On potential debt monetisation for China's post-Covid recovery: what can we learn from the past?[1]

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Abstract

A measure of the degree of debt monetisation is constructed for its impact on the business cycle, to be studied in a standard VAR model. Debt monetisation is hardly stimulative, as it raises public demand that crowds out almost as much demand from the private sector. However, it generates inflation, presumably because of inflationary expectations. Nevertheless the impact of debt monetisation on business cycle dynamics is trivial, given the low efficiency of the monetary transmission mechanism. Unless policy proposals are for extraordinarily aggressive moves, or they are accompanied by monetary reforms which facilitate monetary transmission, the recent debate on debt monetisation, we argue, possesses more theoretical meaning than practical meaning for China's post-Covid recovery.

JEL Classification: E31, E32, E63, H63
Keywords: Debt monetisation; business cycle; VAR; China

1. Introduction

The Covid-19 pandemic has revived an old debate on the possible macroeconomic outcomes of debt monetisation – a means for financing indebted government by money creation – among the media, policy-makers and academics in China. The debate was triggered by a recent seminar talk by Shangxi Liu, the President of the Chinese Academy of Fiscal Sciences (a research institute of the Ministry of Finance), who suggested that: '...[in facing the pandemic]... a moderate monetisation of fiscal deficit would be worth considering' (Cross and Zhang 2020). Liu's idea was for the Ministry of Finance to issue a special, non-interest bearing, treasury bond for the People's Bank of China (PBoC hereafter) to buy directly; funds raised by this issuance would then be used to pay off the deficits the fiscal authority was expected to generate as a result of a series of anti-Covid recovery schemes. Simply put, the idea was for the PBoC to bail out the fiscal authority when the latter was running into a budget predicament.

Liu's proposal soon triggered a heated debate. Those who support it believe that, given the low efficiency of the monetary transmission mechanism and the fundamental role fiscal expansion has been playing in China's economic growth, deficit/debt monetisation would be an effective means for stimulating the economy without causing substantial crowding-out of private demand caused by a rise of the nominal interest rate. Those who are against it are mainly concerned with potential inflation; whilst there are also doubts regarding its need and feasibility, as well as worries about how such an act would undermine fiscal discipline and central bank credibility.

Indeed, although monetising government liabilities is nothing new in modern monetary management – from day-to-day open market operations, to occasional large-scale money injections – research in this area has focused mostly on the US and the EU, with the backdrop of major central bank interventions, such as the Fed's purchases of Treasury bonds during World War II, the several rounds of quantitative easing (QE) it implemented following the global financial crisis, and the QE by the ECB in dealing with the eurozone debt crisis. In contrast, very little has been developed for the Chinese market. This is partly because the Chinese economy has been developing in a relatively stable fashion since its post-1978 marketisation reform, such that unconventional expansion of public debts or the central bank balance sheet was rarely needed to respond to sizable shocks. On the other hand, both the Budget Law (which enforces 'living within your means') and the Law on the People's Bank of China (which prohibits the PBoC from lending to the government directly), both published in 1995, have prevented major monetisations from happening.

The real debt problem in China emerged around 2008, when the global financial crisis laid huge pressure on economic growth, while the burden of local governments was also intensified by the task of promoting urbanisation. The 'four-trillion yuan stimulus package' assigned by the central government, plus fierce fiscal competition among local governments, resulted in a surge of public debt, including the '600-billion Special Treasury Bond' sold (indirectly) to the PBoC. As debts of the local governments continue to accumulate and many of them start to mature, and the Ministry of Finance issues new batches of an anti-Covid special bond, the repaying ability of the general government, the role of the PBoC in facilitating such repayment (by monetising the public debt), and the impact of debt monetisation, have become burning policy issues awaiting careful investigations.

