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Macro-Econometric Model: Keynesian-Monetarist Synthesis of the International Balance of Payments (The Indonesian Case)

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A B S T R A C T

The study of the Keynesian-monetarist synthesis macroeconomic model on Indonesia's balance of payments combines the goods market and money market approaches to Indonesia's balance of payments theory. This study used three models of shortness to balance payments: Keynesian, monetarism, and synthesis of Keynesian and monetarism methods. Data was used from 1998 to 2019 from International Monetary Fund, international financial statistics, and balance sheet book from Bank Indonesia statistics report. The data is analyzed using reduced-form regression analysis. The results show that based on the monetarist approach to the balance of payments, it is found that the effect of the money multiplier on the international balance of payments; the magnitude of which is strongly influenced by the size of the high-powered money or the monetary base; has a negative effect on the international balance of payments, while the Net Domestic Assets has a positive effect on the international balance of payments. In the Keynesian model of the international balance of payments, it is found that government spending, world income, and domestic prices have a negative effect on Indonesia's balance of payments. Based on the Keynesian-monetary syntheses approach to the balance of payments, it is found that government spending and domestic prices have a negative effect on the international balance of payments; the higher the level of government spending and the level of domestic prices will reduce foreign exchange reserves. At the same time, an increase in foreign income, in this case, an increase in US GDP, will increase Indonesia's foreign exchange reserves.

A B S T R A K

Kajian model makroekonomi sintesis Keynesian-monetarist pada neraca pembayaran Indonesia menggabungkan pendekatan pasar barang dan pasar uang dengan teori neraca pembayaran Indonesia. Penelitian ini menggunakan tiga model shortness to balance payment yaitu metode Keynesian, monetarisme, dan sintesis Keynesian dan monetarisme. Data yang digunakan dari tahun 1998 hingga 2019 dari Dana Moneter Internasional, statistik keuangan internasional, dan buku neraca dari laporan statistik Bank Indonesia. Data dianalisis menggunakan analisis regresi bentuk tereduksi. Hasil penelitian menunjukkan bahwa berdasarkan pendekatan monetaris terhadap neraca pembayaran, ditemukan bahwa pengaruh pengganda uang terhadap neraca pembayaran internasional, yang besarnya sangat dipengaruhi oleh ukuran high-powered money atau basis moneter, yang berpengaruh negatif terhadap neraca internasional pembayaran, dan Aset Domestik Neto berpengaruh positif terhadap neraca pembayaran internasional. Dalam model Keynesian neraca pembayaran internasional, ditemukan bahwa pengeluaran pemerintah dan pendapatan dunia serta harga domestik berpengaruh negatif terhadap neraca pembayaran Indonesia. Berdasarkan pendekatan Keynesian-monetary syntheses terhadap neraca pembayaran, ditemukan bahwa pengeluaran pemerintah dan harga domestik berpengaruh negatif terhadap neraca pembayaran internasional; semakin tinggi tingkat pengeluaran pemerintah dan tingkat harga domestik akan mengurangi cadangan devisa, sedangkan peningkatan pendapatan luar negeri, dalam hal ini peningkatan GDP AS akan meningkatkan cadangan devisa Indonesia.

1. INTRODUCTION

The paradigm of the balance of payments theory of thinking continues to roll, starting from the concept of balance by itself, which continues to the elasticity and absorbance approach, which later became Keynesian, monetary approach, and international balance of payments portfolio approach. The monetarist approach rests on the balance of the money market. The balance of the money market is the balance between demand and supply of money (Goodfriend, 2011), so the balance of payments imbalance occurs due to money market imbalance. At the same time, Keynes's thinking revealed that the inequality of the balance of payments is a change in the foreign exchange reserves or international balance or a reflection of the international balance of payments, a combination of trade balance transactions and capital balance (Latief, 2020).

The principle of a market balance-based approach is the mechanism of supply-demand that leads to balance. In case of imbalance, the forces that work alone lead to an adjustment of the balance. While the partial balance adjustment is based on adjusting the elasticity of the demand and the export/import supply, it means the effect of exchange rate changes on export and import variations changes, assuming export and import demand is considered constant (Mussa, 2019; Nakatani, 2018). The elasticity of the supply is perfectly elastic so that the economy uses export production sources, and there is a perfect substitution.

According to the analysis of the international balance of payments based on the Marshall-Lerner condition (Bano et al., 2014), changes in exchange rates (depreciation of domestic currencies) can reduce the trade balance account deficit if the amount of elasticity of overseas import demand and the elasticity of export demand prices is more significant. Therefore, the condition of the international balance of payments is significantly determined by how elastic the export and import demand is. Thus, domestic and imported goods can replace each other, and exchange rate changes will increase foreign exchange reserves if the elasticity of demand and supply is elastic.

Keynesian thinking on the international balance of payments reveals that changes in revenue variations on the balance of payments through their influence on net exports (NX) are transferred into the effects of idle resources and the impact of trade periods. Inactive resource effect means increasing revenue will improve the balance of payments during marginal propensity to absorb smaller than one. Meanwhile, the term of trade effect on increasing revenue on the balance of payments will worsen the balance of payments through increased imports. These conditions differ from a monetary point of view (MABOP), where increasing revenues will increase demand for money, increase international reserves, or improve the balance of payments conditions.

When exchange rate changes affect the balance of payments through a direct effect on absorption (expenditure reduces devaluation effect), the mechanism of absorption influence or expenditure effect is divided into three channels: real cash balance, income redistribution effect, and money illusion effect (Vaona, 2013). From this point of view, there is a difference in perspective between Keynesian and monetary thinking on the international balance of payments. In comparison, the effect of changes in the relative price of exchange rates on the balance of payments depends on three factors: income multiplier effect, term of trade effect, and direct impact on absorption.

Astuti et al. (2015) emphasized the role of monetary factors rather than fundamental factors in their influence on the international balance of payments through the impact on currencies and transaction capital, the imbalance of international balance of payments as a reflection of the inequality of money demand with the money supply. Increased revenues will increase demand for money and improve the international balance of payments. Raising domestic interest rates will lower the demand for money and worsen the international balance of payments. This phenomenon contrasts with the Keynesian view that a rate hike would increase foreign exchange reserves through increased capital inflows in capital accounts.

As for the condition of Indonesia's Balance of Payments (BOP) in 2018, it experienced a deficit of USD 7.1 billion after the last time it experienced a deficit in 2015 of USD 1.1 billion. Whereas in 2016, the BOP had a surplus of USD 12.1 billion; in 2017, it also experienced a surplus of USD 11.6 billion (Musyaffa, 2019). Fortunately, in 2019, Indonesia's balance of payments recorded a surplus of USD4.7 billion (Latief, 2020). However, this fluctuation is interesting to study.

Balance of payments research is carried out with various approaches such as monetary, Keynesian, absorption, the balance of payments

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portfolio, and others. In addition, the method varies according to the assumptions used concerning currency exchange rates. However, this study emphasizes comparing the monetarist, Keynesian, and Keynesian-monetarist synthesis models on the balance of payments phenomenon. So the purpose of this study is to examine how the macro-econometric model of monetary approach is the Keynesian approach to Indonesia's balance of payments.

The model's novelty is in the approach used. The monetarist model sees the balance of payments as a phenomenon of money market balance. In contrast, the Keynesian model considers the balance of payments as a balance between current account transactions and capital balance. Meanwhile, the Keynesian-monetarist synthesis considers the balance of payments as an imbalance in the money and goods markets. In this approach, the exchange rate variable is exogenous. Assuming financial markets are balanced, using Keynesian-monetarist synthesis is the most suitable model. However, the final result depends on how big the situation is.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

Several theoretical studies that can be put forward regarding the existence of payment methods are (1) a partial approach to the international balance of payments through an elasticity approach, (2) an absorption approach to the balance of payments, (3) a monetary approach to the balance of payments.

Partial Approach to the International Balance of Payments through Elasticity Approach

The partial approach to the international balance of payments theory is the elasticity approach to the international balance of payments (Thirlwall, 2019), the absorbent approach to the international balance of payments, the capital market approach to the international balance of payments, and the monetary approach to the balance of payments. Payments and a structural approach to the international balance of payments (the structural approach to the balance of payment). The whole approach aims to explain the balance of payments from different perspectives, where each approach complements the other.

