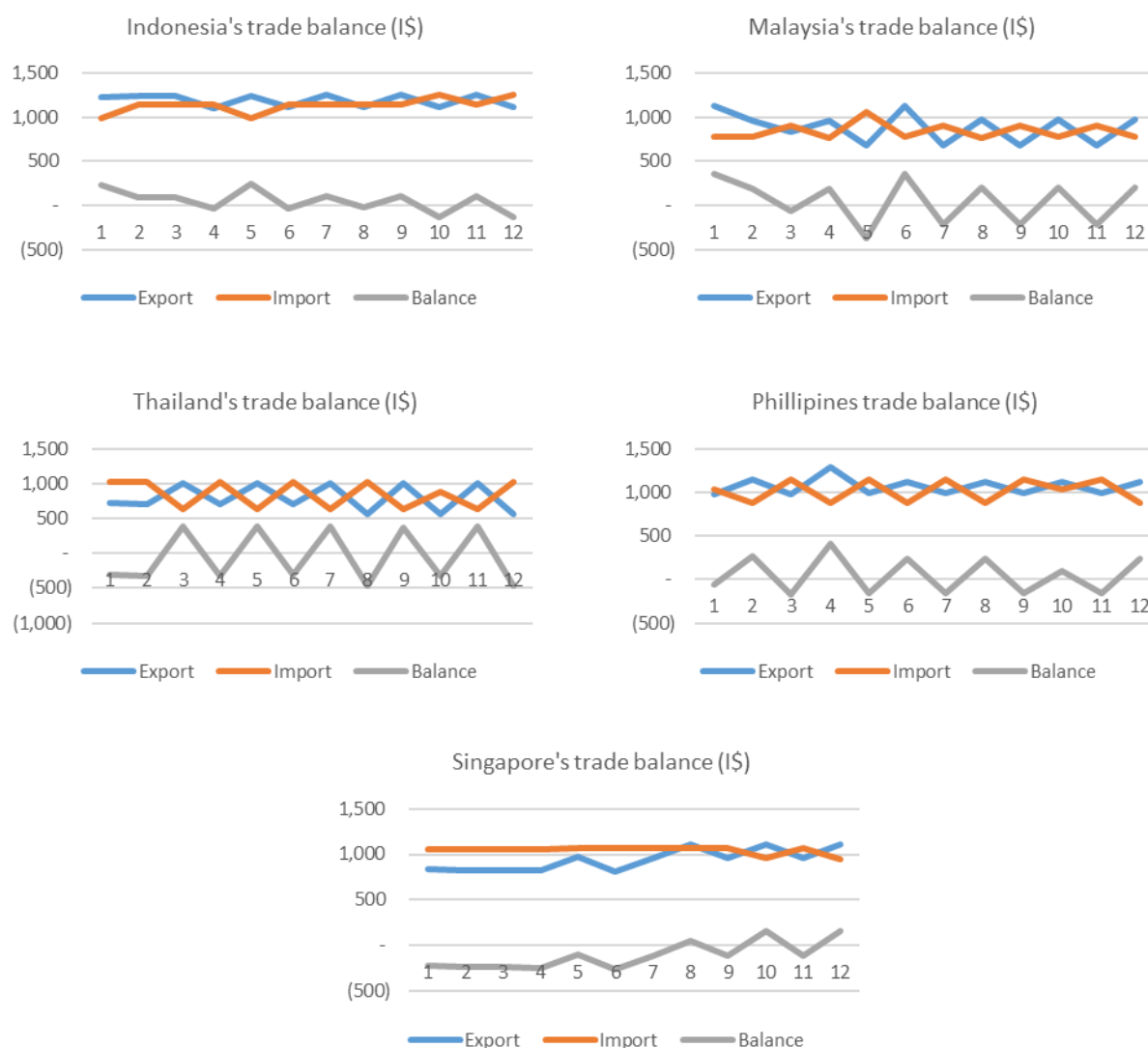


Figure 5 Exports, imports, and trade balances of member countries in organic system simulation

In the real world, perfect equality of competitiveness never exists. This equates to 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 persist. And, 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 $(GDP + \text{Surplus BS}) / (GDP + \text{Deficit BS})$ 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. In the end, the trade balances of all countries neutralize each other as shown in the image below. So, the auto-balancing exchange rate (with its two components) makes the trade balances of all member countries tend to be relatively balanced or neutral.