In this paper we study how debt monetisation – defined as the PBoC's general liquidity creation associated with public debt expansion – has affected the business cycle in China since the early 2000s, using a standard VAR identified by the Cholesky decomposition. We find that, while debt monetisation fails to promote economic growth, as it raises public demand that crowds out almost as much demand from the private sector, it does generate inflation, presumably mostly arising with inflation expectations. Nevertheless, the evidence also suggests that the impact of debt monetisations is trivial, given the low efficiency

of the monetary transmission mechanism. These findings suggest that debt monetisation is better seen/used as an inflation management tool, rather than one for stimulating the economy in an output crisis. Unless policy proposals are for extraordinarily aggressive moves, or they are accompanied by monetary reforms which facilitate monetary transmission, the current debate on debt monetisation, we argue, therefore possesses more theoretical meaning than practical meaning for China's post-Covid recovery.

To the best of our knowledge, this is the first time the impact of debt monetisation on the business cycle dynamics of China has been evaluated systematically in an empirical model. While more research (especially work embedding greater theoretical detail and micro-foundations) will be needed in the future, we believe that the findings we provide in this paper are a timely contribution to the ongoing debate and an important springboard for future research.

The remainder of this paper is organised as follows: Section Two reviews the literature; Section Three measures the degree of debt monetisation in China; Section Four models the dynamic relationships among the business cycle and policy variables in a standard VAR; Section Five analyses the findings; Section Six concludes.

2. The literature

Research on debt monetisation can be dated back as early as Barro (1977, 1978a, 1978b) and Niskanen (1978), who studied the relationship between government spending and money. Both Barro and Niskanen identified a co-movement between government spending and money creation in the US; however when fiscal deficit was substituted for spending, tests suggested no significant impact of deficit on the growth of money – hence, no evidence of 'debt monetisation'. Hamburger and Zwick (1981) revisited the issue, taking into account regime shifts and extending the discussion for it to embrace the consequences for inflation. They found that the deficit did not lead to the growth of money in the 1950s, because fiscal policy was rather 'conservative' at the time. However, as fiscal policy became more pro-active and the Federal Reserve focused more on interest rate stabilisation from the mid-60s, the fiscal deficit became an important determinant of money, which contributed to high inflation. Blinder (1982) examined the forecasting ability of both debt and debt monetisation and found both to be good predictors for inflation, but neither performed well in predicting real output (See also Burdekin and Wohar 1990). Blinder also found that the Fed tended to monetise less when inflation was high and government spending was fast-growing.

Miller (1983) argued that persistently high deficits – whether or not monetised by the monetary authority – are inflationary, as the deficit crowded out private investments with higher interest rates. This slowed down economic growth on the one hand, whilst the private sector 'monetised' the deficits voluntarily seeing government bonds as a profitable, risk-free asset, on the other. Leeper

(1991), Sims (1994), Woodford (1998, 2001) and Cochrane (2001, 2005) all provided an alternative narrative – the fiscal theory of the price level (FTPL) – where the monetary authority accommodates the government budget to ensure that latter is always solvent; inflation, effectively being an 'inflation tax' levied by money creation here, is determined by the level of outstanding debts.

Palacio-Vera (2012) considered the real sector, and found that coordination between the fiscal and monetary authorities on the stance of fiscal policy, inflation target, and the scale and scope of monetisation, could make debt monetisation an effective stimulus, even when the nominal interest rate reached the Zero Lower Bound. Menuet *et al* (2018) studied the short-run and long-run effects of debt monetisation and found that, by weakening the long-run debt burden, debt monetisation reduced the impact of public indebtedness on productive public expenditure, which was growth and welfare enhancing. They also called for a high degree of monetisation to avoid short-term indeterminacy of the balanced growth paths.

Unfortunately, the literature has said very little on how debt monetisation affects the Chinese economy. Gan (1991) and Que (1992) conducted, respectively, a casual calculation on how much fiscal deficit contributed to inflation in the 1980s; the former found deficit contributed little, while the latter found it an important contributor. Yu (1999) discussed the need, room and potential consequences of debt monetisation in China, and pointed out that monetising debts could be a cheap and easy way to finance the public sector in the short run, but world experiences all pointed to a long-run failure of similar actions as inflation would rise eventually, and the rise might even exceed that of money.