The elasticity and absorption approaches, which examine the balance of payments in terms of the trade balance, differ from the monetary and portfolio approaches. The monetary approach views the balance of payments as the totality of the current account balance and the capital account. The capital market approach uses a monetary approach that focuses on the spectrum of assets and emphasizes the wealth portfolio. However, the elasticity and absorption approach looks at the balance of payments from the perspective of the goods market balance, the elasticity theory uses a micro approach, and the absorptive theory uses a macroeconomic approach. While the monetary approach to the balance of payments is based on the theory of money market balance, it focuses more on the balance of the asset market and money market.

The structural approach to the international balance of payments emphasizes the structural approach to the balance of payments so that the imbalance in the international balance of payments is seen from the structural imbalance in the international balance of payments. According to the structural approach, a balance of payments imbalance is considered an imbalance due to non-price factors, such as production and trade structures, that affect the balance of payments performance.

Marshallian partial equilibrium approach is applied to the export and import markets. The movement of capital and the domestic price level change following the world price level (Brady, 2018). The movement of exchange rate changes on export and import conditions highly depends on the elasticity of foreign demand for a country's exports (ex) and the elasticity of domestic demand for imports (em). Suppose the two elasticities are added together with more than one (ex + em > 1). In that case, the devaluation or depreciation of the exchange rate will improve the balance of payments condition, assuming the stable foreign exchange market. It is called the Marshall-Lerner condition. However, if the sum of the second elasticity is equal to one, then the change in the exchange rate will have no impact on the balance of payments condition, or the balance of payments will not change. If the sum of both is less than one, the depreciation of the exchange rate will cause the balance of payments to deteriorate. On the contrary, appreciation will improve the condition of the balance of payments.

This approach is based on the principle of the supply-demand mechanism with an emphasis on determining the equilibrium price of demand and supply, which tends to be balanced when there is an imbalance. The balance adjustment is based on the elasticity of demand and supply. The approach proposed by Arrazola et al. (2015) focuses on the elasticity of demand and supply of exports and imports. The microeconomic approach to the trade

balance (exports-imports) focuses on choosing domestic and international demand for goods based on movements along the particular market supply and demand curves. Partial balance analysis in terms of the effect of changes in the exchange rate on variations in exports and imports with a ceteris paribus view where the position of export and import demand is considered constant. This approach assumes that trade in goods is perfectly elastic, prices are fixed in domestic currency, and the economy can use some sources for export production and is perfect for substitution without hindrance.

The stability of the exchange rate S (Rp/$) assumes that there are only two countries in the world, Indonesia and the United States, and there is no capital flow. Under this assumption, the quantity of dollars demanded equals the value of US exports. It can be written $p_x Q_x(Sp_x)$ where p_x is the dollar price of exports from the United States, and $Q_x(S.p_x)$ is a count of United States exports. The dollar value demanded is the export price multiplied by the export value (Q_x depends on S and p_x where the rupiah price is from US exports, S is the spot rate S (Rp/$). The dollar quota offered is the same as the value of Indonesian imports. It can be written $\left(\frac{p_m}{S}\right).Q_m.(\frac{p_m}{S})$ where p_m is the import price of dollars in rupiah, $Q_m.(\frac{p_m}{S})$ the dollar value offered is the dollar import price $\left(\frac{p_m}{S}\right)$ multiplied by the dollar value of imports, where the value of imports depends on $\left(\frac{p_m}{S}\right)$, when the exchange rate S (Rp/$) puts the price of imported rupiah in US dollars. The dollar price of imports from the United States is relevant to US buyers $\left(\frac{p_m}{S}\right)$, which determines the number of imports into the United States.

The demand for excess dollars is written as follows;

$$E = p_x.Q_x(S.p_x) - \frac{p_m}{S}Q_m\left(\frac{p_m}{S}\right) \quad (1)$$

The excess demand for dollars is the value of dollars demanded minus the value supplied. If the assumption of elasticity of supply for exports and imports is perfectly elastic, then it is assumed that p_x and p_m remain unchanged, then changes in the number of exports and imports that change due to changes in the exchange rate, then;

$$\frac{dE}{dS} = p_x.\frac{dQ_x}{d(Sp_x)}.\frac{d(Sp_x)}{dS} - \frac{p_m}{S}.\frac{dQ_m}{d(^{p_m}/_S)}.\frac{d(^{p_m}/_S)}{dS} - Q_m\frac{d(^{p_m}/_S)}{dS} \quad (2)$$

In the Marshall-Lerner condition scenario, the effect of changes in the exchange rate on the trade balance is formulated as follows;

$$dB = P_x.dQ_x + Q_x.dP_x - (P_m.dQ_m + Q_m.dP_m) \quad (3)$$

When the import price does not change (dp_m = 0) with depreciation or devaluation, then the equation becomes;

$$dB = P_x.dQ_x + Q_x.dP_x - P_m.dQ_m \quad (4)$$

If the percentage change in exports whose exports are subject to changes in the price of P_x is called the elasticity of demand for exports, π_x then it is written as follows;

$$\pi_x = -\frac{\frac{dQ_x}{Q_x}}{\frac{dP_x}{P_x}} = \frac{\frac{dQ_x}{Q_x}}{k\left(\frac{P_x}{P_x}\right)} = \frac{dQ_x.P_x}{Q_x.k.P_x} \quad (4.a)$$

where $k = \frac{dP_x}{p_x}$ (percentage of depreciation or devaluation of the rupiah), in the same way, the coefficient of price elasticity of import demand can be formulated as follows;

$$\pi_m = -\frac{\frac{dQ_m}{Q_m}}{\frac{dP_m}{P_m}} = -\frac{dQ_m.P_m}{Q_m.P_m} \quad (4.b)$$

$$dB = \pi_x.Q_x.P_x.k - Q_x.P_x.k - (-\pi_m.Q_m.P_m.k) \quad (5)$$

$$dB = k[Q_x.P_x(\pi_x - 1) + \pi_m.Q_m.P_m] \quad (5.a)$$

If it is assumed $B = Q_x.P_x - Q_m.P_m = 0$ so;

$$dB = k[Q_x.P_x(\pi_x + \pi_m - 1)] \quad (5.b)$$

Then the trade balance will be in surplus if $(\pi_x + \pi_m - 1) > 0$ or $(\pi_x + \pi_m) > 1$) where both elasticity values are positive if the value of exports and imports in foreign currencies is expressed V_x and V_m, so $\pi_x + (V_x/V_m)\pi_m > 1$.

Marshall-Lerner's condition for stabilizing the foreign exchange market is written as follows;

$$\frac{e_x(\pi_x - 1)}{e_x + \pi_x} + \frac{\pi_m(e_m + 1)}{e_m + \pi_m} \quad (6)$$

From this formula, it can be continued to be;

$$[e_x(\pi_x - 1)(e_x + \pi_x)^{-1} + \pi_m(e_m + 1)(e_m + \pi_m)^{-1}] > 0 \quad (6.a)$$

Export supply elasticity and export demand elasticity $(e_x + \pi_x)$, the elasticity of import supply and import demand $(e_m + \pi_m)$, a devaluation will improve the trade balance if the total elasticity of demand for exports and imports exceeds one. Such conditions are relevant for industrialized countries whose exports consist of manufactured commodities. The adequate conditions for a devaluation are increasing the trade balance if the sum of the price elasticity of demand for imports and supply for exports is greater than zero.

The trade balance elasticity approach views devaluation as a potential adjustment mechanism, calculating price elasticity as a tool for analyzing macroeconomic policies (such as exchange rate policies, monetary and fiscal policies, and commercial policies) that can be used for the balance of payments targets. If the long-run elasticity

exceeds one, the devaluation will succeed. However, based on the theoretical and empirical framework for international trade, the short-run effect of devaluation can worsen the trade balance. In estimating the price elasticity of imports and exports, it is assumed that the domestic price level is constant.

Pre-Keynes empirical studies on the international balance of payments are commonly called the international balance of payments elasticity approach. Several empirical studies use cross-sectional data to observe data analysis between countries and use time-series data and data analysis of a country flow model. Marshall-Lerner condition related to the balance of trade payments;

$$\frac{dNP}{de} = -X\frac{e_x(\pi_x-1)}{e_x+\pi_x} + M\frac{\pi_m(e_m+1)}{e_m+\pi_m} \quad (7)$$

$$\frac{e_x(\pi_x-1)}{e_x+\pi_x} + \frac{\pi_m(e_m+1)}{e_m+\pi_m} \quad (8)$$

where dNP is the change in the trade balance as measured by the domestic currency, (de) is the change in the exchange rate, X is for exports, M is imported, and also includes the elasticity of supply for exports (e_x), the elasticity of export demand (π_x), the elasticity of import demand (π_m), and the elasticity of the supply of imports (e_m).

