ASSET PURCHASE PROGRAMS IN EMERGING MARKETS AND DEVELOPING ECONOMIES DURING COVID-19

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Abstract

The Covid-19 pandemic has presented an unprecedentedly challenging time, especially for emerging markets and developing economics, which was hence inducive to the novel deployment of unconventional monetary policies, in particular asset purchase programs. This paper investigates the relationship between the government announcements of asset purchase programs of 14 emerging markets and the government bond yields using event study method. With fixed-effect regression method, the paper finds evidence in favour of asset purchase program's lowering impact on the government long-term bond yield, but this alone does not bring down the maturity rate of shorter-term ones. The paper therefore suggests that in a 1 to 2-day window, the announcement of asset buying schemes do work, but further investigation must be conducted for the long run macro effects on the economy.

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1 Introduction

The outbreak of Covid-19 pandemic has upset all economies, both in real economy and the financial market. For advanced economies, because they have exhausted their policy rate and to stimulate the economy and encourage lending, unconventional monetary policy are their options, leaning on measures such as forward guidance and large-scale asset purchase schemes to quickly interfere with interest rates. Their experience with unconventional monetary policy is not new, as the Global Financial Crisis 2007-2008 already made them resort to such measures. However, for emerging markets and developing economies, they have the option the combine both conventional and unconventional measures to handle the pandemic-induced market malfunctions and frozen trading. There is already voluminous research into unconventional monetary policy employed by advanced economies, especially US and Japan. However, studies on the effectiveness of such creative, desperate-situation-born monetary tools, in particular asset purchase program, on emerging economies are still limited.

Specifically, this paper looks at the cases of 14 developing economies, including Brazil, Hungary, Chile, Colombia, Croatia, India, Indonesia, Mexico, Philippines, Poland, Romania, South Africa, Thailand, and Turkey to measure the effectiveness of the announcement of asset purchase program on government fixed income securities, controlling for relevant factors. The paper uses a sample data of the mentioned 14 countries, recording asset purchase program announcements throughout the period from March 2, 2020, to August 4, 2020, with a total of 44 announcements and data on country-specific government bond yield level to calculate bond yield daily changes. The study uses fixed-effect panel regression to test the null hypothesis that the announcement of asset purchase plans from the central bank has no impact on the government risk-free bond maturity, controlling for possible intervening factors. The independent variable is therefore the announcement of the

planned event, and the dependent variables are the changes of government bond yield, 10-year, 5year and 1-year, 1 day before the announcement, 1-day and 2-day following the event.

The study finds strong evidence rejecting the null hypothesis and therefore confirming the lowering impact on government bond maturity of the announcement within 2 days following public statement with high confidence. The paper also finds that the effectiveness of the announcement is greater on longer-term bond yield, lowering the 10-year bond yield by the most units, compared to 5-year bond yield. However, while there is decreasing impact of asset purchase program on 1-year government bond yield, the regression results are not statistically significant. The paper also does not find statistically significant evidence for the spill-over effect of either the Federal Reserves (Fed) announcement of quantitative easing plans or domestic policy rate reduction across the countries in question. The central bank credibility, used only as an interaction term with the announcement dummy variable, despite yields negative impacts on the bond yield, does not yield a statistically significant coefficient either.

The paper is structured as followed: section 2 outlines the motivation for asset purchase program utilization in emerging markets. Section 3 provides a literature review. Section 4 describes the data used in this study. Section 5 explains the methodology in detail. Section 6 reports the results and Section 7 summarizes the findings and concludes with policy recommendation.

2 Covid-19 pandemic: an unprecedented situation

2.1 A disruption in both Financial Market and Real Economy

The Covid-19 pandemic has shocked the economies in a different transmission model, unparallel to any crisis in the history. During the onset of the Global Financial Crisis in 2007-2008, it was the financial markets that was hit first, and via the retrenchment in the liquidity market and the erosion

of business confidence, negative effects on the real markets were observed. On the contrary, the shock was reversed with the outbreak of Covid-19 pandemic: it was the extreme social distancing policies that disrupted the real economy first, which then spilled over to financial market (Bank for International Settlements 2020). A few months after the outbreak (March 2020), corporate bond yields in advanced economies skyrocketed; corporate IOUs, securitized mortgages and assets were paralyzed in several markets; stock prices slumped; and market volatilities surged (Hale et al. 2021). Sudden disruption in liquidity also led to disturbed fixed income asset markets. European sovereign bond spreads jumped significantly, while US Treasury long-term bond yield soared (Schrimpf, Shin, and Sushko 2020). For emerging markets and developing economies, severe Covid-19 containment actions halted their capital mobility, blocking any external financing, dragging down domestic foreign exchange rate, eventually crippling domestic financial situation (Hördahl and Shim 2020). As risk premium widened and business confidence crumbled, most emerging markets suffered from drastic sell-off of domestic bonds and spiking of government bonds (Hördahl and Shim 2020).

2.2 Conventional Monetary Policy as a Response from Emerging Markets and Developing Economies

Still having room to ease funding initiatives and boost demand, emerging markets, and developing economies were quick to deploy conventional monetary policies, including 1) interest rate reduction and 2) reserve ratio decrease to accommodate the situation (Cantú et al. 2021). Emerging markets and developing economies cut policy rate to an unprecedented level: the Central Bank of Turkey reduced their rate to 300 bps, which is the lowest compared to more than 200 bps reduction in interest rate practiced by banks of Brazil, Mexico, Peru, and South Africa; and at least 100 bps decrease by central banks of Chile, Colombia, Czech Republic, Hong Kong, Israel, India, the

Philippines, Poland, Russia, Singapore, United Arab Emirates and Vietnam (Hale et al. 2021). To contain more liquidity within domestic markets, emerging markets and developing economies reduced reserve ratio: Brazil dropped required reserve from 25% to 17%, China eased ratio to 200 bps (but conditioning on other requirements), and Turkey severely lowered from 20% to 0% (but only applicable to selected banks) (Cantú et al. 2021). To boost funding, other central banks resorted to accepting alternatives to bank deposit requirements, i.e., loans for small-and-medium-sized enterprises (the Bangko Sentral ng Pilipinas) and government bonds (central bank of Malaysia) (Hale et al. 2021).

2.3 Unconventional Monetary Policy as a Response from Emerging Markets and Developing Economies

As opposed to advanced economies' pre-existing records of unconventional monetary policies due to the 2007-2008 Global Financial Crisis, some, but not all, emerging markets and developing economies carefully introduced those measures in incremental implementation, including 1) forward guidance, 2) lending operations, and 3) nation-wide, large-scale public asset purchase programs – the focus of this paper.