Yi (1991), in a more general perspective, discussed China's monetisation process since the marketisation reform.[4] He argued that, although the money supply had been rising dramatically as the reform deepened, severe inflation did not happen until the late 1980s, as monetisation created new demand for money sufficient to absorb the greater stock of money (See also Li 1997; J Zhang (1997, 2006); Cheng and Lin 2006; W Zhang 2008; Liu and Hu 2010; and Jing and Tong 2018, for similar discussions). However, as Yi himself pointed, 'monetisation' in these studies is generally 'vague and not well-defined'. Most assessments along this line have focused on the broad expansion of money (usually measured by the money-supply-to-GDP ratio) which may, or may not, be associated with the expansion of government debt or deficit; hence, they do not say much about whether and how debt monetisation affects particularly these variables. This is precisely the gap we aim to fill, as we go on to elaborate in the following.

3. Debt monetisation in China

While the term 'monetisation' generally refers to the process of converting an asset to 'money' for liquidity to be created, we define debt monetisation here as the monetary authority's liquidity creation caused by the fiscal authority's debt

expansion – hence, it describes a process of financing public debt with 'helicopter money' (Friedman 1968). The extent to which public debt may be monetised depends substantially on the institutional relationship between the fiscal authority and the central bank. In China, the PBoC had a long tradition of being a supporter of the country's fiscal authority, such that money had a history of being printed to write off public debt or fill public deficits (This was particularly the case in the late 1980s and early 1990s, when excess money supply consistently led to double-digit inflation).

The situation changed in the mid-1990s, when the PBoC became much more independent following the publication of the *Budget Law* and the *Law on the People's Bank of China*. Since then, the PBoC has had no legal obligation (and is required by law not) to finance the fiscal authority directly. Although in later years there were extreme events – such as the global financial crisis – that led the PBoC to purchase special treasury bonds (indirectly) to finance major stimulus packages on several occasions, debt monetisation in China has been mainly in the form of open market transactions on bond repurchase agreements, which have served monetary targets, instead of fiscal ones, over the past twenty years.

Previous work on this topic has, depending on the research questions, adopted somewhat different measures on the degree of debt monetisation. Most have used the central bank's holding of public debt or such holding as a fraction of total public debt outstanding (Barth *et al* 1982; Blinder 1982; Dwyer Jr 1982; Burdekin and Wohar 1990; and Palacio-Vera 2012). Others have used some sort of monetary aggregate, such as the monetary base or M1, of which some are normalised by economic growth, as an approximation (Thornton 1984; Protopapadakis and Siegel 1986; Lebow 2004).

However, similar measures would not be appropriate when they are applied to Chinese data, for two main reasons. The first is that the bookkeeping method of the PBoC does not record all holdings of public debt on the bank's balance sheet, such that 'claims on government debts' on the balance sheet is only a small proportion of the PBoC's transactions related to debt monetisation. This small proportion is related to debts issued for particular purposes (such as to fund big infrastructure projects or fiscal stimulus packages), where the PBoC monetises the debts to facilitate the delivery of fiscal targets. The rest, the majority of monetising activities, *viz.*, regular open market operations, takes the form of pledged repurchase agreements, where the PBoC monetises public debts for the short run. However, these transactions do not induce a transfer of debt ownership, as they are just central bank lending backed by government bonds. Since these bonds are not accounted for as assets of the PBoC, they are not recorded on the bank's balance sheet. Hence, using the data of the PBoC's holding of public debts alone would be missing a substantial part of the debt monetisation happened via off-balance-sheet activities.

The other problem with using conventional measures with Chinese data, is related to the use of monetary aggregates as a proxy measure of debt

monetisation. These proxies would be good measures if the issuing of money was dominated by transactions of government bonds (for example, the variation of M0 in the US is a close follower of that of the Federal Reserve's holding of Federal debts). However this is not the case in China, where the data show that over 30 per cent of the variation of the monetary base is attributed to transactions of central bank notes, changes in reserve requirements, and net inflows of foreign currencies (given the 'managed float' exchange rate arrangements). Hence, for the monetary aggregates to be a good reflection of the degree of debt monetisation, a careful account of this bias would be necessary.