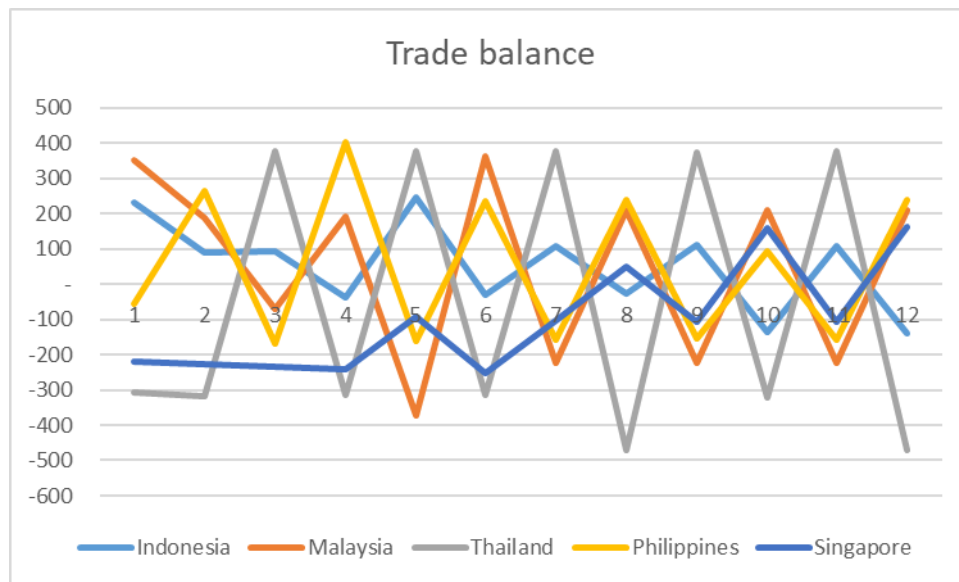


Figure 6 Trade balances of member countries in organic system simulation

This has implications for the balance sheets and FX reserves. When the trade balances between countries tend to be 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.

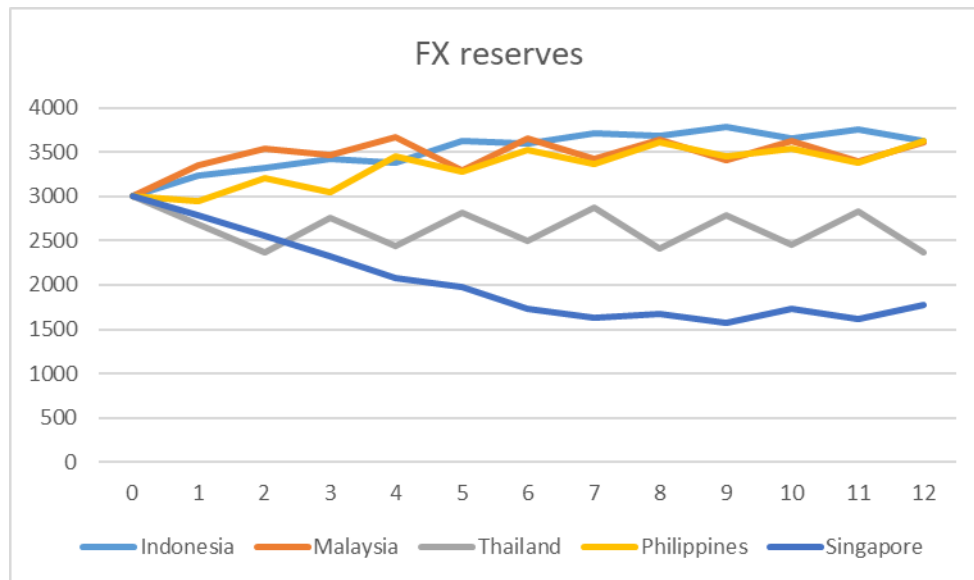


Figure 7 FX reserves balances of member countries in organic system simulation

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. 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 investment yields every month. The investment flows and profit transfers from the cash flow side (FX reserves) will look like 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 affect the current account and balance sheet, which makes Indonesia and Malaysia a surplus 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 and (2) lowering the Philippine peso and Singapore dollar. As a result, in the long term, 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).

