DOI: 10.28934/ea.20.53.1.pp179-186

ARTICLE REVIEW

# Creating Monetary Measurement Unit (MMU) as the Global Universal Measure for Hedging against Inflation and Currency Risk[1]

**Aleksandar Manić[1*] | Zoran Grubišić[2]**

[1] Independent Researcher
[2] Union University Belgrade, Belgrade Banking Academy - Faculty for Banking, Insurance and Finance, Department for Banking, Insurance and Finance, Belgrade, Serbia

**ABSTRACT**

The paper presents an indicator created to reflect the long-term stability in the trend of real growth of the global economy, based on the current market data through a basket of currencies with a government bond yields based premium. The results suggest that the indicator is adequate to be considered as a benchmark for widespread indexation, with a potential hedging for diverse types of contracts and assets against price level volatility and currency risk on an international scale.

**Key words:** *indexation, hedging, inflation, currency risk, international financial markets*

**JEL Classification:** E31, E32, E44, F31

## INTRODUCTION

The topic of indexation has been attracting attention of academics as well as the participants on the international financial markets especially since the rise of free market economics in the 1970s (Backhouse, 2005), in the wide scope spreading from wage indexation to the creation of capitalization-weighted indexes used predominantly for investing-in or benchmarking-to in the trillion-dollar industry of modern stock markets. Since creating and validating an index appropriate for mass utilization is a complex, and moreover, highly responsible endeavour, the demand for such a benchmark is yet to be satisfied.

In the present world, it is widely believed that openness in financial systems can create more international financial linkages and enhance direct relationship between different categories of markets and assets. This phenomenon implies that it is more difficult to utilize the contribution of the modern portfolio theory with the general aim of implementing internationally diversified portfolio and reduce market risk defined by Markowitz (1952, 1959) and developed by many other authors (among others, Mangram (2013)). In practice, the effects of diversification arise where there are incentives to invest in international markets (Grubel (1968), Levy & Sarnat (1970)), from lower correlations coefficients between markets and assets. In the contemporary markets, it is essential to acknowledge the effects of information spillovers, as a result of

[1] The research presented in this paper is part of "The MMU Algorithm" project financed by *Anchor AG*, Switzerland, as stated in the Acknowledgments section of the paper.
[*] Corresponding author, e-mail: aleksandar_manic@yahoo.com

globalization shocks experienced in one financial market are transmitted to other markets, regardless of the linkage between the economies the markets are situated in (Aragó-Manzana and Fernandez-Izquierdo (2007)). Moreover, it is not an easy endeavour to find even a weak safe haven in order to effectively execute the hedging strategy. It is widely believed that gold as a "store of value" has that characteristic, but it is questionable from the dynamic point of view - is there a one and only safe haven for all times? Analysis of Chen and Weng (2019) supported the view that safe haven characteristic of gold depends on the time frame. In addition, it differs across different sectors. It is, in this sense, of great importance to design an appropriate global measurement unit in order to use it in numerous different hedging strategies.

In the process of developing a very current business concept, an indicator that seems to be an adequate candidate for the mentioned necessity has been created and is presented in this paper: it is the MMU – *Monetary Measurement Unit*.

The very origins of the MMU are connected to an idea to reflect a highly stable variable with a scope large enough not to be disrupted by short-term and local, even regional political and other shocks. In this sense, the trend of real growth of the global economy has been looked upon as an almost ideal candidate, since it empirically shows a stable and slight increase, if the years of global crisis are not taken into account.

## LITERATURE REVIEW

Humphrey (1974) explores the concept of indexation in economic history, presenting an elaborate overview of the evolution of means to protect the real value of time contracts from fluctuations in the value of money. Starting in the eighteenth century, where he traces the origin of a price index, i.e. a weighted average of many prices, more specifically, the origin of the concept of a cost-of-living index as a measure of changes in the purchasing power of money, going over classical (XIX century) and neo-classical (roughly 1870-1930) views on indexation, the author concludes with a comparison of earlier with contemporary views. He elaborates the advantages that proponents of indexation, led by Milton Friedman, propose, describing the mechanisms through which indexation would augment the effectiveness of existing anti-inflationary monetary and fiscal policies.

The paper by Caiani, Godin, Caverzasi, Gallegati, Kinsella, and Stiglitz (2016) moves from a discussion of the challenges posed by the crisis to standard macroeconomics, specifically focusing on the solutions adopted within the DSGE[2] community. The authors argue that major drawbacks still undermine the reliability of standard models, although several recent improvements have contributed to their realism. In particular, DSGE models still fail to recognize the complex adaptive nature of economic systems, and the implications of money endogeneity. The paper argues that a coherent and exhaustive representation of the inter-linkages between the real and financial sides of the economy should be a pivotal feature of every macroeconomic model and proposes a macroeconomic framework based on the combination of the Agent Based and Stock Flow Consistent approaches.