Bank of Chile and Brazil released official government policy statement complemented with forward guidance elements (Cantú et al. 2021). Regarding lending operations, in the same paper, Cantú (2021) reported that central banks in emerging markets and developing economies cut rates, extended acceptable securitized assets and counterparties. In particular, central bank of Brazil eased the window of liquidity leveling, while central bank of Chile, Magyar Nemzeti Bank and Bank of Israel expanded eligible collaterals to corporate bonds, central bank of Colombia and Czech national bank loosened repo auctions participation requirement and leveling window to civilian funds (Cantú et al. 2021). In his database on central banks' response to Covid-19, some Asian banks (such as bank of Indonesia and Malaysia) were also reported to commit to targeting various market liquidity injection and boosting mutual funds.

Lending operations to directly cushion small-and-medium-sized enterprises were adopted by some Latin American, Eastern European, and Asian central banks (Hale et al. 2021). As per large-scale asset purchase program as the third unconventional monetary policy, along with timelines, transmission channels, and objectives will be discussed in detail in the following sections.

3 Literature Review

3.1 Transmission Channels of Asset Purchase Program

During normal, crisis-free situation, when policy rate is adjusted by the central bank, its stabilizing effects are, via portfolio-self adjusting behaviour of financial market participants, trickled down to both financial markets and eventually the real economy (Fratto et al. 2021). In times of Covid-19 pandemic, however, this mechanism was disrupted as the market was extremely turbulent, especially when government needs of liquidity borrowing surged unexpectedly, the public trust in usually risk-free assets like long-term government bonds deteriorated, and investors were quick to sell off these government debt to acquire more liquid assets, hence shifting even more pressure on public and private bonds (Gray et al. 2021). The expected transmission effect of policy rate adjustment was hence blocked, hindering the trickling down effect into aggregate demand of the whole economy. Therefore, during Covid-19, emerging markets and developing economies tended to conduct asset purchase program to stabilize and restore market functions, which is supposed to be achieved through 5 major channels (Fratto et al. 2021): 1) Direct channel, 2) Portfolio – rebalancing channel, 3) Signalling channel, 4) Liquidity channel, and finally 5) Exchange rate channel.

Via Direct channel, since asset purchases directly inject liquidity into the market, prices are expected to adjust accordingly. One of the most important channels is Portfolio – rebalancing channel, via which market participants will relocate their newly distributed liquidity across different assets within their portfolio (Fratto et al. 2021). According to Fratto (2021), the new flow of funds will then be transmitted throughout the market (if it is well-connected), loosening the credit situation and coordinating reasonable short-term interest rate expectation. A cut in interest rate does not only facilitate private sector lending and borrowing, but it also contributes to government support programs during Covid-19 pandemic, such as nation-wide vaccination campaigns, household income aids and small-and-medium enterprise lending access (Gray et al. 2021).

By making public statements about asset purchase intentions, the central bank also assure the general public of their transparent commitment to timely intervening the market or intention to pursue an accommodative policy during such unpredictable times, hence managing economic participants' anticipation of short-term interest rates and bringing down government bonds' term premiums, which are most exposed to external pressures (Fratto et al. 2021).

Asset purchase program, via Liquidity channel, raise the liquidity level and credit supply within the financial market participants, in particular financial institutions, and banks (Fratto et al. 2021). However, as noted in the same paper, Fratto (2021) observed that if asset purchase programs target offshore currency assets, such programs nonetheless may not bring down the cost of domestic financing, hence muddling with the programs' initial objectives.

It is however worth noticing that those channels are only theoretical, hence their real-time action when an asset purchase program is adopted rely heavily on country-specific conditions on the central bank's credibility and domestic bond active participation (signalling channel), market's international interaction (portfolio – rebalancing channel) and how much foreign investment existing in their financial markets (exchange rate channel) (Fratto et al. 2021).

3.2 Risks of Asset Purchase Program in Emerging Markets and Developing Economies

Despite the expected positive effects of initial phase of asset purchase program rollout, there are market functioning risks associated with Large-scale Asset Purchase Programs if continued implemented beyond the scope of crisis-induced extreme financial distress, especially for emerging markets and developing economies who do not have policy rate venturing near the Effective Lower Bound (Gray et al. 2021; Sever et al. 2020). The following associated risks are therefore considered (Hofman and Kamber 2020; International Monetary Fund 2020; Sever et al. 2020):

First, while implementing asset purchase programs, emerging markets, and developing economies risk weakening their institutional and central bank credibility, which is already a question posed for some central banks well before the Covid-19 strike (International Monetary Fund 2020). In the published book 'Bridge to Recovery', the International Monetary Fund commented that continued pursuit of asset purchase practices may expand government's long-term debt, exposing public balance sheet to vulnerabilities, eventually doubting their competency to raise interest rates if needed in the future. Simultaneously, well-anchored inflation expectation, sound central bank frameworks and public trust are the prerequisite foundations for successful asset purchase pursuit (Hofman and Kamber 2020). As evident from previous research, central banks having strong fiscal fundamentals and governance are correlated with better market resilience in times of crisis (International Monetary Fund 2020).

Second, asset purchase program raises the concern of deteriorated fiscal dominance of central governance (Gray et al. 2021). In other words, Gray, Sahay, Adrian and Erceg (2021) noted that if implemented beyond the dire pandemic-related financial distress, monetary goal fundamentals, i.e., price stability and anchored inflation, may be sacrificed to accommodate government fiscal ventures. Undesirable consequences of overused asset purchases can be overheated economy, inflationary pressures, and government debt (Sever et al. 2020).

Third, Sever (2020) observed that asset purchase program risks the exacerbation of capital flights if continued anticipation among market participants, especially for countries having fragile economic frameworks and easily vulnerable to external shocks. If not used in moderation, prolongation of asset purchase announcements may risk anchoring expectation among the public, further dragging down long-term bond yields and depreciating domestic currency, thus resulting in capital flights (Sever et al. 2020). Sever, Goel, Drakopoulos and Papageorgiou (2020) detailed that when investing in emerging markets, investors are therefore reluctant to pool capitals into those markets: low term premiums compared to similar developing economies, brittle economic groundwork, vulnerable to external distresses.

Last, central bank's intervention as buyer of last resort may present as a hindrance to market selfadjusted prices. Instead of a market corrector, excessive asset purchase plans turn the central bank into a market maker, distorting the functioning of the real economy and financial market (Sever et al. 2020). Overheated valuation, such as asset bubbles, may become an issue as an aftermath of asset purchase programs (Gray et al. 2021).