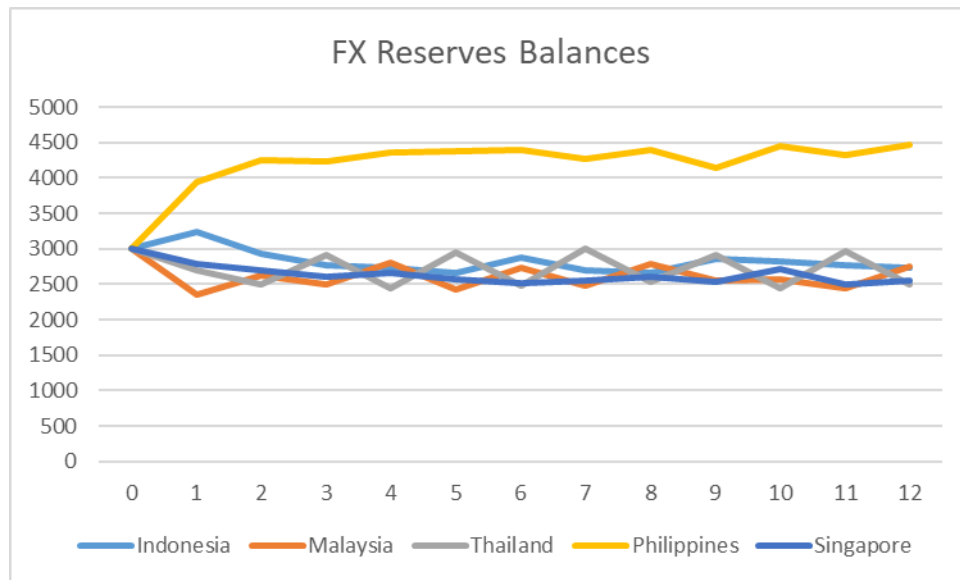


Figure 8 FX reserves balance after capital flows of member countries in organic system simulation

This also has implications for FX reserves. When trade and investment neutralize each other, the current account tends to be neutral, the balance sheet tends to be neutral, and the FX reserves of all countries also tend to be stable, no country accumulates excessively and no country dries up. As shown in Figure 8 above, the FX reserves of all countries are 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 investment flows in the form of cash, which are generally short-term (portfolio). Thus, the Philippines is always ready if the 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. Then, when there is an investment or capital flow that affects the balance sheet, the exchange rate responds so that trade and investment neutralize each other. Investor countries that receive profit transfers 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 global imbalances as a “balance of financial terror” that damaged the global economy. Therefore, he embedded a balancing system in the very core of the bancor, namely: “if member countries experience a trade surplus or deficit of more than $\frac{1}{4}$ of the quota, then the ICB will charge them interest costs”. The ICB will also encourage them to adjust the exchange rate. Thus, countries in the world will be encouraged to balance their trade. 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.

The organic system works in a different way. *First*, the auto-balancing works automatically and continuously; it does not depend on member state policies. *Second*, auto-balancing works on both trade and capital flow, so, at some level, capital control may not be necessary.

3.3 Making the exchange rates and the system stable

This simulation can also test how the organic system stabilizes the exchange rates and the whole system. *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. Equation 1 shows that the exchange rate only follows the fundamentals (the price of tradable goods and services) and the balance of each country's balance sheet. Non-fundamental factors such as short-term capital flows and speculation do not affect the exchange rate. The result is that as shown in the figure

below, the exchange rates of all countries are relatively stable whether there is investment flow (B) or not (A).