## CONCEPT AND METHODOLOGY

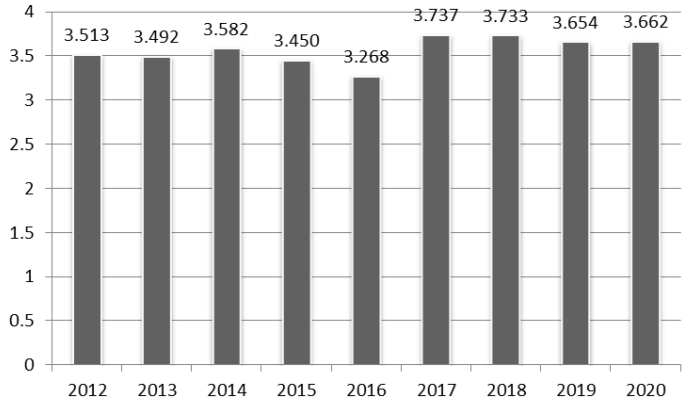
### Innitial adjustments of the imported macroeconomic data

The IMF and the World Bank have been recognized as highly reputable international institutions that collect, analyze and publish reliable data on a regular basis. By looking more

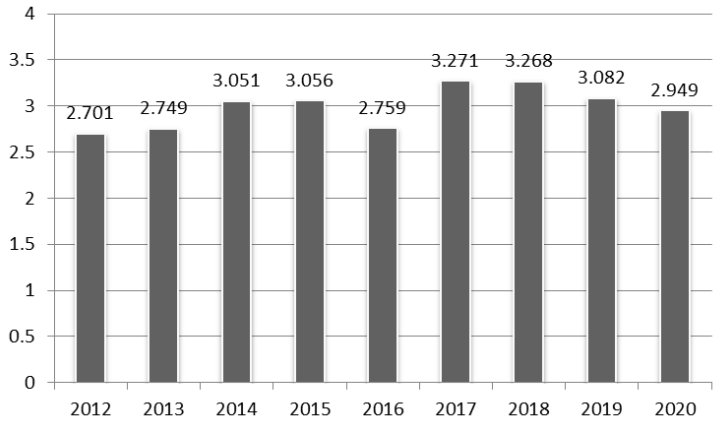
[2] Dynamic stochastic general equilibrium modeling (abbreviated as DSGE, or DGE, or sometimes SDGE) is a method in macroeconomics that attempts to explain economic phenomena, such as economic growth and business cycles, and the effects of economic policy, through econometric models based on applied general equilibrium theory and microeconomic principles.

closely into the methodology of the presented figures for real growth of global GDP, however, it has been established that the published growth rates are based on annual GDPs of 194 countries worldwide expressed with the respect to PPP (purchasing power parity). This implies equal purchasing power for all countries (for the sake of comparison and additon, the PPP GDPs have been expressed in US dollars), namely the the United States of America have been selected as the base country for the purchasing power equalization. The expression of all other countries' realized annual GDPs as if their purchasing power is equal to the purchasing power of the US further implies that the emerging and developing economies' GDPs become larger than their market realized GDPs expressed in constant prices, which as a result increases the total, that is, the real growth of the global economy, as well as the participation i.e. importance of their individual growth rates in the total. This was the main reason for opting for a different methodological approach and recalculation of the variables of interest. For the sake of the result that would be more plausible, i.e. that would rely on data which reflect the quantites of production realized in the international markets, instead of PPP based real GDPs, the real GDPs have been expressed in constant 2010 US dollars and with constant 2010 exchange rates for each country with respect to US dollars (base year 2010 is the IMF standard).

The elaborated methodological adjustment is presented in the following charts:




**Graph 1.** Global GDP growth compared to previous year (%)
*Source: IMF data (World Economic Outlook, Oct. 2018)*




**Graph 2.** Adjusted Real Growth (%)
*Source: Authors' Data*

The adjusted real growth of global GDP therefore served as a benchmark for a variable closely related to the global economy which enables direct and simple verification. Since the real growth

of global GDP takes into account constant prices and exchange rates, i.e. negates monetary variables such as inflation and the exchange rate volatility, the natural next step in the process of creating a monetary benchmark was finding a way to preserve the main desirable traits of the real variables – the stability and the steady increase – when developing a model that would have nominal variables in its core. The problem of the representation of the inter-linkages between the real and financial sides of the economy is a constant in the contemporary academic research (Caiani et al. 2016), which is why realizing the way to solve this issue was a crucial point in the development of the MMU model.