3.3 Results from existing Asset Purchase Program studies

There is already quite extensive existing literature on the effects of asset purchase program deployed by advanced economies. In particular, one of the most common methodologies used by previous research is event study, which affirms the effect of unconventional monetary policy on bond yield and term premia for US (Gagnon et al. 2011; Krishnamurthy and Vissing-Jorgensen 2011; Swanson, Reichlin, and Wright 2011). Krishnamurthy and Vissing-Jorgensen (2011) looked at the yields of US Treasury, agency and mortgage-backed securities and discovered evidence for purchases of mortgage-backed securities' negative effects on mortgage-backed securities yields, similarly with corporate asset risk and corporate yields. They also found Treasury purchases' disproportionate impacts on Treasury and agency bond yields compared to mortgage-backed securities and corporate bonds. Swanson, Reichlin and Wright (2011) studied the impact of Operation Twist and Quantitative Easing 2 on Treasury yields (3- month, 1-year, 2-year, 5-year, 10-year, and 30-year), agency and corporate bonds. They discovered statistically significant effects of Operation Twist on both long-term Treasury yields (approximately 15 basis point) and agency and corporate bond yields, at 13 basis point and 2-4 basis point, respectively. In another asset purchase program launched in US during the Global Financial Crisis presented further evidence on subsequent reduced long-term yields (on 2-year and 10-year Treasury, agency, and mortgagebacked securities yields), as well as risk premiums (Gagnon et al. 2011). Research in US additionally found diminishing risks neutral from options prices as an aftermath of state's acts of unconventional monetary policy measures (Roache and Rousset 2013). Within Euro area, the effects of the expanded asset purchase program launched by European Central Bank in 2014 are found the most significant on exchange rate, at the same time effectively cutting long-term riskfree bond yields (Briciu and Lisi 2015).

Another widely adopted methodology is vector auto-regressive (VAR), which is used to confirm the effects of unconventional macroeconomic policies on market condition in advanced economies (Gambacorta, Hofmann, and Peersman 2014; MacDonald and Popiel 2017; Weale and Wieladek 2016; Wu and Xia 2014). MacDonald and Popiel (2017) studied the effects of unconventional monetary policy measures during the zero-lower bound period on Canada and US's policy and exchange rate, as well as consumer price index, commodity prices and production indexes. Using S-VAR, they uncovered that both unconventional monetary policy measures implemented by Canada's and US's raised Canadian national output, at 0.13 percent and 1.2 percent respectively, implying spill over effects associated in such measures to Canada. Gambacorta, Hofmann and Peersman (2014) used panel VAR method to confirm an increase in economic transactions and general prices arose as an outcome of an increase in central bank assets in 8 advanced economies, by investigating various endogenous variables: log of seasonally adjusted real GDP, log of seasonally adjusted central bank assets and consumer price index. Weale and Wieladek (2016) adopted B-VAR modelling to draw a conclusion that for each 1% of GDP worth of asset purchase announcement made by the central bank, a statistically significant increase of 0.58% and 0.25% (in US) and 0.62% and 0.32% (in UK) in real GDP and CPI, respectively. Finally, Wu and Xia (2014) adopted factor-augmented VAR methodology to find evidence to support that during the effective-lower bound period (2009-2023) in US, unconventional monetary policy launched by Fed did bring down the unemployment rate by 1% as the lowest rate.

While there is sufficient research on the impacts of unconventional monetary policy on advanced economies, there has been only limited studies focusing on the emerging markets and developing economies. On average, based on literature concentrating specifically on emerging markets, the central bank's announcement of bond purchase statistically and significantly brought down benchmark bond yields (Arslan, Drehmann, and Hofmann 2020; Hartley and Rebucci 2020). In particular, Hartley and Rebucci (2020) deployed event study methods to study the impacts of asset purchase program announcements on 10-year bond yield in both emerging and developed markets. They found that while there was a statistically significant negative impact of -0.14% on 10-year bond yield, followed by 1 day after the Quantitative Easing announcements in developed markets, the average effect in developing economies was remarkably larger, of -0.28% to -0.43% followed by 1 and 3-day after the announcement. Arslan, Drehmann, and Hofmann (2020), using event study method to 13 emerging markets (Chile, Colombia, Hungary, India, Indonesia, Korea, Mexico, Poland, Romania, Philippines, South Africa, Thailand, Turkey), found that 10-year bond yield was reduced intra-day with the announcement, averaging 10 basis point, and continued to fall up to 50 basis point in the next 5 trading days. After 5 days, controlled for confounding factors, the effect diminished at approximately 25 basis points. They also observed that the asset purchase program announcement affected exchange rate: while domestic exchange rate against the US dollar by 1% on average before the announcement and remained stabilized for 5 days followed the announcement, but this effect is different for each country in concern. The effects of unconventional monetary policy are further examined, in the context of potential spill-over effects(Falagiarda, McQuade, and Tirpák 2015; International Monetary Fund 2016; Rai and Suchanek 2014). The cross-country report on spill-over effects of unconventional monetary policy launched both European Central Bank and Fed by International Monetary Fund (International Monetary Fund 2016) to selected non-euro included: Czech Republic, Hungary, Denmark, Poland, and Sweden. Falagiarda, McQuade and Tirpak (2015) found substantial evidence spill-over effects of European Central Bank's unconventional monetary policy on bond yields in selected countries: Czech Republic, Hungary, Poland, and Romania. In particular, Securities Markets Program

announcements delivered the most spill-over effects, while Outright Monetary Transaction and Public Sector Purchase Program announcements' effects were not substantial (Falagiarda, McQuade, and Tirpák 2015), supporting the signaling and portfolio rebalancing channels. Sever, Goel, Drakopoulos, and Papageorgiou (2020) confirmed Fed's Quantitative Easing announcements' spill-over effects to emerging markets by improving their long-term bond yields and equity market, controlling for other factors, such as global risk aversion, borrowing costs and domestic policy rate cuts (Sever et al. 2020). However, spill-over effects were only limited. Finally, the report conducted an event study to explore first the presence of European Central Bank's unconventional monetary policy in these selected countries and found declining long-term bond yield after 2 days following the unconventional monetary policy announcements, averaging 1.5 to 2.5 basis point, with emerging economies experiencing larger effects compared to advanced markets. Country-level VAR results re-affirm spill-over effects of European Central Bank's unconventional monetary policy via sovereign bonds similar to previous studies, and currencies are impacted by fluctuations in euro area premium spreads, but evidence of spill-over are not found.