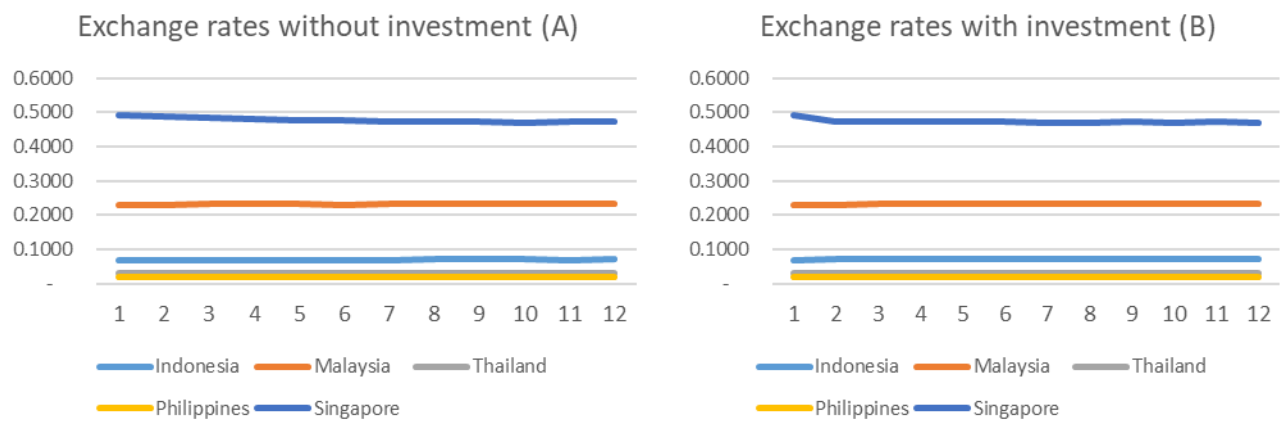


Figure 9 Exchange rates of member countries in organic system simulation with and without investment flow

It should be noted that the main sources of exchange rate fluctuations in the modern economy are speculation and very fast reversal of capital flows between countries. Short-term capital flows are generally speculative-motivated so that they are actually the same thing (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 find empirical evidence that short-term capital flows (especially backflows) lead to severe fluctuations 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. In the end, this caused foreign investors to 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.

Now let's make a comparison of how the current (non)system and the organic system deal with investment/capital flows and their derivatives (especially short term) and how they both maintain exchange rate stability and the whole system.

The current (non)system

When Malaysia invests in the Philippines in the form of international currency (portfolios), the Philippines will experience a flood of liquidity and abundant FX reserves. In the current (non)system, naturally, the price of the international currency in the Philippines will fall and the peso will strengthen. Consequently, the Philippines' imports will increase and FX reserves flow abroad. Then the investment profits that flow out of the Philippines also accelerate the FX reserves outflow. Under adverse conditions, FX reserves can even dry up. When unexpected conditions occur in the Philippine economy, investor confidence declines. They can withdraw their investment/capital suddenly. Then there is a fast reversal outflow of capital; it will drain the FX reserves in a very short time. Under these conditions, exchange rates fluctuate heavily and often lead to crises. This occurred during the 1994 Peso crisis and the 97/98 Asian crisis as described by the experts above.

The organic system

When Malaysia invests in the Philippines in the form of international currency, the Philippines will experience a flood of liquidity and abundant FX reserves. Cash (portfolio) investment activity does not affect the balance sheet because it adds credit and debit at once. In the Philippines, FX reserves (assets) increased and foreign-owned assets (debt) also increased by the same amount. Therefore, as in the example above, this cash investment flow does not affect the balance sheet and exchange rate and ultimately does not affect the trade balance. Then, when the investment profits flow out, this affects the current account as well as the balance sheet. The exchange rate system responded by lowering the Philippine peso's exchange rate. As a result, trade tends to be in a surplus and offset the deficit of profits outflow. In the end, the Philippines' FX reserves remain abundant. When something unexpected happens, investors can suddenly 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. So, in the organic system, short-term

capital flows and speculation do not affect the exchange rate so the system remains 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. This will be recorded in the trade between the two; Indonesia exports capital goods to Singapore. This directly affects the balance sheets of the two countries; Indonesia has a surplus and Singapore has a deficit. So, 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 to have a surplus. So, trade directly neutralizes investment flows and transfers profits right from the start. 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 balanced, stable, and self-sufficient.