The above suggests that a proper measure of debt monetisation in China requires that the part of variations of money in circulation caused by public debt variations be fully, but not overly, accounted for. This part, as explained earlier, embraces PBoC claims on government debts registered on the bank's balance sheet, as well as the bank's open market transactions endorsed by government bonds. This implies the variations of what we define to be 'adjusted M0', which is the part of the monetary base driven solely by the bank's actual public debt holding, is our measure of the degree of debt monetisation.

Figure 1 plots the time paths of the adjusted- and unadjusted-M0, and compares them to that of total public debt outstanding.[5] While total public debt had been expanding fairly rapidly, especially after the global financial crisis as a result of a series of fiscal stimulus packages, the rise of adjusted-M0 was much less dramatic. By contrast, the rise of unadjusted-M0 shared a similar pattern with that of public debt. Nevertheless, since only a small part of such a rise was caused by adjusted-M0, its co-movement with the debt outstanding is not by itself evidence of debt monetisation. Indeed, although both adjusted- and unadjusted-M0 are highly correlated with debt outstanding, we find none of the money growth was Granger-caused by debt growth (Table 1). While the moderate rise of adjusted-M0 does provide evidence of deepened debt monetisation, it seems that, as the PBoC became more independent, the supply of base money depended less and less on the government's debt position.

Figure 1: Rise in the monetary base and total public debt outstanding

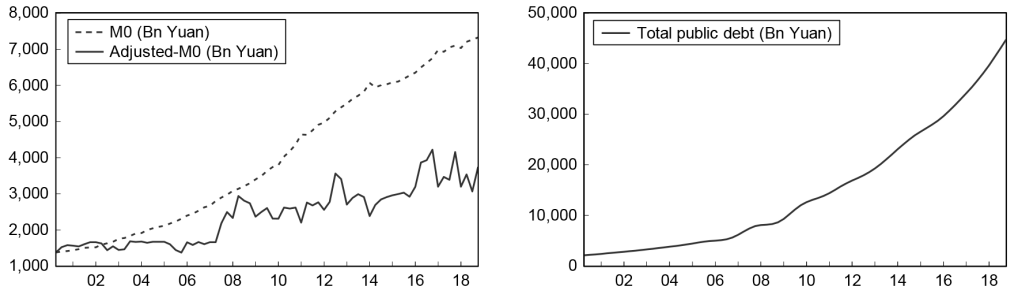


Table 1: The monetary base and total public debt outstanding – correlations and Granger causality

Correlation coefficients	
M0 vs total public debt outstanding	0.97
Adjusted-M0 vs total public debt outstanding	0.88
Granger causality tests	
H_0: The growth of public debt does not cause the growth of M0.	P-value: 0.6029
H_0: The growth of public debt does not cause the growth of adjusted-M0.	P-value: 0.2142

The number of lags for the Granger causality tests is set at 3, as suggested by typical lag selection criteria (LR, FPE, AIC, SIC and HQ).

4. Model and data

Our model is a standard VAR(1) of business-cycle, monetary- and fiscal-policy variables, identified by the Cholesky decomposition, which takes the form:

$$Y_t = C + AY_{t-1} + U_t \quad (1)$$

where $Y_t \equiv (\dot{g}_t, \dot{y}_t, \pi_t, \dot{m}_{0,t}^{adj}, R_t)'$ is a vector of government expenditure, output, inflation, adjusted-M0 and the nominal interest rate, '˙' denotes the growth of a variable, A is a five-by-five matrix of the VAR coefficients, C and U_t are vectors of the constants and the error terms, respectively. The model can be seen as a parsimonious description of how monetary and fiscal policy instruments ($\dot{m}_{0,t}^{adj}$, due to monetisation, R_t, and $\dot{g}_t$) interact with the business cycle variables ($\dot{y}_t$ and π_t). We choose a VAR(1), instead of a VAR of higher orders, as a) a VAR(1) is generally accepted to be a good approximation of a structural model proven to have a good fit to macroeconomic data and, b) given that our data sample (which we explain below) is relatively small, a VAR(1) ensures that our modelling of the data dynamics is not undermined by a substantial loss of the degree of freedom which could lead to model overfitting. Our choice of the VAR order is supported by most of the lag selection criteria, where we allow for up to four lags (Table 2). The multivariate LM test on the VAR(1) residuals, which rejects autocorrelation (Table 3), further confirms that our VAR(1) does not suffer any problem of underfitting.