3.4 Timeline and Objectives of Asset Purchase Program Announcements by Emerging

Markets and Developing Economies during pandemic period

Having experience during the Global Financial Crisis, only 40% of asset purchase announcements in advanced economies are newly drafted, compared to more than 90% in developing economies (Cantú et al. 2021). Before Covid-19 crisis, there were only two asset purchase programs existing in emerging markets, namely the Hungarian bond funding scheme and the government securities swap launched by Colombian central bank (Cantú et al. 2021).

In fact, asset purchase programs are of major importance, if not equal to liquidity facilitation and debt funding, in crisis controlling, as opposed to its limited role in emerging markets (Arslan,

Drehmann, and Hofmann 2020). Bond purchase programs launched in advanced economies are designed to provide credits to businesses, restore market functioning and accommodate other monetary schemes more effectively as their policy rates have reached the effective lower bound (Arslan, Drehmann, and Hofmann 2020). On the contrary, objectives of bond purchase programs designed by developing economies are not only to stimulate monetary transmission within the disrupted economy and support credit lending, but also via signalling channel, to announce to the public of central bank's position as buyers of last resort, and to restore investors' trust in the government (Arslan, Drehmann, and Hofmann 2020).

For developing economies, as mentioned above, 90% of their asset purchase programs during the pandemic are newly drafted, hence almost of asset types are bonds, and rarely swap operations and short-term bill sales were included (Arslan, Drehmann, and Hofmann 2020). As opposed to advanced economies where most asset purchase programs are large-scale, the scale of such programs in emerging economies is relatively modest, at the minimum of merely 0.1% and maximum of 2.8% of GDP (if they even announced their program size) in South Korea and Chile, respectively.

Emerging markets in Latin America Chile and Colombia are the only countries in Latin America that involved in purchasing private assets, which were commercial bank bonds, amounting up to USD 8 billion and USD 1 trillion respectively (Cantú et al. 2021). Chile launched two asset purchase programs, one engaged in spot purchase and bank bonds forward sale, while the other conducted bank deposit re-buying. As governments in Latin American nations had engaged in debt financing leading to rampant long-term hyperinflation in the past, most central banks were hesitant to adopt debt financing, except for Colombia in secondary market, amounting up to USD 500 million. Central banks of Brazil, Colombia and Mexico were involved in longing long-term

bonds and shorting short-term securities, while Chile absorbed their government bonds from primary market (Cantú et al. 2021).

In growing Asian economies, bank of Thailand absorbed investment-grade bonds having 2020-2021 maturity, providing credits to businesses, and seeking to rectify domestic corporate bond markets. The Magyar Nemzeti Bank purchase mortgage-backed bonds, and Bank of Israel absorbed corporate bonds from the market. Other parts of Asia were involved in government bonds purchase in both primary (bank of Indonesia) and secondary market (central banks of South Korea, the Philippines, Thailand, and India) in an attempt to manage the costly aftermath of the pandemic and support economic recovery. In Eastern Europe, several banks (Hungary, Israel, Poland, and Romania) and in South Africa, purchase of government bonds in secondary markets were observed as a measure to inject credits and restore the disrupted transmission of monetary policy into financial markets and real economy. Turkish central bank expanded financing access by accepting government bonds from banks (Cantú et al. 2021).

A summary of emerging markets' objectives and implementation of asset purchase programs, along with country-specific foreign exchange regime and central bank transparency index are provided below (Arslan, Drehmann, and Hofmann 2020; Fratto et al. 2021):

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Country	Date of press release	Objectives	Foreign exchange regime ¹	Central bank transparency index ²	Total size of the program (% of GDP)	Asset types	Buying types
Brazil	26/06/2020	To mitigate the negative impacts of Covid-19 pandemic on the private lending market with comprehensive liquidity provision, especially on the market hit the hardest	Floating	9	2.8	Bank bonds	Outright purchase by central bank
Brazil	21/07/2020	To improve the efficiency of other intervention measures taken by central bank as a counteraction against Covid-19 pandemic's toll on domestic economic situation Additional asset purchase program is announced to foster a transparent public communication, securing favorable conditions for other monetary actions to ease credit tightening issue in the economy	Floating	9		Bank bonds	Outright purchase by central bank

¹ Foreign exchange regime⁵: the information on country-specific foreign exchange regime is extracted from 2017 Annual Report on Exchange Arrangements and Exchange Restrictions (International Monetary Fund 2018)

² Central bank transparency: the Central Bank Transparency Index is obtained from Central The Central Bank Transparency Index (Dincer and Eichengreen 2013). Dincer and Eichengreen 2013) determined a country's central bank transparency as a sum of the scores of answers to questions regarding criteria: 1) political transparency, 2) economic transparency, 3) procedural transparency, 4) policy transparency, 5) operational transparency. The maximum score is 15 and the minimum is 0. The author controls for this variable as the effectiveness of asset purchase programs may vary depending on the credibility of the central bank – signalling channel is in action at this stage.

market turbulence on government risk-free securities market	and bank purchase bonds by central bank
Chile08/04/2020To contain the normal functionality and restore the proper circulation of credit within domestic marketFloating7.5	Government Outright and bank purchase bonds by central bank
Colombia23/03/2020To revive the normal financial market mechanism amidst crisesFloating6.50.8	GovernmentOutrightand bankpurchasebondsby centralbank
Colombia14/04/2020To boost liquidity provision and maintain a liquid public securities marketFloating6.5	Government Outright and bank purchase bonds by central bank
Hungary 16/03/2020 To raise liquidity level in banking sector Floating 13.5 N/A	Government Outright and purchase mortgage by central bonds bank
Hungary07/04/2020To enhance the liquidity level in government risk- free bond market and improve available liquidity To pprovide fundings to banks as a long-term supplierFloating13.5	Government Outright and purchase mortgage by central bonds bank
Hungary28/04/2020To restore the damaged transmission of monetary policy due to Covid-19 pandemicFloating13.5To contain any financial damages to the financial markets due to the pandemicTo contain any financial damages to the financialImage: Contain any financial damages to the financialImage: Contain any financial damages to the financial	GovernmentOutrightandpurchasemortgageby centralbondsbank
Country Date of press Objectives Size of C	e (%Asset typesBuying typesSDP)