In the case of a developing country with a supply elasticity close to infinity, when at the beginning of the equilibrium position, when there is a devaluation or a decrease in the domestic currency exchange rate, such conditions will improve the trade balance when the export and import demand elasticity exceeds one, $\frac{dNP}{de} > 0$ if $\pi_x + \pi_m > 1$ meet Marshall-Lerner condition. Adequate conditions for devaluation can increase the trade balance if the total elasticity of demand for imports and supply for exports is greater than zero. Therefore, if these two conditions are met, the decline in the value of the domestic currency (devaluation) will be used as a trade balance adjustment mechanism.

Imports (M) as a function of real economic activity (Y) and relative import prices (P^{rm}), while exports (X) depend on real-world economic activity (Y^{rw}) and the relative price of exports (P^{rx}). Both import and export in functional form can be formulated as follows: $M = M_0 Y^{\alpha} P_t^{rm\beta}$. This import function is transformed into logarithmic form written as follows: $Log\ M = logM_o + \alpha \log Y + \beta log P^{rm}$. The export function in logarithmic form can be written as follows: $X = X_0 Y_t^{rw^{\alpha}} P^{rx^{\beta}}$.

Based on the Marshall-Lerner condition, changes in the exchange rate (domestic currency depression) can reduce the trade balance transaction deficit if the elasticity of demand for foreign imports and the price elasticity of demand for exports is greater than one. This condition is revealed by requiring domestic and imported goods to replace each other (perfect substitution).

Balance of Payments Absorption Approach

Complementing the elasticity of the balance of payments approach in the partial balance section, Rath et al. (2020) reveal an approach that states that the trade balance will be disturbed if output increases more than absorption (A) based on exchange rate adjustments (Thirlwall, 2019). Determination of national income based on the balance between planned expenditure (E) and income is formulated as follows;

$$Y = C + I + G + XM \quad (9)$$

where absorption is a total of A = C + I + G so that XM = Y - A, the trade balance is the difference between output and absorption, so that the trade balance is not balanced, government policies in reducing spending and switching policies that can affect the amount of expenditure and or income. So that to overcome the balance of payments deficit carried out with spending and reduction policies. To be able to know the impact of changes in exchange rate policy.

In his research, Sujianto et al. (2020) reveal the relationship between the balance of payments and the money supply based on two aspects. On the one hand, based on the balance of payments regulations are based on the classic basic concept of "metal price flow mechanisms and monetary analysis of the balance of payments." Internal and external balance, such as the "trilemma theory."

The criticism of the previous approach is related to the elasticity approach, so Rath et al. (2020) criticized the elasticity approach as a partial equilibrium analysis. By proposing a proposition based on Keynesian modeling that uses the national income identity, it is formulated as follows;

$$Y = C + I + G + X - M \quad (10)$$

Y is national income, C is consumption expenditure, I is investment expenditure, G is government expenditure, X is exported, and M is Imports. So, the trade balance (NX = net exports) is the difference between saving and investment. Savings (S) is written as S = Y - C - G, and if C + I + G is the magnitude of absorption (A) and NX = X-M, then the identity equation can also be written as follows;

$$Y = A - NX \quad (11)$$

Then the net export equation can be written as follows;

$$NX = Y - A \quad (12)$$

$$dNX = dY - dA \quad (13)$$

where the change in the amount of absorption (dA) depends on the size of real income and other factors related to changes in the exchange rate (devaluation/revaluation), so that the amount of change in absorbance can be further explained as follows;

$$dA = bdY - dEx \quad (14)$$

where b is the rate of absorption (tendency to absorb), and Ex is the effect of changes in the exchange rate on absorption. Then substitution of equation (14) into equation (13) will give;

$$dNX = dY - (b\,dY - dEx) \quad (15)$$

$$dNX = (1 - b)\,dY + dEx \quad (16)$$

Based on this equation, it can be seen the effect of absorption on output and net exports. The main effect of devaluation on income is related to the increase in exports as a result of the devaluation of a country. Meanwhile, the stimulation of domestic demand through the multiplier effect runs in the economy under full capacity. Meanwhile, the effect of income on net export (NX) is broken down into idle resource effect and term of trade effect. The idle resource effect means that increasing income will improve the balance of payments as long as the marginal propensity to absorb is smaller than one.

The effect of the term of trade effect of changes in income on the balance of payments is considered to worsen the balance of payments. When exchange rate changes are made in full employment or when the value of 'b' is equal to or greater than one, the devaluation will increase the balance of payments through a direct effect on absorption (the expenditure-reducing effect of the devaluation). The mechanism of this expenditure effect is through three channels: the real cash balance effect, the income redistribution effect, and the money illusion effect. The real cash balance effect occurs when money holders accumulate cash in the event of an increase in the general price level due to a devaluation. Such conditions resulted in a decrease in real spending. An increase in the demand for cash will also lead to an increase in interest rates, reducing absorption through a decrease in investment.

The income redistribution effect occurs when an increase in wages implies a price increase that drives profit. Suppose there is a shift in income from individuals with a high marginal consumption tendency to individuals with a low marginal consumption tendency. In that case, absorption will decrease, and the balance of payments will improve. However, high profits stimulate investment demand, so absorption does not decrease. The money illusion effect occurs when individuals pay more attention to the price of money than the income of money. Such conditions will reduce spending when prices rise during devaluation. If the decrease in consumption is greater than the real money balance effect of a devaluation, then the money illusion will improve the balance of payments. The conclusion shows that changes in the exchange rate on the balance of payments depend on three factors: the income multiplier effect, the term of trade effect, and the direct effect on absorption.

The balance of payments monetary analysis emphasizes that the balance of payments is a monetary phenomenon (Bobai, 2013). An imbalance in the balance of payments will change the money supply and affect the economic development of a country. Based on the theory of the "trilemma" of internal and external economic balance, Dincer & Yüksel (2019) described the independence of monetary policy, a stable exchange rate, and free flow of international capital that can be achieved at the same time; the monetary authority can choose the best policy.

The study of the effect of the balance of payments on the money supply conducted by Senyefia et al. (2019) observed how the balance of payments could affect the domestic money supply in the settlement system and the sales exchange rate. In their view, in the exchange rate settlement and sales system, improvement in the balance of payments with the expansion of domestic money, which stems from an increase in the central bank's foreign exchange reserves, can also come from reducing excess reserves in commercial banks, it will increase the multiplier. Money offers money. The next factor comes from capital flows, which Alberola et al. (2016) concluded that through foreign exchange reserves, international capital flows will have a greater influence on the money supply.

Lawal et al. (2017) conducted an empirical test on the effect of the relationship between a country's capital outflow and deflation during macroeconomic operations to conclude that capital outflow is one of the most influential factors in the money supply capital outflows will reduce the domestic money supply. The third factor is related to foreign exchange reserves; the loss of foreign exchange reserves has strengthened the increase in base money, which is expressed by the large proportion of foreign exchange reserves to the increase in the money supply.

Through the balance of payments imbalance adjustment mechanism that has been developed, the monetary approach, the elasticity approach, and the absorption approach (Jiránková & Hnát, 2012), how

the monetary approach to the balance of payments shows that the balance of payments is a monetary phenomenon. This fundamental approach to the flow mechanism of this classical type of price is based on the view that money plays an important role in the balance of payments disturbances which is necessary to adjust to disturbances (Senyefia *et al.*, 2019).

By definition, the balance of payments is a systematic recording of all economic transactions between citizens of the country where the records are registered and citizens of other countries within a certain period. This understanding emphasizes that disclosure of the balance of payments involves elements of economic transactions carried out by citizens at a certain period. Calculating the balance of payments recording is the basis of the principle of double-entry bookkeeping, which can occur in two-way and one-way transactions. Accounting will record on the debit side if there is an increase in assets or decrease in liabilities. At the same time, the credit side is used for an increase in liabilities or a decrease in assets. Indonesia's exports to other countries will be recorded on the credit side; debit entries will indicate increased share claims.