Table 2: Optimal VAR order according to different criteria

No. of lags	*LR*	*FPE*	*AIC*	*SIC*	*HQ*
1	248.9201	2.60e-20*	–30.9094*	–29.9458*	–30.5266*
2	27.9115	3.34E-20	–30.6682	–30.8778	–29.9665
3	33.8458	3.75E-20	–30.5807	–28.011	–29.5600
4	49.5604*	2.94E-20	–30.8778	–27.5051	–29.5382

a) * indicates lag order selected by the criterion. b) LR: sequential modified likely ratio; FPE: final prediction error; AIC: Akaike information criterion; SIC: Schwarz information criterion; HQ: Hannan-Quinn information criterion.

Table 3: The LM test on the VAR(1) residuals

No. of lags	LM test stat	P value
1	23.3684	0.5561

a) H_0: There is no autocorrelation. b) Sample: 2000Q3 and 2018Q4.

The ordering of our VAR variables reflects the standard assumptions in the literature: government expenditure has a contemporaneous impact on output and inflation, but the latter only feed back to the former with a 'decision lag' (Blanchard and Perotti 2002); output affects inflation contemporaneously with a wealth effect, but the feedback from price changes to production is delayed as a result of nominal contracts and costs of capital adjustment; monetary variables are adjusted in response to output and inflation, while changes in money supply are followed by changes in the nominal interest rate. These assumptions imply a sequence – based on descending degree of exogeneity – that goes from government expenditure to output and inflation, then to money supply and the nominal interest rate, which is what we impose for identifying the structural shocks by the Cholesky decomposition. The ordering is standard; some recent applications, among many others, include Rossi and Zubairy (2011), Bekaert *et al* (2013), Boiciuc (2015) and Nguyen *et al* (2019).

The data cover the period 2000Q3 to 2018Q4. Government expenditure, output (measured by GDP), and adjusted-M0 are normalised by the CPI. Inflation is measured by the quarter-on-quarter growth in the CPI, while the nominal interest rate is measured by the three-month weighted average of interbank lending rates. Adjusted M0, as elaborated earlier, is extracted from the M0 data to reflect the part of changes in the monetary base resulting from debt monetisation. The data for government spending is collected from the China Yearbook of Finance via the CNKI database. The data for GDP and CPI are collected from the Center for Quantitative Economic Research of the Federal Reserve Bank of Atlanta (Chang *et al* 2016). The interbank lending rate is collected from the State Administration of Foreign Exchange via Datastream. The data for adjusted M0 are calculated with the PBoC's balance sheet and open market transaction data collected from the Wind database. The time series are plotted in Figure 2. In Table 4 we show that the time series used for estimating the VAR are all stationary according to standard unit root tests.