Hungary	21/07/2020	To provide the public an emergency support, which is expected to be extended if necessary To enhance the transmission of monetary policy, damaged by the pandemic To reinforce the prolonged duration of sovereign debt	Floating	13.5		Government and mortgage bonds	Outright purchase by central bank
India	18/03/2020	To assure of a liquid, robust and efficiently operating market in all industry sectors	Floating	4.5	0.2	Government bonds	Outright purchase by central bank and Bond purchases funded by short-term paper sales
India	20/03/2020	To assure of a liquid, robust and efficiently operating market in all industry sectors with sufficient trading volumes	Floating	4.5		Government bonds	Outright purchase by central bank and Bond purchases funded by short-term paper sales
India	23/03/2020	To assure of a liquid, robust and efficiently operating market in all industry sectors with sufficient trading volumes	Floating	4.5		Government bonds	Outright purchase by central bank and Bond purchases funded by

							short-term paper sales
Indonesia	02/03/2020	To mitigate systemic risks and domestic currency vulnerability to Covid-19 disruption, as measures to contain monetary and financial market exposure To ensure the Rupiah exchange rate's fundamental principles remaining intact, as well as that of market dynamics	Floating	4.5	N/A	Government bonds	Outright purchase by central bank and Bond purchases funded by short-term paper sales
Indonesia	19/03/2020	To mitigate systemic risks and domestic currency vulnerability to Covid-19 disruption, as measures to contain monetary and financial market exposure To ensure the Rupiah exchange rate's fundamental principles remaining intact, as well as that of market dynamics	Floating	4.5		Government bonds	Outright purchase by central bank and Bond purchases funded by short-term paper sales
Indonesia	31/03/2020	To support other policies managing Covid-19 disruptive impacts on the robustness of financial trading operation	Floating	4.5		Government bonds	Outright purchase by central bank and Bond purchases funded by short-term

							paper sales
Country	Date of press release	Objectives			Size (% of GDP)	Asset types	Buying types
Indonesia	21/04/2020	Asset purchase program launched by the government is necessary to serve as an emergent fundings to restore domestic economy and contain nation-wide financial operation amidst a pandemic- related monetary crisis, which includes the auction of long-term Government Debt Securities (SUN) and/or Government Islamic Securities (SBSN) in the primary market. Such practices are according to Bank of Indonesia's guiding fundamentals as 'buyer of last resort,' in situations where market has already reached its capacity to self-adjust, causing securities maturity yield too high	Floating	4.5		Government bonds	Outright purchase by central bank and Bond purchases funded by short-term paper sales
Indonesia	06/07/2020	To support the general government policies in controlling the damaging scope of Covid-19 as attempts to restore domestic economic performance	Floating	4.5		Government bonds	Outright purchase by central bank and Bond purchases funded by short-term paper sales

Mexico	20/03/2020	To expand debt issuances, inject liquidity to boost trading operation, and speed up the recovery of normal market self-adjusted pricings mechanism To maintain the crucial market participation of financial entities and operation of risk-free government bonds market	Floating	9	N/A	Government bonds	Bond purchases funded by short-term paper sales
Mexico	21/04/2020	To revive the credit supply of the market To counteract damaged trading environment in secondary market induced by lack of liquidity available due to Covid-19-provoked unpredictability and turbulence To liquidate and re-establish trading vehicles To repair Mexico's securities market, which was impaired by the crisis	Floating	9		Government bonds	Bond purchases funded by short-term paper sales
Country	Date of press release	Objectives			Size (% of GDP)	Asset types	Buying types
Poland	16/03/2020	To re-establish the impaired cash flow composition in both private and public banks To partly liquidate government long term securities in secondary market	Floating	6	N/A	Government bonds	Outright purchase by central bank
Poland	08/04/2020	To help boost the effectiveness of government policy rate cuts as measures to revive the normal	Floating	6		Government bonds	Outright purchase

		transmission channels of conventional monetary policies To provide liquidity for asset buying in secondary market To assist the re-structuring of cash flow compositions within both private and public banks					by central bank
Poland	28/05/2020	To help boost the effectiveness of government policy rate cuts as measures to revive the normal transmission channels of conventional monetary policies To provide liquidity for asset buying in secondary market To assist the re-structuring of cash flow compositions within both private and public banks	Floating			Government bonds	Outright purchase by central bank
Poland	14/07/2020	To help boost the effectiveness of government policy rate cuts as measures to revive the normal transmission channels of conventional monetary policies To provide liquidity for asset buying in secondary market To assist the re-structuring of cash flow compositions within both private and public banks	Floating	6		Government bonds	Outright purchase by central bank
Country	Date of press release	Objectives			Size (% of GDP)	Asset types	Buying types
Romania	20/03/2020 29/05/2020	To fund the actual economy and business sector's operation via the integration of liquidity fundamentals in systemic banking sector To lift the shortage of funds and disrupted cash flow in money market and enhance a well-functioning financial market	Stabilized arrangement	10.5	N/A	Government bonds	Outright purchase by central bank

Philippines	10/04/2020	To encourage active involvement in trading activities by regaining trust in market participators and partners To regulate government risk-free, long-term assets if needed	Floating	6	N/A	Government bonds	Outright purchase by central bank
South Africa	25/03/2020	To further ease the credit tightening issue existing in domestic market To inject more liquidity to financial market and restore the smooth transmission channels of the actual economy To further boost public monetary policy portfolio as a financial instrument regulating market available funds To indirectly lower the borrowing cost To effectively curb price fluctuation of government fixed income assets market To achieve seamless operation of government long term, fixed income bond market	Floating	7.5	N/A	Government bonds	Outright purchase by central bank
Thailand	17/03/2020	To reduce fluctuations in government fixed income asset maturity rate and enhance its usual, normal functioning role To make sure that sufficient fundings and liquidity provision from central bank can reverse deteriorating investors' trust and confidence in the financial market	Floating	7.5	0.6	Government and corporate bonds	Outright purchase by central bank
Thailand	22/03/2020	To encourage private investment in A-grade quality, freshly rolled-out corporate bonds To provide liquidity and re-establish a well- funded, functioning financial market To reverse deteriorating investors' trust and confidence in the financial market	Floating	7.5		Government and corporate bonds	Outright purchase by central bank
Thailand	07/04/2020	To provide liquidity safety net, provide bridging instruments to monetize high quality business with	Floating	7.5		Government and	Outright purchase

		corporate bonds, set to mature between 2020 and 2021				corporate bonds	by central bank
Turkey	31/03/2020	To expand credit access and loosen liquidity requirements to banking sector To regulate asset evaluation amidst high market volatility and price distortion To reverse the damaged monetary transmission channels	Floating	10	N/A	Government bonds	Outright purchase by central bank
Turkey	17/04/2020	To control market trading volumes and assist the effectiveness of other monetary policies To regain the seamless credit transmission mechanism	Floating	10		Government bonds	Outright purchase by central bank

Table 1: Summary of emerging markets' implementation of asset purchase programs

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4 Data

The sample includes 14 emerging markets and developing economics (Brazil, Hungary, Chile, Colombia, Croatia, India, Indonesia, Mexico, Philippines, Poland, Romania, South Africa, Thailand, and Turkey) with asset purchase program announcements spreading from March 2020 (March 2, 2020, is the earliest date of announcement from Indonesia) to August 2020 (August 4, 2020, is the last recorded date of announcement from Chile).