Monetary Approach to the Balance of Payments

The fundamental theoretical foundations regarding the monetarist approach to the international balance of payments emphasize the role of monetary factors in influencing the balance of payments through their effect on currency and capital transactions (Johnson, 2018; Thirlwall, 2019; Wallace, 2020). The balance of payments imbalance reflects the imbalance between the demand for money and the money supply (Astuti *et al.*, 2015).

The modeling assumes a small open economy model with a fixed exchange rate system with a stable money demand function, reinforced by placing domestic prices, interest rates, and outputs set exogenously. In contrast, the money supply is an endogenous variable, and the monetary authority cannot sterilize foreign exchange reserves. The international balance of payments monetary structure model and economic growth, as reviewed by Astuti et al. (2015), is as follows:

$$y = f(u, p) \quad (17)$$

$$\left(\frac{m}{p}\right) d = md = f(y, \pi^*) \quad (18)$$

$$md = p.md = pf(y, \pi^*) \quad (19)$$

$$ms = mm.md \quad (20)$$

In the monetary approach, the balance of payments is defined as the rate of change in foreign exchange reserves which is part of the adjustment process in the face of monetary disturbances and collateral for adjusting the balanced condition of the monetary sector. The synthesis between the two approaches, namely Keynesian synthesis and monetarism on the international balance of payments and economic growth with the formulation of economic modeling, is:

$$\Delta R = PBT(Y, e) + kf(r) \quad (21)$$

$$m = L(p, y, r) \quad (22)$$

$$m = mm(DC + R) \quad (23)$$

$$\Delta R = \Delta \frac{1}{mm} L(p, y, r) - \Delta DC \quad (24)$$

$$Y = E(y, r) + G + Bt(Y, e) \quad (25)$$

$$Ms = mm.RM \quad (26)$$

$$Y = f(P) \quad (27)$$

$$Ms = Md \quad (28)$$

The model's weakness still does not show a supply-side view to increase economic growth and improve the international balance of payments.

3. RESEARCH METHOD

This study used three models of shortness to balance payments: Keynesian, monetarism, and synthesis of Keynesian and monetarism methods. Data were collected from 1998 to 2019 from International Monetary Fund, international financial statistics, and the Bank of Indonesia statistics report balance sheet book. The endogenous variables in the model analysis are Gross Domestic Product (GDP), interest rate, and international reserves. In contrast, independent or exogenous variables are the difference in the Monetary Model using Stock Money Supply (M2), Net Domestics Asset (NDA), and money multiplier (mm). Meanwhile, in the Keynesian model that acts as a free variable, namely Tax (Tx), Transfer Payment (TR), Government Expenditure (G), Exchange Rate (e), World Income (Yw), Price (P), Amount of Money stock (M), and US interest rate. At the same time, the combination of the monetarist-Keynesian approach uses both as exogenous variables. The collected secondary data is analyzed using reduced-form regression analysis with the help of EViews software.

4. DATA ANALYSIS AND DISCUSSION

The data used in the study include the 1998 to 2019 period. Data were obtained from various sources: International Monetary Fund Institute (IMF), international financial statistics, Balance of Payments Statistics for the Financial Year, and Bank Indonesia reports.

Keynesian Model of International Balance of Payments

From Keynes's perspective, the balance of payments is the current balance, and the capital balance is

formulated as follows:

$$IR = X(e, Y^*) - IM(e,Y) + KF(r - r^*) \quad (29)$$

where IR is an international reserve or reserve as an overview of the balance of payments; if positive means surplus, and if negative means deficit. While X(e, Y^*) is an export whose magnitude is influenced by the exchange rate (e) and world revenues (Y*), and IM is an import that is influenced by the exchange rate (e) and domestic income (Y). Both exports and imports are trade balances and put into the balance of services into the current balance. In contrast, capital flow (KF) transactions are influenced by differences in interest rates between domestic interest rates (r) and world interest rates (r^*).

The total differentiation of the balance of payments equation will result in:

$$dIR = x_e.de + x_{yw}.dY^* - im_e.de - im_y.dY + kf_r.dr + kf_w.dr^w \quad (30)$$

where $x_e = \frac{dX}{de} > 0$ means the higher the rupiah exchange rate against the dollar (e=Rp/$). This formula means that the rupiah depreciates against the dollar, so exports will rise to assume a ceteris paribus. $x_{yw} = \frac{dX}{dY^*} > 0$, the higher the world revenue, the higher the domestic exports. $im_e = \frac{dIM}{de} < 0$, if the rupiah depreciates, the import will decrease, and $im_y = \frac{dIM}{dY} > 0$ the higher the domestic revenue, the more imports will increase. The capital flow component, $kf_r = \frac{dKF}{dr} > 0$ dan $kf_w = \frac{dKF}{dr^w} < 0$.

Outputs that affect the number of imports from the Keynesian approach are outputs that describe the balance of the goods market, the balance between the expenditure and revenue plans. Its modeling can be written as follows;

$$Y = C(Y^d) + I(r) + G + X(e,Y^w) - IM(e,Y) \quad (31)$$

where $Y^d = Y - TX + TR$ dan I and I are investment expenditure, G is government spending, and C is consumption expenditure. So, the total differentiation of equations is as follows:

$$dY = c_y.(dY - dTx + dTr) + i_r.dr + dG + x_e.de + x_{yw}.dY^* - im_e.de - im_y.dY \quad (32)$$

$$(1 - c_y + im_y)dY = c_y.(-dTx + dTr) + i_r.dr + dG + x_e.de + x_{yw}.dY^* - im_e.de \quad (33)$$

where $c_y = \frac{dC}{dY} = MPC > 0$ dan $i_r = \frac{dI}{dir} < 0$. G is the budget element, i.e., government spending, T is tax, and TR is a transfer payment. Equation (31) describes the condition of the balance of the goods market. The balance of the money market conditioned the balance between the demand for money and the supply of money, which in the Keynesian model is written as follows:

$$\frac{M^S}{P} = L(r,Y) \quad (34)$$

The total differentiation of the money market balance equation is formulated as follows:

$$\frac{PdM - M.dP}{P^2} = l_r.dr + l_y.dY \quad (35)$$

where $l_r = \frac{dL(.)}{dr} < 0$, means that if interest rates rise, then people's preference for securities increases and demand for money decreases, and $l_y = \frac{dL(.)}{dY} > 0$ the higher the income, the higher the demand for money. Thus, the internal balance between the money market (LM) and the goods market (IS) can be written as follows:

$$d_r = \left(\frac{1}{l_r}\right)\left(\frac{PdM - M.dP}{P^2}\right) - \left(l_y / l_r\right)dY \quad (36)$$

Entering equation (36) into an equation (31) will result in the following equation:

$$(1 - c_y + im_y)dY = c_y.(-dTx + dTr) + i_r.\left[\left(\frac{1}{l_r}\right)\left(\frac{PdM - M.dP}{P^2}\right) - \left(l_y / l_r\right)dY\right] + dG + x_e.de + x_{yw}.dY^* - im_e.de \quad (37)$$

Equation (37) can be changed to:

$$\left[(1 - c_y + im_y) + i_r\left(l_y / l_r\right)\right]dY = .(dG - c_y.dTx + c_y dTr) + \left[\left(\frac{i_r}{l_r}\right)\left(\frac{PdM - M.dP}{P^2}\right)\right] + (x_e - im_e)de + x_{yw}.dY^* \quad (38)$$

Meanwhile, if we move towards the balance of the money market with the goods market, we will get the following combination of equations:

$$(1 - c_y + im_y)dY = c_y.(-dTx + dTr) + i_r.dr + dG + x_e.de + x_{yw}.dY^* - im_e.de \quad (39)$$

$$\frac{PdM - M.dP}{P^2} = l_r.dr + l_y.dY \quad (40)$$

$$\begin{vmatrix} (1 - c_y + im_y) & -i_r \\ l_y & l_r \end{vmatrix} \begin{vmatrix} dY \\ dr \end{vmatrix} = \begin{vmatrix} c_y.(-dTx + dTr) + dG + x_e.de + x_{yw}.dY^* - im_e.de \\ \frac{PdM - M.dP}{P^2} \end{vmatrix} \quad (41)$$