Figure 2: Data

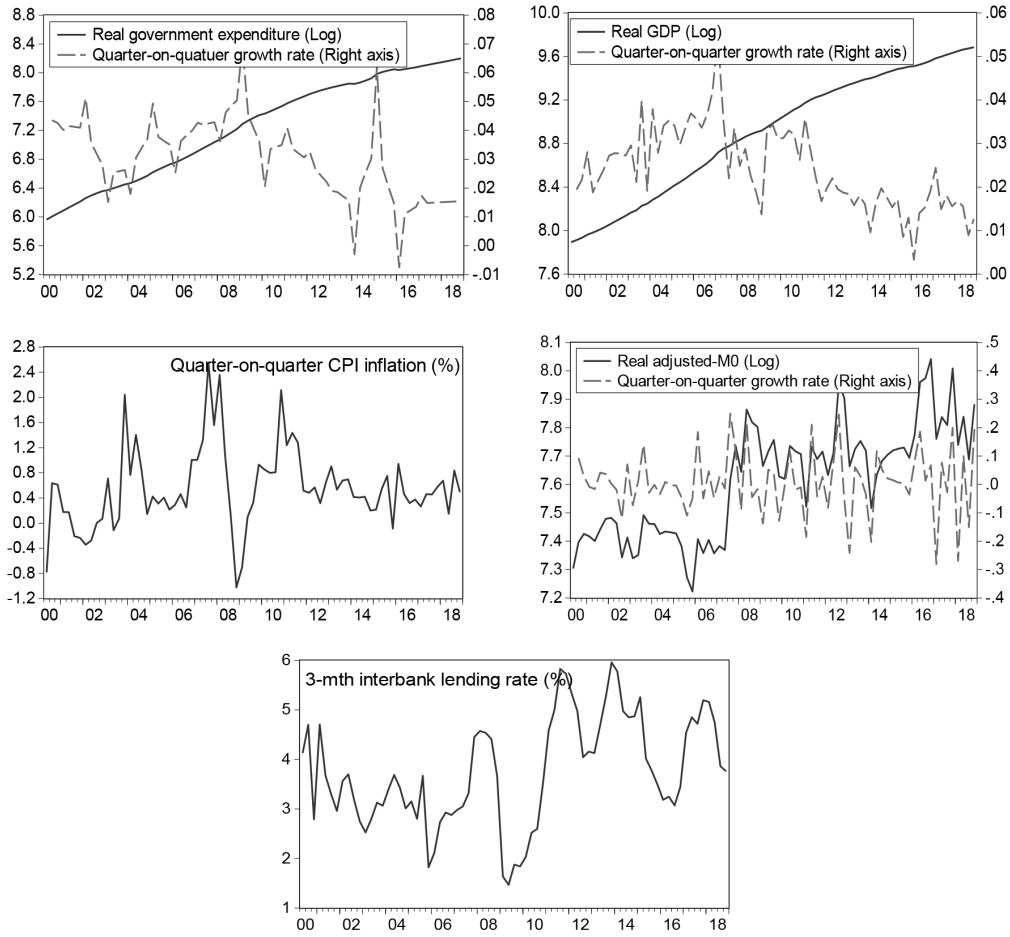


Table 4: Unit root tests of the data

Variables	*ADF test stat*	*KPSS test stat*	*Remarks*
$\dot{g}_t$	–1.5847	0.6564**	Stationarity supported by the KPSS test.
$\dot{y}_t$	–1.9676	0.7025**	Stationarity supported by the KPSS test.
π_t	–4.8976***	0.1145	Stationarity supported by both tests.
$\dot{m}_{0,t}^{adj}$	–7.7849***	0.2783	Stationarity supported by both tests.
R_t	–2.6247*	0.4547*	Stationarity supported by both tests.