**Fundament for the model: adjusted participations of the Basket Countries**

As a monetary indicator, the MMU is designed to reflect the real growth of global GDP and express it in a nominal sense by including the current market data with adjustments for the key underlying factors of the global GDP. Preserving the most important features of the real global economy and its growth has been realized in terms of relying on each country's participation in the total adjusted global GDP. Moreover, the distribution of countries and their respective participations has been concentrated; namely, at first the idea was to include 20 countries with the largest contribution to the annual global GDP (this conveniently corresponds to the trait of their participation in the global GDP being 1% or larger). The real global GDPs of these 20 countries, which combine both the advanced and the emerging economies situated worldwide, in total represent over 80% of the total real global GDP, which is a more than satisfactory scope having in mind the improvements it provides, being a simplified base for calculation which contributes to having adequate data faster, with a decreased probability of error, thus enabling and enhancing the verification process.[3] The countries that have been selected in the stated manner are included in the MMU model in two crucial manners. First and foremost, the exchange rates of these countries are included in a currency basket weighted by the appropriate participation of their respective countries, which results with an average global currency, as an authentic indicator of the average world economy.[4] As expected, its value is between the relative[5] values of currencies of the advanced economies, and the economies of the emerging and developing countries, as it will be further discussed in the Results section of this paper. The currency based indicator constructed in the described manner is the base for the MMU calculation. It includes actual market data, imported as the final or closing values for each currency pair on a selected day. During the MMU creation process, the predictability and sustainability of the world's overall real economic growth always should be regarded as the most important benchmark. That is why, in order not to let short-term shocks impact the MMU value, an average of 365 days has been established as the most appropriate for the sake of an adequate average value that will both buffer temporary volatility and also preserve the feature of relying on the current market data. Finally, this 365-day average has been established as the base for the final MMU calculation.

The second manner of inclusion of the selected countries' participation in the final MMU value is through a premium that will ensure slight and steady increase over time, to reflect the corresponding property of the growth of real global economy. This premium is based on the risk-free interest rates of government bond yields which also reflect the strength and the stability of the observed country's economy through country risk premiums.

[3] This is especially important having in mind that the first utilization of the MMU is planned for business purposes, and efficiency is an important trait in this process.

[4] On this point, a comparison to the existing concept of the SDR (*Special Drawing Rights*) is to be expected. However, the SDR are considered to be more politically fashioned in terms of the quantities of the currencies included in the basket, so the comparison is reasonable only in the terms of very general properties.

[5] Expressed in a chosen currency unit from the ones included in the basket; for the sake of this paper, all such data are presented in US dollars.

The amount of data for the model established in this way was rather substantial. Several issues came up during the calculations, such as year-to-year change in the list of top 20 countries in terms of real GDP and the availability of specific data (especially for government bond yields), among others. Therefore, eventually the number of included countries was reduced to 10[6], and this decision was supported by various significant advantages. The top 10 countries with largest real GDP are highly constant over time[7], with slight changes in participation; potential change of a country in the list would still result in including a large production economy with participation relatively smaller than the rest of the countries' in the basket. Moreover, the proportion of advanced and emerging economies is preserved, with all of them having participation over 2% in the real global GDP. In addition, the total participation of the top 10 economies' GDPs is stably around 70% of the real global GDP, which is another confirmation that the essence of the global economy is preserved in an extent significant enough, given the conveniences this alteration provides not only in the sense of more efficient data processing, but also in the terms of analyses and monitoring.

## Construction of MMU

The base for the MMU model is, as is mentioned, the currency based indicator (also referred to as the FX indicator) which is constructed as the average weighted value of the basket of currencies, representing the average global currency, and reflecting the relations between the major world economies included in the basket. In order to maintain the proportions of countries' participations, the exchange rates are weighted with quantities, calculated on the basis of elaborated adjusted participations of the included countries. This happens simultaneously with the automatic update of the real GDP data when the latest IMF database update becomes available. The adjustment of currency quantities is performed in the following manner:

$$Q_{cur} = part \,/\, fx_{USD/cur} \quad (1)$$

In the equation, $Q_{cur}$ is the calculated quantity of the specific currency, part the adjusted participation of the corresponding country in the global real GDP and $fx_{USD/cur}$ the exchange rate of the specific currency with respect to USD on the first day of the update (implemented on each 1st of January). The quantities are then constant until the following yearly update and as such included in the model.