The paper will use 3 dependent variables for analysis: *10-year bond yield*, 2) *5-year bond yield*, and 3) *1-year bond yield*. The data on bond yield (in percentage) is sourced from Bloomberg. Change in bond yield is calculated in percentage.

The paper runs panel regressions to examine intra-day, 1- and 2-day impact on 10-year, 5-year and 1-year government bond yield following the announcement date of asset purchase program across countries.

The paper will also control the following variables:

• *Federal Reserve's announcement on Quantitative Easing scheme:* on March 23, 2020, as a plan to counteract Covid-19 and further monitor market conditions, the Federal Reserves announced several purchases of agency commercial mortgage-backed securities and agency mortgage-backed securities (Federal Reserve issues FOMC statement n.d.) Along with newly purchases of private securities, Federal Reserves of US also committed to open market purchases of large-scale asset programs and other term agreements (Federal Reserve issues FOMC statement n.d.).

• *Policy rate*: lastly, as all the selected 14 countries have not reached the effective lower bound yet, the central bank still has the capacity to cut policy rate as a popular conventional

monetary policy. This paper controls for this factor in case there is any policy rate cut coincides with asset purchase program announcement, hence possibly interfering with the impact of asset purchase program.

• *Interaction terms*: the paper also investigates whether and to what the degree central bank credibility possibly have an impact on the dependent variable by including the interaction between these variables (information on their sources are already mentioned above, in table 1, under footnote) with the announcement event.

5 Methodology

First, to examine whether the announcement of asset purchase program has any impacts on the bond yields of the selected 14 countries, the paper will compare the government bond yield (long-term, 10-year, 5-year, and 1-year) on the day of announcement with one day prior to the announcement. The same method will be repeated to capture the dependent variable on the day of program announcement with that after 1 day and 2 days after the event. This paper uses fixed effect panel regression model, which captures any unobservable heterogeneity across the sample, to test the null hypothesis that the announcement of asset purchase program does not have any impact on the changes in bond yield on a daily basis.

To simplify the question, let us denote 2 days the day before announcement day as t = -2, one day before the announcement day is t = -1, the day of announcement day as t = 0, 1 day after announcement day is t = 1, and 2 days following the event is t = 2.

The change of bond yield before the announcement day is therefore:

$$\Delta bond yield_{before} = bond yield_{t=-2} - bond yield_{t=-1}$$

The change of bond yield within the day of announcement, compared to 1 day before is:

$$\Delta bond yield_{previous day} = bond yield_{t=0} - bond yield_{t=-1}$$

The change of bond yield 1 day following the announcement day, compared to 1 day is:

$$\Delta bond yield_{1 day} = bond yield_{t=1} - bond yield_{t=-1}$$

The change of bond yield 2 days following the announcement day, compare to 2 days before is:

$$\Delta bond yield_{2 day} = bond yield_{t=2} - bond yield_{t=-1}$$

Therefore, the fixed effect panel regression the paper looks at will be followed:

$$\Delta bond \ yield = \alpha + \beta Before. \ After + \gamma \Delta CB. \ Pol. \ Rate + \delta \Delta Fed$$
$$+ \theta Before. \ After \times Central \ bank \ transparency + \varepsilon$$

Note that as the paper investigates daily changes, domestic policy rate cut, and both ΔFed and *CB*. *Pol*. *Rate* dummy variable varies accordingly. Therefore, the complete panel regression for each scenario will be:

Previous day-comparison regression formula:

 $\Delta bond yield_{previous day}$

 $= \alpha + \beta. Before. After + \gamma \Delta CB. Pol. Rate_{previous \, day} + \delta \Delta Fed_{previous \, day}$ $+ \theta Before. After \times Central \, bank \, transparency + \varepsilon$

1-day regression formula:

 $\Delta bond yield_{1 day}$

 $= \alpha + \beta. Before. After + \gamma \Delta CB. Pol. Rate_{1 day} + \delta \Delta Fed_{1 day}$ $+ \theta Before. After \times Central bank transparency + \varepsilon$

2-day regression formula:

 Δ bond yield_{2 day}

 $= \alpha + \beta.Before.After + \gamma \Delta CB.Pol.Rate_{2 day} + \delta \Delta Fed_{2 day}$ $+ \theta Before.After \times Central bank transparency + \varepsilon$

In which:

• $\Delta bond yield$ is the change in government bond yield. This regression will be run for 3 dependent variables: 10-year government bond yield, 5-year government bond yield, 1-year government bond yield.

• *Before. After* uses the dummy variable for the day of announcement. To measure intraday impact of the announcement, '1' will denote the day of announcement while '0' will denote 1 day prior. Note that this '0' remains the same for 2 other regressions, in which '1' denotes 1 day after the event (for 1-day impact measurement) and 2 days following the announcement (for 2-day effect test).

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• $\Delta CB. Pol. Rate$ uses the dummy variable to capture the changes in country-specific domestic policy rate (in percentage) according to the dates in concern: '0' denotes no change, and '1' denotes otherwise. These variables vary depending on which regression is concerned.

• ΔFed also uses the dummy variable to check if there is any coincidence of daily bond yield with the day of Fed Quantitative Easing announcement (March 23, 2020). This paper denotes any domestic asset purchases announcements of emerging markets in concern that coincide with Fed's announcement as '1' and '0' otherwise. Similar to *CB*. *Pol*. *Rate*, this variable varies depending on scenario.

• *Before*. *After* × *Central bank transparency* is the interaction term between central bank credibility with the announcement.