The magnitude of the determinant of the matrix is $\Delta = (1 - c_y + im_y)l_r + i_r.l_y$. When combined by entering the international balance of payments equation, it will produce the following derivation:

$$dIR = x_e.de + x_{yw}.dY^* - im_e.de - im_y.dY + kf_r.dr + kf_w.dr^w \quad (42)$$

(BOP equation). Then the internal and external balance from the Keynesian perspective is as follows;

$$\begin{vmatrix} (1 - c_y + im_y) & -i_r & 0 \\ l_y & l_r & 0 \\ im_y & -kf_r & 1 \end{vmatrix} \begin{vmatrix} dY \\ dr \\ dIR \end{vmatrix} =$$

$$\begin{vmatrix} c_y.(-dTx+dTr)+dG+x_e.de+x_{yw}.dY^*-im_e.de \\ \frac{PdM-M.dP}{P^2} \\ x_e.de+x_{yw}.dY^*-im_e.de+kf_w.dr^w \end{vmatrix} \quad (43)$$

Then the value of the determinant of the matrix that ensures the internal and external balance of the Keynesian perspective is as follows:

$\Delta = \left[(1-c_y+im_y)l_r\right]+\left[l_y i_r\right]$ or

$\Delta = \left[(1-c_y+im_y)+\frac{l_y i_r}{l_r}\right] > 0$

Suppose the exogenous variable is budget, exchange rates, world income, money supply, prices, and world interest rates, while the endogenous variables are income, interest rates, and balance of payments. In that case, the relationship can be seen in Table 1.

$$\begin{Vmatrix} -c_y & c_y & 1 & (x_e-im_e) & x_{yw} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1/p & -M/p^2 & 0 \\ 0 & 0 & 0 & (x_e-im_e) & x_{yw} & 0 & 0 & kf_w \end{Vmatrix} \begin{vmatrix} dT_x \\ dTR \\ dG \\ de \\ dY^w \\ dM \\ dP \\ dr^w \end{vmatrix} \quad (44)$$

The co-factor matrix of this matrix is;

$$\begin{vmatrix} (1-c_y+im_y) & -i_r & 0 \\ l_y & l_r & 0 \\ im_y & -kf_r & 1 \end{vmatrix} co\ factor\ matrik\ is\ ;$$

$$= \frac{1}{\Delta}\begin{vmatrix} (l_r) & -l_y & (l_y kf_r + l_r im_y) \\ i_r & (1-c_y+im_y) & (1-c_y+im_y)kf_r + i_r m_y \\ 0 & 0 & (1-c_y+im_y)+i_r l_y \end{vmatrix}$$

So that the reduced form equation is formed as the following perspective on the Keynesian equilibrium model for the Balance of Payments:

$$dY = \pi_{11}dTX + \pi_{12}dTR + \pi_{13}dG + \pi_{14}de + \pi_{15}dY^w.+\pi_{16}dM + \pi_{17}dP + \pi_{18}dr^w \quad (45.a)$$

$$dr = \pi_{21}dTX + \pi_{22}dTR + \pi_{23}dG + \pi_{24}de + \pi_{25}dY^w.+\pi_{26}dM + \pi_{27}dP + \pi_{28}dr^w \quad (45.b)$$

$$dIR = \pi_{31}dTX + \pi_{32}dTR + \pi_{33}dG + \pi_{34}de + \pi_{35}dY^w.+\pi_{36}dM + \pi_{37}dP + \pi_{38}dr^w \quad (45.c)$$

The Monetary Model of the International Balance of Payments

The balance of payments imbalance in the view of monetarism is considered a phenomenon of money market imbalance, namely an imbalance between the demand for money and the money supply, meaning that an imbalance in the balance of payments means that the money market is also unbalanced.

$$M = CU + DD \quad (46)$$

where M is money supply, CU is currency, and DD is the Current Account. The magnitude of the behavior of people in holding money compared to saving it in a bank or the currency to demand deposit ratio (kd)) or $kd = \frac{CU}{DD}$, so the relationship between kd and stock money is $M = (kd+1)DD$; while the monetary base consists of Reserves and Current Accounts; $MB = R + DD$ the money supply as a result of interactions between agents involving three markets (monetary reserves, credit, securities) and four economic actors (commercial banks, corporations, wage earners, central bank). Therefore, the money supply can have narrow meanings (M1) and broad money (M2), where narrow money (M1) consists of currency (banknotes and coins) and current accounts (DD) (at banking institutions and other financial institutions). If it is added with quasi money, it will become broad money (M2).

Table 1. The Keynesian model of the international balance of payments

Exogenous Variable	Gross Domestic Product (GDP)	Domestic Interest Rate (dr)	International Reserve (dIR)
Taxes	$\pi_{11} = \frac{0}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}} = 0$	$\pi_{21} = \frac{0}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}} = 0$	$\pi_{31} = \frac{0}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}} = 0$
Transfer payment	$\pi_{12} = \frac{0}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}} = 0$	$\pi_{22} = \frac{0}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}} = 0$	$\pi_{32} = \frac{0}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}} = 0$
Government expenditure	$\pi_{13} = \frac{0}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}} = 0$	$\pi_{23} = \frac{0}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}} = 0$	$\pi_{33} = \frac{0}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}} = 0$
Exchange rate	$\pi_{14} = \frac{(x_{yw})\{(1-c_y+im_y)+i_r l_y\}}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}}$	$\pi_{24} = \frac{(x_{yw})\{(1-c_y+im_y)+i_r l_y\}}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}}$	$\pi_{34} = \frac{(x_{yw})\{(1-c_y+im_y)+i_r l_y\}}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}}$
Foreign Income	$\pi_{15} = \frac{x_{yw}\{l_r+(l_y kf_r+l_r im_y)\}}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}}$	$\pi_{25} = \frac{x_{yw}\{l_r+(l_y kf_r+l_r im_y)\}}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}}$	$\pi_{35} = \frac{x_{yw}\{l_r+(l_y kf_r+l_r im_y)\}}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}}$
Stock of Money	$\pi_{16} = \frac{0}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}} = 0$	$\pi_{26} = \frac{0}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}} = 0$	$\pi_{36} = \frac{0}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}} = 0$
Price domestic	$\pi_{17} = \frac{0}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}} = 0$	$\pi_{27} = \frac{0}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}} = 0$	$\pi_{37} = \frac{0}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}} = 0$

Foreign interest rate	$\pi_{18} = \frac{[(1-c_y+im_y)+i_r l_y]kf_w}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}} < 0$	$\pi_{28} = \frac{[(1-c_y+im_y)+i_r l_y]kf_w}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}} < 0$	$\pi_{38} = \frac{[(1-c_y+im_y)+i_r l_y]kf_w}{[(1-c_y+im_y)+\frac{l_y i_r}{l_r}} < 0$

Source: Formulated by the Author (2020) based on Ahtiala (1994), Soelistyo (2003), and Soelistyo (2017)

The relationship between the money supply (currency in the hands of the public outside the banking system) and demand deposits and reserves that are not lent and provided by the central bank in open market operations depends on people's preference between choosing to hold the currency and placing in a banking institution (demand deposit, excess reserves, loan reserves). The Money Supply (M) consists of money owed by the public (CU = currency) plus demand deposits (in the DD banking system) or formulated as M = CU + DD. If the proportion of money owed by the community is stated by "h percent," then it means (1-h) percent indicates the amount of money held in the form of demand deposits. It means CU = hM and DD = (1-h) M. If the reserve ratio desired by the community is Bank Indonesia (required reserve ratio) is stated as "rqr" which is part of the DD demand deposit that banks must own as a reserve (RR-required reserve), then RR = rqr. DD = rqr (1-h) M. So, the presence of all banking reserves as reserves must be balanced with the use of large accounts, such as unloaded reserves, which are distributed to purchase government securities in the bond market to be the BPR reserves borrowed for commercial banks.

Reserves (R) consist of the mandatory RR reserve requirement and excess RE reserves, the existence of reserves provided by Bank Indonesia through open market operations, and the purchase of securities that will become the currency in the hands of the people (CU currency). The total amount of reserves, based on the source of reserves and their use, namely, RU + RB = R = RR + RE + CU. The reserve identity equation is a policy instrument that the Central Bank can control through open market operations; RU = RR + RE-RB + CU = RR + RF + CU.