Currency quantities adjusted as described above are then included as weights for corresponding currencies' values for determining the average basket level, i.e. the value of the currency based indicator. The final daily value of the indicator is determined as a moving average value of basket weighted averages for the current day and 364 previous days (a 365-day moving average). This time scope was selected as the most adequate for both preserving the property of data being current and achieving the required stability over time.

The historical data for the indicator constructed in this manner resulted with a stable trend with the property of slow increase over time. However, it still reacted to intrinsic volatility deriving from the fluctuations of currencies' relative strengths, and had significant short-term decreases within the overall trend of increase. At this point, government bond yields based premium was introduced to the model.

---

[6] For illustratory purposes, the 10 countries with the largest realized real GDP (constant 2010 prices) in 2019 are: Canada, China, France, Germany, India, Italy, Japan, Russia, United Kingdom and the United States of America. Since three of the selected 10 countries are in the EU, thus using Euro as their currency, there are 8 currencies in total in the MMU currency basket.

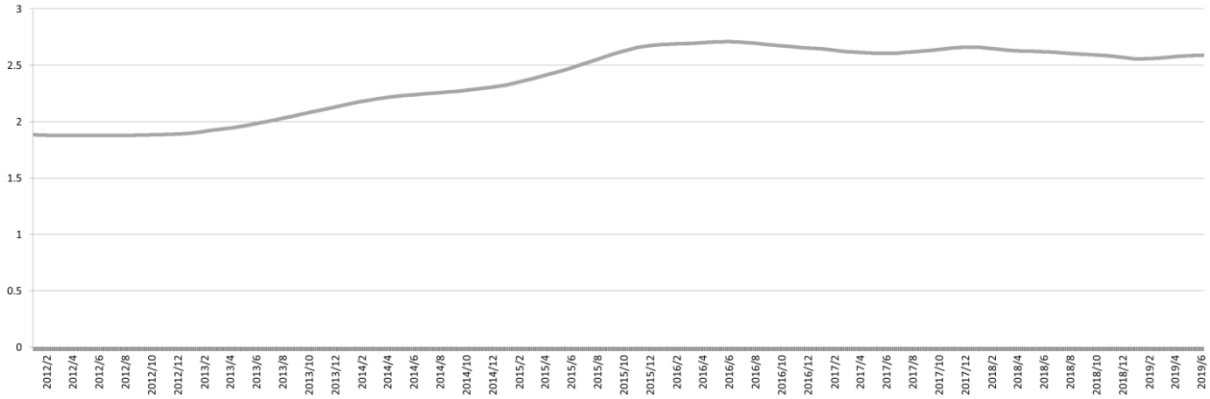
[7] Constant in the calculations period decided by data availability, since 2010.

The premium is developed as an average weighted average of the 10 year government bond yields of the countries in the basket. The data for the yields is updated daily, and the daily values for the basket daily average are stabilized through another implementation of a 365-day moving average. This 365-day moving average value of the average basket yield is calculated on a monthly basis. The application of the premium is devised as an alternative manner for development of the trend for the currency based indicator. It takes the starting historical value of the indicator and applies the premium gradually (on a daily basis), in order to result in an almost perfectly linear trend with highly stable incremental increase whose yearly rate corresponds to the average yearly value of the basket government bond yields premium.

The final value of the MMU indicator represents a daily average of the currency basket indicator value and the value devised from the premium-included indicator.

## RESULTS AND DISCUSSIONS

The following illustration presents the long-term trend of the currency basket based indicator:



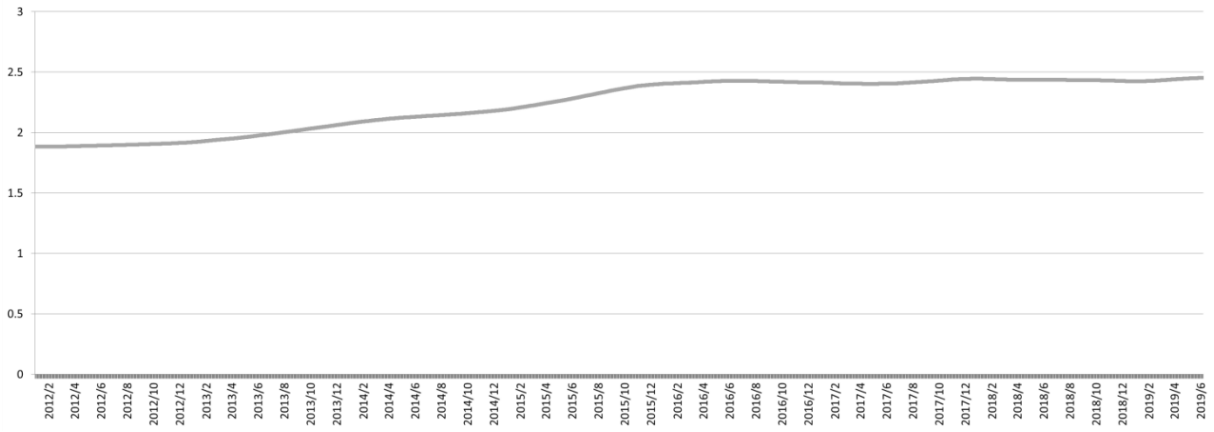

**Graph 3.** Currency Basket Indicator

*Source: Authors' Data*

The value of the indicator represents the average number of currency units in the basket required for converting one currency to another.

The trend is stable with the property of slow increase in the long-term perspective. However, the short-term decreases due to intrinsic volatility deriving from the fluctuations of currencies' relative strength, have a significant effect within the overall trend of increase.

The historical trend of the MMU, for which the development was elaborated in the Methodology section of this paper, is presented in the following illustration:




**Graph 4.** MMU Historical Trend
*Source: Authors' Data*

A conclusion can be derived that the model dynamics strongly correlates to the currency basket indicator's, keeping its fundamental properties with an intrinsic mechanism that ensures that the impact of the short-term market fluctuations is minimized and that the value of the MMU preserves the expected stability at any given moment as well as in the long term.

Fundamentally being a measurement unit, the MMU provides a solid base for numerous applications in the sense of indexation for the purpose of hedging.

## CONCLUSION

The Monetary Measurement Unit, an indicator that reflects the stable growth of the real global GDP and is based on monetary variables relying on current market data, whose creation and development have been presented in this paper along with the results, represents a sound candidate for a global measurement unit that could be used for hedging against price level volatility and currency risk, which is an intrinsic characteristic of the global financial markets.

The research required a rather substantial amount of data, both macroeconomic and market-based, that was processed and adjusted in the elaborated manner and included in the automated calculations that provided a long-term trend of the value of the indicator.

In the process of creation of this paper emerged a certain limitation. So far, to the best of our knowledge, there has been insufficient research on the topic of a global measurement unit. Hedging strategies were based on exploring options for a safe haven, strong hedge, weak hedge or at least diversifier. In this sense, this paper offers a valuable insight and suggestion and affirms the opportunity for future research.

## ACKNOWLEDGEMENTS

This paper is a result of a research conducted for the project "The MMU Algorithm" financed by Anchor AG, Switzerland.

## REFERENCES

**Aragó-Manzana, V., and Fernandez-Izquidero, M. A.** (2007). "Influence of structural changes in transmission of information between stock markets: A European empirical study." *Journal of Multinational Financial Management*, 17(2): 112-124.

**Backhouse, R. E.** (2005). "The Rise of Free MarketEconomics: Economists and the Role of the State since 1970." *History of Political Economy,* 37(1): 355-392.

**Caiani, A., Godin, A., Caverzasi, E., Gallegati, M., Kinsella, S., Joseph Stiglitz, J**. (2016). "Agent based-stock flow consistent macroeconomics: Towards a benchmark model." *Journal of Economic Dynamics and Control,* 69(1); 375-408.

**Grubel, H.** (1968). "Internationally Diversified Portfolios: Welfare Gains and Capital Flows." *The American Economic Review*. 58 (5): 1299-1314.

**Humphrey, T. M.** (1974). "The Concept of Indexation in the History of Economic Thought." *FRB Richmond Economic Review,* 60: 3-16.

**Ke, C., Wang, M.** (2019). "Is gold a hedge and safe haven for stock market?" *Applied Economics Letter*, 26(13): 1080-1086.

**Levy, H., M. Sarnat.** (1970). "International Diversification of Investment Portfolios." *The American Economic Review*, 60(4): 668-675.

**Mangram, M.E.** (2013). "A Simplified Perspective of the Markowitz Portfolio Theory." *Global Journal of Business Research*, 7(1): 59-70.

**Markowitz, H.** (1952). "Portfolio Selection." *The Journal of Finance*, 7(1): 77-91.

**Markowitz, H.** (1959). "Portfolio Selection: Efficient Diversification of Investments." New Haven, Connecticut: Yale University Press.



| *Article history:* | Received: May 31, 2020 |
|---|---|
| | Accepted: June 10, 2020 |