4 Conclusion

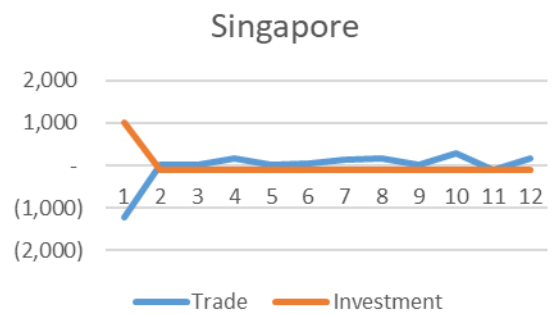
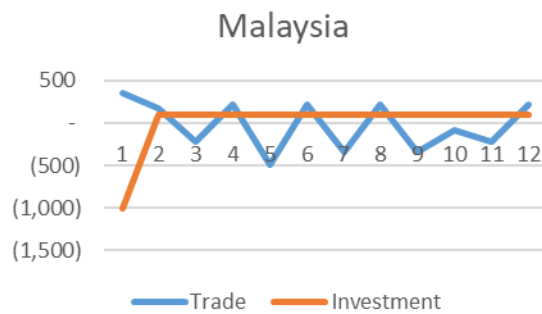
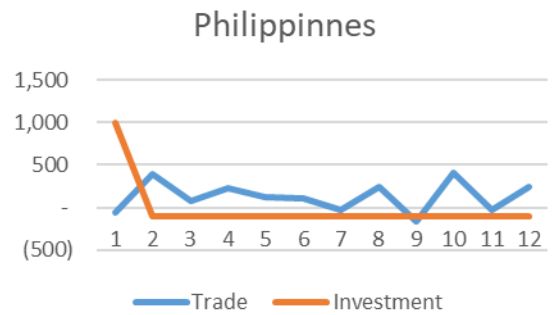
We developed a new model of the symmetrical IMS called the organic system or organic IMS. The organic IMS is created and managed by all member countries in the world. The system issues an international currency that is part of and coexists with the national currency of each country. This model could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

The organic system uses its own exchange rate, which is called auto-balancing. It consists of two components, namely, *firstly*, the true exchange rate, $\overline{PI}/\overline{PX}$, and *secondly*, the balancing factor $(GDP + Surplus\ BS)/(GDP + Deficit\ BS)$. The first component makes the trade competitiveness or comparative advantages of all member countries relatively balanced so that their trade also tends to be relatively balanced. Then the second component makes the balance sheet between countries also tend to be balanced so that trade and capital flows 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 also becomes stable. 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. But, it reduces its effectiveness. This system can start anywhere in the world and any country may join.

Appendix

Trade and investment/capital flows neutralize each other



References

- 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. (2019). *Triennial Central Bank Survey: Global Foreign Exchange Market Turnover in 2019*. 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
- Brown, B. (2016). The Global 2% Inflation Standard – How Will it End? *Atlantic Economic Journal*, 44(2), 183-196. doi:10.1007/s11293-016-9495-5
- 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
- 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. (2011). A Forensic Analysis of Global Imbalances. *NBER Working Paper*. Cambridge: NBER. doi:10.3386/w17513
- Cooper, R. N. (2006). Proposal for a Common Currency among Rich Democracies. *Bank Of Greece Working Paper* (pp. 5-15). Athens: Bank Of Greece. Retrieved from www.bankofgreece.gr
- 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>
- Farhi, E., Gourinchas, P.-O., & Rey, H. (2011). *Reforming the International Monetary System*. Washington, D.C.: CEPR.
- Greenwald, B. C., & Stiglitz, J. E. (2008). A Modest Proposal for International Monetary Reform. *International Economic Association Meeting*. Istanbul. doi:10.7916/D8V98H8Q
- 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. (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>
- Kruger, M. (1996). Speculation, Hedging and Intermediation in the Foreign Exchange Market. *Documentos de Trabajo del Banco de España*. Madrid: Banco de España. Retrieved from <https://www.bde.es>
- 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>
- Obstfeld, M., & Rogoff, K. (2010). Global Imbalances and the Financial Crisis: Products of Common Causes. *CEPR Discussion Paper No. DP7606* (pp. 1-72). Washington, D.C.: CEPR. Retrieved from <https://EconPapers.repec.org>
- Ocampo, J. A. (2017). *Resetting the International Monetary (Non)System*. London: Oxford University Press. Retrieved from <https://library.oapen.org>
- 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 Economics 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. *GCI Working Paper No 2-2022* (pp. 1-39). Jember: GCI. doi:10.33774/coe-2022-qjrf5-v3
- 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
- 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* (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

The World Bank. (2020). *Net trade in goods and services (BoP, current US\$)*. Retrieved from The World Bank: <https://data.worldbank.org>

WTO. (2019). *World Trade Statistical Review 2019*. Geneva: WTO. Retrieved from <https://www.wto.org>