The amount of net reserves (RF) is conditioned as the difference between excess reserves and borrowed reserves (RF = RE-RB). The amount of free reserves is very sensitive to changes or movements in interest rates. The number of reserves desired by the central bank RR = rqr. DD = rqr (1-h) M, combined with the number of unborrowed reserves, will yield; RU = rq. (1-h) M + RF + hM So that RU-RF = (rqr (1-h) + h) M and the money supply (M) will be formulated; $M = \frac{RU-RF}{h+rqr(1-h)} = \frac{RU-RF}{rqr+h(1-rqr)}$. From the money supply equation, it is revealed that the response to the money supply to changes in un-borrowed reserves is positive, $\left(\frac{\partial M}{\partial RU} > 0\right)$. In contrast, the response is the money supply to changes in the net free reserve (RF), and changes in the proportion of currencies. Held by the community (h) and the change in the ratio of the minimum statutory reserves (rqr) is negative $\left(\frac{\partial M}{\partial RF} < 0; \frac{\partial M}{\partial h} < 0 \; dan \; \frac{\partial M}{\partial rqr} < 0\right)$.

Based on these conditions, money supply increases when more unloaded reserves (RU) are provided and the net reserves (RF) are reduced. The minimum reserve requirement ratio is reduced, and vice versa. Money supply $M = \frac{RU}{h+rqr(1-h)} - \frac{RF}{h+rqr(1-h)}$ shows that the money supply under the control of the central bank is considered an exogenous component of the money supply $\left(\frac{RU}{h+rqr(1-h)}\right)$, and the component of the endogenous money supply is determined by the banking system in response to lending opportunities and changes in interest rates.

In a tight credit situation, when loan demand is high relative to unborrowed reserves, the free reserve is expected to be negative, with banks valuing excess reserves as tightly as possible and lending to banks at a lower rate. Interest rate (discount window rate). Free reserve's response to changes in credit conditions is measured by the sensitivity of free reserves to interest rates or the positive money supply elasticity of interest rates supply.

Money multiplier-mm is one of the elements that determine the money supply. On the one hand, the money supply (M) consists of currency and demand deposits (M = CU + DD). In contrast, the core money (monetary base MB or high-powered money) consists of currency and reserves, including private demand deposits, time deposits, and government deposits. The relationship between the money supply (M) and the monetary basis (B) is as follows: $R = r(DD + TD + GD)$ where DD is private demand deposits, TD is time deposits, and GD is government deposits, and r is the average reserve ratio for all bank deposits calculated directly by dividing total reserves to total deposits.

$M = \frac{1+kd}{rq(1+t+g)+kd} xMB$ and $MB = R + CU$, where kd is the ratio of currency to demand deposits ($k_d = \frac{CU}{DD}$), t is the ratio of time deposits to current accounts ($t = \frac{TD}{DD}$), and g, the ratio of government savings to current accounts ($g = \frac{GD}{DD}$) and rq is the ratio of total reserves to current accounts ($r_q = \frac{R}{DD}$). The amount of share money is the "money multiplier" product with the monetary base (MB), or the amount of money

multiplier formulated $mm = \frac{1+kd}{rq(1+t+g)+kd}$. So the relationship between core money and the money supply is developed:

$$M = mm.MB \quad (47)$$

and the money multiplier equation $mm = \frac{1+kd}{r(1+t+g)+kd}$ so the differentiation of the money multiplier is;

$$dmm = \frac{(r(1+t+g)+kd)dkd-(1+kd)d(r(1+t+g)+kd)}{(r(1+t+g)+kd)^2}.$$

The monetary base is defined as the monetary authority of the monetary authority (in this case, Bank Indonesia as the central bank) located in commercial banks and the non-bank community. By assuming a stable money demand function and a money supply function, it is formulated as:

$$M = mm\,(IR + NDA) \quad (48)$$

M is the money supply, mm is the money multiplier, IR is the official holder of reserves or international conditions that describe the condition of the international balance of payments or Net Foreign Assets, and NDA is the component of the monetary base that can be controlled or domestic credit, or also called Net Domestic Credit (NDC).

On the money supply side, the real money supply is the product of the money multiplier (mm money multiplier) with the high-power money monetary base supply consisting of the International Reserve RSV and credit creation. Domestic banking (DC) is written as follows; $M^S = mm\,(MB)$ and $Monetary\ base\ (MB) = IR + DC$. Therefore, the equation for the money supply; $M^S = mm(IR + DC)$, using the assumption of money market balance, namely the balance between money demand and money supply, can be derived from the monetarist version of the international balance of payments (IR) equation as follows;

$$M_s = mm.(IR + NDA) \quad (49)$$

MABOP–monetary approach to the balance of payments) where mm is the money multiplier. The money supply differentiation equation is formulated as follows;

$$M_s = mm\,.IR + mm\,.NDA \quad (50)$$

If the money supply equation is made from total differentiation, the following equation is formed:

$$dM^s = mm.dIR + mm\,dNDA + (NDA + IR)\frac{(r(1+t+g)+kd)dkd-(1+kd)d(r(1+t+g)+kd)}{(r(1+t+g)+k\ )^2}$$

Furthermore, the condition of the balance of payments is:

$$dIR = \left(\frac{1}{mm}\right).dM - dNDA + (NDA + IR)dmm$$

Money market equilibrium conditions occur when the money supply equals the money demand. Money request formulated:

$$MV = PT \quad (51)$$

and if k = 1 / V dan PT = Y, then the demand for money can be formulated: $M_d = kY$, where M is the money supply, V is the velocity of money, P is the price level, T is the number of transactions that occur, and Y is the Gross Domestic Product, by including the interest rate as an explanatory variable for money demand. Then the differentiation of total money demand is as follows:

$$M_d = L(r, Y) \quad (52)$$

$$\text{and } dM_d = l_r dr + l_y dY \quad (53)$$

Money market equilibrium differentiation is:

$$l_r dr + l_y dY = mm.dIR + mm\,dNDA \quad (54)$$

Determination of fundamental output:

$$M.V = P.Y \quad (55)$$

total differentiation for the output determination model by including the Neo-Classical model in determining where the output $Y = AK^{\alpha}N^{\beta}$ Where K is the amount of capital stock, N is the population, P is price, M is money supply, and V is the velocity of money:

$$M.dV + V.dM = P.\left(\alpha\frac{Y}{K}dK + \beta\frac{Y}{N}dN\right) + y.dP \quad (56)$$

The balance between the money market, the output function, and the balance of payments are written as follows: $l_r dr + l_y dY = mm.dIR + mm\,dNDA$ (money market balance). $dM = kdY$ (output determination), $dIR = \left(\frac{1}{mm}\right).dM - dNDA + (NDA + IR)dmm$ (BOP).

Then the internal and external balance of the monetary perspective is as follows:

$$\begin{vmatrix} l_y & l_r & -mm \\ k & 0 & 0 \\ 0 & 0 & 1 \end{vmatrix} \begin{vmatrix} dY \\ dr \\ dIR \end{vmatrix} = \begin{vmatrix} mm.dNDA \\ dM \\ \left(\frac{1}{mm}\right).dM - dNDA + (NDA + IR)dmm \end{vmatrix}$$

Then the magnitude of the determinant of the matrix that ensures the internal and external balance of the monetary perspective is as follows:

$$\Delta = -kl_r > 0 \quad (57)$$

If the exogenous variables are: NDA, interest rate (r), money stock (dM), net domestic assets (NDA), and money multiplier (mm), then the relationship can be seen in the table below:

$$\begin{Vmatrix} mm & 0 & 0 \\ 0 & 1 & 0 \\ -1 & 1/mm & (H) \end{Vmatrix} \begin{vmatrix} dNDA \\ dM \\ dmm \end{vmatrix}$$

where H = NDA + IR. The co-factor matrix of this matrix is:

$$\begin{vmatrix} dY \\ dr \\ dIR \end{vmatrix} = \frac{1}{\Delta} \begin{vmatrix} 0 & -k & 0 \\ -l_r & 0 & 0 \\ 0 & k.mm & kl_r \end{vmatrix} \begin{Vmatrix} mm & 0 & 0 \\ 0 & 1 & 0 \\ -1 & 1/mm & (H) \end{Vmatrix} \begin{vmatrix} dNDA \\ dM \\ dmm \end{vmatrix}$$