6 Results

6.1 Previous-day comparison analysis

The table below explores the effect of the announcement of asset purchase plan on changes of 10year, 5-year and 1-year bond yield, within the day of the announcement, compared to previous change 1 day before the announcement. It is clear that the announcement of asset purchase program had a statistically significant negative impact on intra-day changes of all 10-year, 5-year and 1-year bond yield. Evidently from the general regression result from 10-year and 5-year bond yield, the Before. After variable, in other words, the bond-yield lowering impact of the announcement of asset purchase program on the day of statement compared to before the event, is statistically significant at a very high confidence level (99.9%). Controlling for other variables (Fed announcement of its quantitative easing plan and domestic policy rate cuts), 10-year and 5-year government bond yield dropped by 0.36 and 0.29 units respectively within the day of asset purchase program announcement at a 0.001 significant level. The R-square for 10-year bond yield is 0.3552 implying that 35.52% of the previous-day comparison variability in 10-year bond yield can be attributed by the model. The explanatory power within 1 day of the announcement on 5-year bond yield is even higher, which can explain more than 60% of variance. Albeit weaker compared to the effect on longer term government securities maturity, the within-day bond yield lowering effect of announcement of asset buying plan is still statistically significant at 90% confidence level, with lower R-square at 0.139. At the same day of the press release of asset purchase plan, the 1-year bond yield decreased by 0.08 units. The model as a whole has a low p-value of 0.01416, indicating that it is statistically significant. Other independent variables, which are the announcement of Fed quantitative easing plan and central bank policy rate cut, do not have any statistically significant effect on the dependent variable.

	10-year bond	5-year bond	1-year bond	
Before.After	-0.361416***	-0.294228***	-0.081850*	
ΔFed	0.065163	-0.073619	-0.003221	
$\Delta CB. Pol. Rate$	0.307146	0.212988	-0.072996	
Before.After × Central Bank transparency	-0.043165	-0.005892	-0.007230	
factor(Country) Chile	0.025864	0.085633	0.046502	
factor(Country) Columbia	0.031358	0.182325	0.057485	
factor(Country) Croatia	-0.385637	-1.093118**	0.100803	
factor(Country) Hungary	-0.016218	-0.030274	0.012618	
factor(Country) India	-0.024123	0.045760	0.005930	
factor(Country) Indonesia	0.132523	-0.014489	0.155403	
factor(Country) Mexico	-0.092237	0.083884	0.029419	
factor(Country) Philippines	-0.032938	0.007516	0.015338	
factor(Country) Poland	-0.172276	-0.011391	0.027452	
factor(Country) Romania	-0.358365	-1.086405***	0.125431	
factor(Country) South Africa	-0.501761	-0.462253*	0.054094	

factor(Country) Thailand	-0.011420	0.005089	0.057249
factor(Country) Turkey	0.021229	0.399411**	-0.090446
R^2 (whole model)	0.3552	0.6024	0.139
p - value (whole model)	0.01416	4.026e-08	0.8729

Note : Significant level: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' '1

Table 2: Effect of asset purchase program announcement on 10-year, 5-year and 1-year bond yield

6.2 1-day analysis

Table 3 below describes the outcomes of the panel regression on the effect of the asset purchase program announcement on government risk-free securities, following 1 day later. The results confirm the decreasing impact of the asset purchase announcing event on 10-year and 5-year bond after 1 day at very high confidence level (99.9%), controlling for other factors. The R-square of 10-year and 5-year bond yield is also high, implicating the impact of asset purchase program announcement can explaining 40.68% and 53.92% of bond yield variance, respectively. In details, regression results show that the central bank asset purchase statement had an effect of lowering 10-year and 5-year bond yield by 0.45 and 0.36 units, statistically significant at 99.9% confidence level. The units change in long-term bond yield after 1 day is in fact larger than that of intra-day. The p-value of the whole regression for 10-year and 5-year bond yield are very low, indicating a statistically significant model. However, although the results also indicate a decreasing effect on 1-year bond yield, it is not statistically significant. While the policy rate reduction and the interaction between central bank transparency and the event both are reported to have a decreasing effect on bond yield, it is not statistically significant.

	10-year bond	5-year bond	1-year bond
Before. After	-0.449199***	-0.35869***	-0.064273
ΔFed	NaN	NaN	NaN
$\Delta CB.$ Pol. Rate	-0.040892	-0.20984	-0.153654
Before.After × Central Bank transparency	-0.042409	-0.008294	-0.002002
factor(Country) Chile	-0.021336	0.11378	0.049484
factor(Country) Columbia	-0.100616	0.08035	0.087862
factor(Country) Croatia	-0.593256	-1.18124**	0.123269
factor(Country) Hungary	-0.078255	-0.04072	0.059880
factor(Country) India	-0.048508	0.13423	0.039751
factor(Country) Indonesia	-0.003453	0.09353	0.192231
factor(Country) Mexico	-0.107446	0.12357	0.079731
factor(Country) Philippines	-0.058589	0.08722	0.048884
factor(Country) Poland	-0.149693	0.02659	0.052579
factor(Country) Romania	-0.510882	-1.29192**	0.129706
factor(Country) South Africa	-0.715070	-0.65354*	0.074954
factor(Country) Thailand	-0.038238	-0.04519	0.084645
factor(Country) Turkey	0.119363	0.36218	-0.037295
R^2 (whole model)	0.4068	0.5392	0.1593
p - value (whole model)	0.001203	1.246e-06	0.7088

Note: Significant level: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 '' 1

No coincidence with Fed announcement in this 1-day impact regression, hence 'NaN' outcome of Fed independent variable

Table 3: 1-day effect of asset purchase program announcement on 10-year, 5-year and 1-year bond yield

6.3 2-day analysis

The table below reports the regression result on two-day effect of central bank's notice of asset purchase program on government fixed-income securities. The result confirms the impact of central bank's statement on long-term bond-yield, which reports a decrease in 10-year and 5-year bond yield by 0.48 and 0.37 units respectively after 2 days of program public statement, statistically significant at 99.9% confidence level, controlled for confounding factors. The R-square for these two long-term fixed-income assets is also high, implying high explanatory power of the model: 45% and 50% of variance in 10-year bond yield and 5-year bond yield can be explained by the model respectively. On the other hand, although negative, the impact of asset buying declaration from central bank to the public after 2 days on 1-year bond yield is not statistically significant, but rather, the policy rate reduction does, at 0.05 significance level. Other independent variables report no statistical significance.