Where the determinant of the matrix is equal to =Δ=-kl_r > 0

So, the equation of the reduced form is formed as follows:

$$dIR = \pi_{31} dNDA + \pi_{32} dM + \pi_{33} dmm \quad (58)$$

Table 2. The monetary model of the international balance of payments

Exogenous Variable	Endogenous variables		
	Gross Domestic Product	Interest rate	International reserve
Net Domestics Asset	$\pi_{11} = \frac{0}{-kl_r} = 0$	$\pi_{21} = \frac{-mm.l_r}{-kl_r} = \frac{mm}{k} > 0$	$\pi_{31} = \frac{-k.l_r}{-kl_r} = 1$
Stock Money	$\pi_{12} = \frac{-k}{-kl_r} > 0$	$\pi_{22} = \frac{0}{-kl_r} = 0$	$\pi_{32} = \frac{k.mm + \frac{kl_r}{mm}}{-kl_r}$
Money Multiplier	$\pi_{13} = \frac{0}{-kl_r} = 0$	$\pi_{23} = \frac{0}{-kl_r} = 0$	$\pi_{33} = \frac{kl_r H}{-kl_r} < 0$

Synthesis of the Keynesian and Monetarist Model of the International Balance of Payments

The combination of the two approaches to the international balance of payments is analyzed with some variables for internal and external balances, where Keynesians see the balance of payments as the sum of current account transactions and capital transactions. In contrast, the monetarist view of the balance of payments imbalance is a phenomenon of money market imbalances. By placing four endogenous variables, namely Output (Y), Balance of Payments (IR), interest rates (r), and money supply (M), while exogenous variables are taxes, transfer payments, government spending, exchange rates, world income, exchange rates. Interest rate, world interest rate, NDA, money multiplier (mm), and price level. The relationship between endogenous and exogenous variables is formulated as follows:

Aggregate Demand Equation:

$$(1 - c_y + im_y)dY = c_y.(-dTx + dTr) + i_r.dr + dG + x_e.de + x_{yw}.dY^* - im_e.de \quad (59)$$

BOP-Keynesian Equation

$$dIR = x_e.de + x_{yw}.dY^* - im_e.de - im_y.dY + kf_r.dr + kf_w.dr^w \quad (60)$$

BOP-monetary Equation;

$$l_r dr + l_y dY = mm.dIR + mm\ dNDA \quad (61)$$

Money Market Equation

$$\frac{PdM \quad .dP}{P^2} = l_r.dr + l_y.dY \quad (62)$$

$$\begin{vmatrix} (1 - c_y + im_y) & 0 & -i_r & 0 \\ im_y & 1 & -kf_r & 0 \\ -l_y & mm & -l_r & 0 \\ l_y & 0 & l_r & 1/p \end{vmatrix} \begin{vmatrix} dY \\ dIR \\ dr \\ dM \end{vmatrix} = \begin{Vmatrix} -c_y & c_y & 1 & (x_e - im_e) & x_{yw} & 0 & 0 & 0 \\ 0 & 0 & 0 & (x_e - im_e) & x_{yw} & xf_w & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & mm & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & M/P^2 \end{Vmatrix} \begin{vmatrix} dTX \\ dTR \\ dG \\ de \\ dY^* \\ dr^* \\ dNDA \\ dP \end{vmatrix}$$

Determinant Matrix:

$$|\Delta| = -\frac{(1 - c_y + im_y)l_r}{p} - \frac{l_y i_r}{p} = -\frac{(1 - c_y + im_y)l_r + l_y i_r}{P} > 0$$

Co-factor matrix:

$$\begin{vmatrix} \frac{mmkf_r - l_r}{p} & -\frac{-im_y l_r - kf_r l_y}{p} & \frac{im_y mm - l_y}{p} & -(im_y mml_r + kf_r mml_y) \\ -\frac{mm\ r}{p} & \frac{l_y l_r - (1 - c_y + im_y)kf_r}{p} & -\frac{(1 - c_y + im_y)mm}{p} & (1 - c_y + im_y)mml_r + i_r l_y mm \\ \frac{i_r}{p} & -\frac{im_y i_r - k\ r(1 - c_y + im_y)}{p} & \frac{(1 - c_y + im_y)}{p} & -(1 - c_y + im_y)l_r + l_y i_r \\ 0 & 0 & 0 & (1 - c_y + im_y)(kf_r mm - l_r) - i_r im_y mm - i_r l_y \end{vmatrix}$$

The equation is reduced from the Keynesian-monetarist syntheses for international balance of payments, and its influence value can be seen in Table 3.

$$dIR = \pi_{21}dTX + \pi_{22}dTR + \pi_{23}dG + \pi_{24}de + \pi_{25}dY^{w}. + \pi_{26}dr^{w} + \pi_{27}dNDA + \pi_{28}dP \quad (63)$$

The effect of changes in exogenous variables on endogenous variables in the Keynesian-monetarist synthesis model in Table 3 shows that changes in government spending as an instrument of fiscal policy on the balance sheet are determined by how big the value of the money multiplier is and how investment responds to changes in interest rates. ($\frac{-mmi_r}{(1-c_y+im_y)l_r+l_y i_r}$), while the effect of changes in the exchange rate on the balance of payments (international reserves) is determined by the sensitivity of changes in the trade balance to changes in exchange rates ($(x_e - im_e)\frac{l_y l_r-(1-c_y+i\ \ y)kf_r-mmi_r}{(1-c_y+im_y)l_r+l_y i_r}$) and also how much money multiplies and changes in interest rates in the flow of capital flows, including components in the goods market and money market. Meanwhile, the effect of changes in domestic prices on the international balance of payments is influenced by several conditions, namely the magnitude of the multiplier value of money (mm), real money stocks, money market conditions ($\frac{((1-c_y+im_y)mml_r+i_r l_y mm)\left(\frac{M}{P}\right)}{(1-c_y+im_y)l_r+l_y i_r}$) and market conditions of goods.

Table 3. Synthesis of the Keynesian and monetarist models of the international balance of payments

Exogenous Variables	Endogenous Variables		
	Output	Interest rate	International reserve
Taxes	$\frac{-c_y(mmkf_r - l_r)}{(1-c_y+im_y)l_r+l_y i_r}$	$\frac{-c_y i_r}{(1-c_y+im_y)l_r+l_y i_r} > 0$	$\frac{c_y mmi_r}{(1-c_y+im_y)l_r+l_y i_r}$
Transfer Payment	$\frac{c_y(mmkf_r - l_r)}{(1-c_y+im_y)l_r+l_y i_r}$	$\frac{c_y i_r}{(1-c_y+im_y)l_r+l_y i_r}$	$\frac{-c_y mmi_r}{(1-c_y+im_y)l_r+l_y i_r}$
Government Expenditure	$\frac{(mmkf_r - l_r)}{(1-c_y+im_y)l_r+l_y i_r}$	$\frac{i_r}{(1-c_y+im_y)l_r+l_y i_r} > 0$	$\frac{-mmi_r}{(1-c_y+im_y)l_r+l_y i_r}$
Exchange rate	$\frac{(x_e - im_e)(mmkf_r - l_r + im_y l_r -}{(1-c_y+im_y)l_r+l_y i_r}$	$(x_e - im_e)\frac{i_r - im_y i_r - kf_r(1-c_y+in}{(1-c_y+im_y)l_r+l_y i_r}$	$(x_e - im_e)\frac{l_y l_r-(1-c_y+im_y)kf_r-mi}{(1-c_y+im_y)l_r+l_y i_r}$
Foreign Income	$\frac{x_{yw}(mmkf_r - l_r+im_y l_r + kf_r l_y)}{(1-c_y+im_y)l_r+l_y i_r}$	$x_{yw}\frac{mmkf_r - l_r+im_y l_r + kf_r l_y}{(1-c_y+im_y)l_r+l_y i_r}$	$x_{yw}\frac{l_y l_r-(1-c_y+im_y)kf_r-mmi_r}{(1-c_y+im_y)l_r+l_y i_r}$
Foreign interest	$\frac{im_y l_r + kf_r l_y}{(1-c_y+im_y)l_r+l_y i_r}xf_w$	$-\frac{im_y i_r - kf_r(1-c_y+im_y)}{(1-c_y+im_y)l_r+l_y i_r}xf_w$	$\frac{l_y l_r-(1-c_y+im_y)kf_r}{(1-c_y+im_y)l_r+l_y i_r}xf_w$
Net Domestics Asset	$\frac{im_y mm - l_y}{(1-c_y+im_y)l_r+l_y i_r}mm$	$\frac{(1-c_y+im_y)}{(1-c_y+im_y)l_r+l_y i_r}mm$	$\frac{-(1-c_y+im_y)mm}{(1-c_y+im_y)l_r+l_y i_r}mm$
Domestic price	$\frac{-(im_y mml_r + kf_r mml_y)}{(1-c_y+im_y)l_r+l_y i_r}(\frac{M}{P})$	$\frac{-((1-c_y+im_y)l_r+l_y i_r)(\frac{M}{P})}{(1-c_y+im_y)l_r+l_y i_r}$	$\frac{((1-c_y+im_y)mml_r+i_r l_y mm)\left(\frac{M}{P}\right.}{(1-c_y+im_y)l_r+l_y i_r}$

Empirical Results

Indonesia's 1998-2019 time-series data for empirical estimation of the balance of payments model with three approaches: the monetarist approach, the Keynesian, and the Keynesian-monetarist synthesis approach of Indonesia's balance of payments can be presented in Table 4.