	10-year bond	5-year bond	1-year bond
Before. After	-0.481059***	-0.370707***	-0.048859
ΔFed	0.232922	0.139059	0.046366
$\Delta CB.$ Pol. Rate	-0.062913	-0.116239	-0.189635*
Before. After × Central Bank transparency	-0.042425	-0.006884	-0.004757
factor(Country) Chile	-0.028295	0.146486	0.025863
factor(Country) Columbia	-0.229634	-0.035923	0.029539
factor(Country) Croatia	-0.301635	-1.037158*	0.015245
factor(Country) Hungary	-0.161659	0.002662	0.050979
factor(Country) India	0.004267	0.034633	-0.057166
factor(Country) Indonesia	0.066255	0.069159	0.140472
factor(Country) Mexico	-0.124052	0.071506	0.042207
factor(Country) Philippines	-0.003061	0.050392	-0.015153
factor(Country) Poland	-0.155314	0.039889	0.060415
factor(Country) Romania	-0.327411	-1.116240*	0.101685
factor(Country) South Africa	-0.498251	-0.524201.	0.020353
factor(Country) Thailand	-0.022752	-0.019034	0.066157
factor(Country) Turkey	0.219187	0.393369	0.013134
R^2 (whole model)	0.4506	0.5021	0.159
p - value (whole model)	0.0003197	2.395e-05	0.7746

Note: Significant level: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 4: Two-day effect of asset purchase program announcement on 10-year, 5-year and 1-year bond

7 Conclusion

7.1 Summary of Results and Further Study

Results from the fixed effect panel regression affirms the lowering effect of the announcement of asset purchase program in 14 selected emerging markets (Chile, Colombia, Croatia, Hungary, India, Indonesia, Mexico, Philippines, Poland, Romania, South Africa, Thailand, and Turkey) during Covid-19 pandemic, at the day of, 1 day and 2 days following the statement on long term government bond yield, in particular 10-year and 5-year bond. The effect of asset purchase program announcement on longer-term bond yield is also found to be larger. In all three situations (previous bond yield difference comparison, 1-day and 2-day comparison), the units change of the concerned dependent variable in case of 10-year bond yield change are consistently larger than those of 5-year. For the shortest-term government bond that this paper investigates (1-year bond), results show no statistically significant impacts of asset purchase program statements across these developing markets, at any time of or any days after the announcement. The results also highlight larger impacts of the announcement as days passed, when the units change in bond yield widens after each day following the announcement. While not statistically significant, high central bank transparency steadily has a decreasing effect on all government bond yields, regardless of which time (compared with previous day before, 1 or 2 days following the announcement). Other independent variables, Fed announcement of quantitative easing and domestic policy rate cut, have inconsistent impact on the bond yields, statistically insignificant.

However, this paper's findings may be attributed to the model's choice of anchoring comparison point, which is the change in bond yield 2 and 1 day *before* the announcement. When looking at the daily bond yield before the announcement, the paper keeps in mind that under the Covid-19 turmoil, most government bond yields are observed to surge quickly and severely, hence the change in

dependent variable is positive and substantial at that point of chosen time. If the anchoring comparison is different, for example, change in 1 day before and the exact day of announcement, findings may have been different to some extent, albeit in the same direction.

There are also limitations of the model. First, the model fails to consider one important factor impacting government fixed income assets that are widely discussed in the literature: public's outlook and expectation of the macro economy condition. In major contribution of the study of effects of unconventional monetary policy, to capture the first factor mentioned, authors tend to use VIX index as a financial metric to gauge market expectation of near-future volatility and potential price fluctuation, which tend to rise during times of turbulence and stabilize otherwise. Another factor that the paper wishes to include in the regression model is the magnitude of domestic inflation rate change, using metrics such as Consumer Price Index or Producer Price Index. Furthermore, the sample used by the paper is small, thus further studies on the same subject can be improved tremendously given more updated data. Last, as the paper only studies the immediate impacts, it has not covered the aftermath of bond yield development *after* the actual implementation, so obviously deeper research into how this unconventional measure performs in the longer run is needed.

7.2 Policy Recommendation for Emerging Markets and Developing Economies

From the results of the regression model, paper can reassure policy makers the effectiveness of the asset purchase program in immediately lowering government risk-free assets in crisis-driven periods, but also give the financial market time to react to achieve the best results from this measure. However, the results also show that such effects are more evident for long-term bonds, but not too obvious on shorter-term bonds, so caution should be taken while implementing this. Central bank credibility should be another concern for policy makers as this metric, despite not yielding

statistically significant impact on the topic, consistently has contributed to the achievement of goals of the asset purchase program. As mentioned in the previous part, the paper only covers the microrun impact of asset purchase program on lowering government risk-free securities, policy makers should refer to other studies for a bigger picture of this unconventional monetary policy's impacts, such as on exchange rates, domestic inflation rates, and asset prices.

Combining the results of this study and risks already outlined (part 3.2 Risks of Asset Purchase in Emerging Markets and Developing Economies), the paper can advise the policymakers the following:

Prioritize existing conventional monetary policy first. As emerging economies have not reached the effective lower bound yet, the paper will thus advise their central banks to target interest rate and inflation rate utilizing conventional measures first, as they have been backed with established market theory and extensive research, as opposed to unconventional tools which were born out of unexpected financial and economic crisis. Studies of advanced economies' adoption of asset purchase programs have been voluminous, as opposed to developing ones, hence limited evidence. In addition, the paper believes policymakers of developing markets should be aware of potential risks of this unconventional tool (outlined in the part 3.2 on Risks of Asset Purchase in Emerging Markets and Developing Economies) before drafting and implementing it.

However, consider asset purchase tool only when policy rate cut does not work. As evident from the result, during Covid-19 pandemic, there is no statistically significant proof to prove the correlation between policy rate reduction and lowering in bond yield in 14 selected emerging economies. In such extreme case, policymakers may need to contemplate this unconventional tool.

Target long-term government bonds over short-term ones. Evident from this paper results, there is high confidence that asset purchase announcements have a lowering impact on long-term government bond, but not on short-term ones. Policymakers may consider launching other policies to enhance asset purchase plans desired impact on long-term government bond yield.

Scatter the announcements over time. As shown in the results, the bond yield lowering impacts of asset purchase scheme announcements increased over a 2-day window, policymakers should allow some time for each public announcement to be in its full effect and avoid overlapping announcements.

Keep the size of purchase modest. As seen in Table 1above, the range in size of all asset purchase programs are from 0.8-2% of GDP, and they already significantly bring down the government bond yield. In the early experience of such unconventional tool, the paper advises policymakers not to go overboard with too large-scale asset purchase announcement, in case of overheated central bank balance sheet, government debt and inflation as an aftermath.

Manage central bank credibility to improve effectiveness of asset purchase programs. Despite not statistically significant, results from this study still find a negative correlation between central bank transparency index and change in bond yield, so policymakers may want to factor in this element to further add to the program's effectiveness.

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