Table 4. Estimation results of the monetarist model, Keynesian, and the Keynesian-monetarist synthesis of the balance of payments

Variables		Balance of Payment (International Reserve)		
		Monetarist	Keynesian	Keynesian-Monetarist Synthesis
INTERCEPT	Coefficient	9.23E+10*	-3.08E+10	-2.74E+10
	t-Statistic	4.796588	-0.794652	-0.637536
TX	Coefficient	-	3.63E-07	3.35E-07
	t-Statistic	-	0.870756	0.812941
TR	Coefficient	-	8.89E-06	1.37E-05

Variables		Balance of Payment (International Reserve)		
		Monetarist	Keynesian	Keynesian-Monetarist Synthesis
	t-Statistic	-	0.268375	0.465974
G	Coefficient	-	-3.21E-06*	-3.21E-06*
	t-Statistic	-	-4.670826*	-3.501954
Exchange Rate	Coefficient	-	-2747493	-2927398
	t-Statistic	-	-1.517026	-1.688457
GDPUSA	Coefficient	-	-0.017921*	0.008402
	t-Statistic	-	2.034579*	1.839110**
M2	Coefficient	-3.71E-07	-1.94E-07	-
	t-Statistic	-0.418395	-0.354771	-
P	Coefficient	-	-25107404**	-25159250**
	t-Statistic	-	-1.989426**	-1.985635**
rUSA	Coefficient	-	6.26E+08	5.90E+08
	t-Statistic	-	0.346458	0.304592
NDA	Coefficient	1.54E-05**	-	-9.57E-07
	t-Statistic	1.777690	-	-0.190091
mm	Coefficient	-4.01E+10*	-	-
	t-Statistic	-3.705543	-	-
Adj. R Square		0.915882	0.973033	0.972813
F Statistic		69.95780*	86.69440*	85.98414*
* Sig & Prob(F-statistic) < 0,05			** (0,10)	

Source: Eviews Software Data Output (2020)

Notes: TX = Tax, TR = Transfer Payment, G = Government Expenditure, GDPUSA = USA Gross Domestic Product, M2 = Money Supply, P = Price, rUSA = USA interest of rate, NDA = Net Domestic Asset, mm = Money Multiplier

Based on the monetarist approach to the international balance of payments, it was found that the effect of the money multiplier on the international balance of payments which was strongly influenced by the amount of high-powered money or the monetary base, had a negative effect on the international balance of payments of -4.01E + 10 and was significant. However, net domestic assets had a significant positive effect of 1.54E-05 on the international balance of payments. The effect of the money supply on the international balance of payments is determined by several parameters between how money demand responds to interest rates and the money supply. Empirical results show that an increase in the domestic money supply will decrease the value of international reserves.

These results support Senyefia et al. (2019), which reveal that exchange rates, domestic net, and interest rates have a significant effect in the long run on payments. Net domestic credit and broad money supply also have a very significant influence on the payment position. The results of this study also fully support Rath et al. (2020) and Musa (2019), who proved that the money supply significantly affects the balance of payments. This finding is also in line with Sujianto (2020), which explained that the exchange rate and interest rates significantly affect Indonesia's balance of payments. In detail, interest rates have a positive impact, but exchange rates have a negative effect. So, suppressing or at least maintaining the value of the rupiah exchange rate is very important in the international payment process. As found by Andriyani et el. (2020) and Astuti et al. (2015), the devaluation of the exchange rate, which indicates that the price of foreign goods in Indonesia increases and imports decrease, can lead to the use of the foreign exchange. Thus, foreign exchange reserves will increase. Foreign exchange reserves can stabilize international capital flows and positively impact international payments (Alberola et al., 2016; Lawal et al., 2017).

The independent variables that significantly affect the balance of payments are government spending, world income, and domestic prices. In the Keynesian international balance of payments model, it is found that government spending, world income, and domestic prices negatively affect Indonesia's balance of payments.

Based on the Keynesian-monetary synthesis approach for the reduced form, it can be seen that government spending has a negative impact on the international balance of payments, as well as the domestic price level, which has a negative effect on the international balance of payments, the higher the level of government spending and the level of domestic prices (international reserves). At the same time, the

increase in foreign income, in this case, the rise in US GDP, will increase Indonesia's foreign exchange reserves.

Based on the results of this study, it is known that the increase in foreign income has a positive impact on Indonesia's foreign exchange reserves. Alberola et al. (2016) reveal that foreign exchange reserves stabilize international capital flows, particularly during periods of global financial stress. Meanwhile, government spending and domestic price levels have a negative effect on the balance of payments, where the higher government spending and domestic prices, the lower the balance of payments.

However, according to Astuti et al. (2015), the balance of payments is an indicator of economic fundamentals that describes a country's ability to earn foreign exchange and foreign payments. It means that if government spending and domestic prices are high, the country's ability to earn foreign exchange will be hindered, especially in making foreign payments. It is where the control over government spending and domestic price levels comes into play. According to Arrazola et al. (2015), during disequilibrium situations, domestic prices adjust more quickly than stocks, where demand is not as sensitive as supply to price variations. This finding follows Jiránková & Hnát (2012), who revealed conditions in Europe that when external imbalances occur, the economies of Euro member countries are faced with a process of price and income adjustment. This finding further clarifies the link between domestic prices and the external conditions of a country, which of course, ultimately is closely related to the international balance of payments.

The results of this study also prove that of the three approaches used to determine the balance of payments, there are two approaches with almost the same good results: the Keynesian approach and the Keynesian monetary synthesis. If analyzed from the R-square value, the Keynesian approach is slightly higher than the Keynesian monetarist synthesis approach. However, the Keynesian monetarist synthesis approach can consider Net Domestic Assets (NDA) as an exogenous variable, where this variable can only be calculated through a monetarist model; it cannot be taken into account through the Keynesian model. Meanwhile, the Keynesian monetary synthesis approach also has a weakness; it cannot consider the money supply (M2) as an exogenous variable as it can be done either through the monetarist or Keynesian approaches

5. CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

Based on the monetarist approach, the money multiplier's effect on the international balance of payments is strongly influenced by the amount of high-powered money or the monetary base, which has a negative effect. Meanwhile, NDAs have a significant positive impact on the international balance of payments. In the Keynesian international balance of payments model, it is found that government spending, world income, and domestic prices negatively affect Indonesia's balance of payments. Based on the Keynesian-monetarist synthesis approach for the reduced form, it can be seen that government spending has a negative impact on the international balance of payments, as well as the domestic price level, which has a negative effect on the international balance of payments, the higher the level of government spending and the level of domestic prices (international reserves). At the same time, an increase in foreign income, in this case, an increase in US GDP, will increase Indonesia's foreign exchange reserves. The government must control the budget deficit to increase the number of foreign exchange reserves. The rupiah's depreciation against the dollar must be minimized to encourage an increase in foreign exchange reserves.

The practical implication of the results of this research is to improve the position of the balance of payments. It is necessary to control the capital flows so that the incoming capital flows can support the improvement of the balance of payments. It is also necessary to monitor the exchange rate to encourage exports and suppress imports.

The limitation of the monetary model only looks at the balance of payments imbalance from the money market side. At the same time, Keynes saw the balance of payments imbalance in terms of the imbalance between the good market and the money market

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