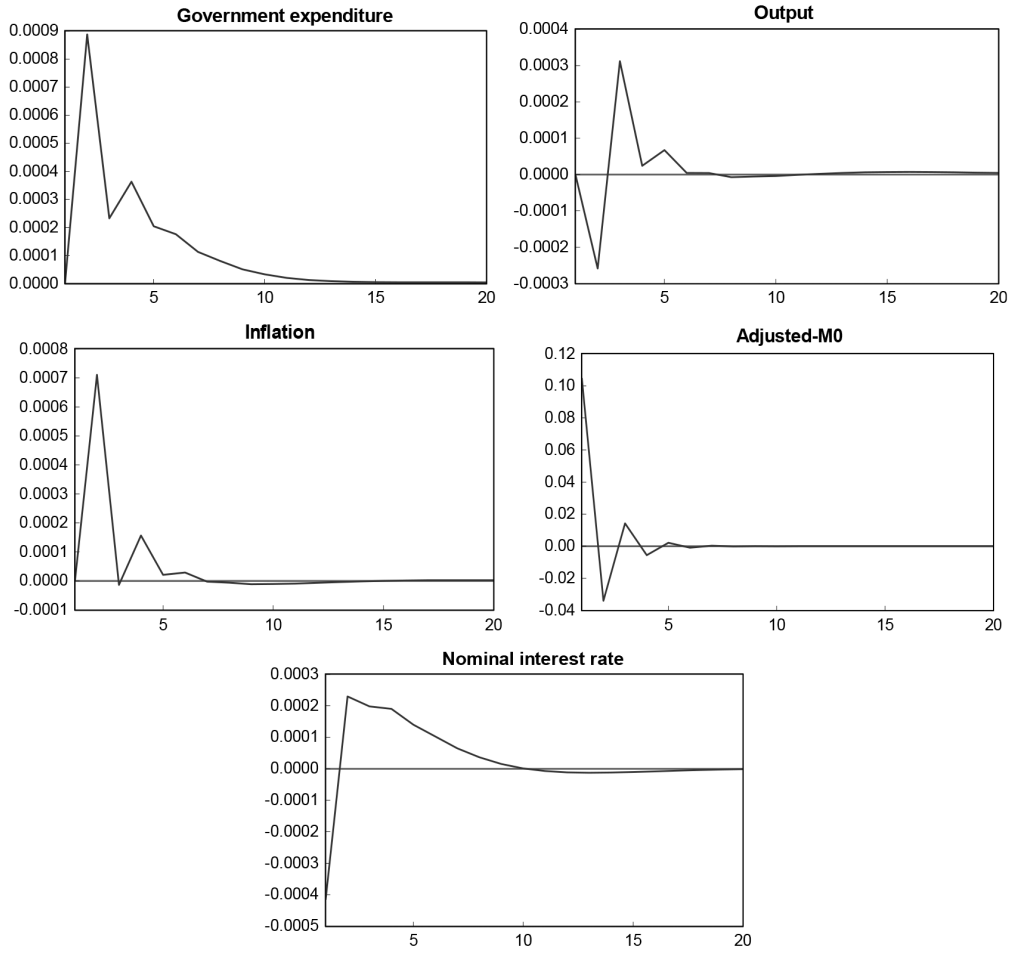
a) *, **, *** indicate rejection of H_0 at the 10%, 5% and 1% levels, respectively. b) H_0 of the ADF test: the time series has a unit root; H_0 of the KPSS test: the time series is stationary. c) Critical values of the ADF test: –3.52 (1%), –2.90 (5%), –2.59 (10%); Critical values of the KPSS test: 0.73 (1%), 0.46 (5%), 0.35 (10%). d) Sample: 2000Q3 to 2018Q4.

5. Findings

5.1 How does debt monetisation affect the business cycle?

We start by investigating how debt monetisation affects the business cycle. Figure 3 plots the impulse responses of all the VAR variables to a one-standard-error shock to adjusted-M0, whose innovations represent debt monetisation. A rise in adjusted M0 eases the government's budget position, which causes government expenditure to rise. The rise in government expenditure tends to drive up the nominal interest rate, crowding out private consumption and investment (whose responses are omitted from the VAR representation here). The aggregate impact on output depends on whether the rise in government expenditure dominates the fall in consumption and investment, where on this

Figure 3: Impulse responses to a monetisation shock



occasion it does not initially, but does subsequently, resulting in a fall in the aggregate output on impact, followed by a fast rebound.

The accumulated impact is shown to be positive, albeit short-lived and minor. Inflation rises immediately, presumably driven by inflation expectations; whilst the minor impact in the subsequent periods is a combined effect of higher aggregate demand, expectations and lags. The equilibrium interest rate, which is a joint outcome of the upward pressure given higher government expenditure, the downward pressure caused by the expanded monetary base, and the likely rise as policy responds to inflation, falls at the beginning, but rises straight after and converges from above gradually.

All in all, we find that debt monetisation is hardly stimulative, as it leads to a rise in the demand of the public sector that crowds out too much demand from the private sector. This may be as a result of the relatively low income elasticity of government expenditure, or relatively high interest rate elasticity of private consumption/investment, or both. Yet it does generate inflation, most likely because of inflation expectations. Hence, while debt monetisation may be a handy instrument for managing inflation, it would not be a desired one if the policy objective also embraces stabilisation of the real economy, given i its weak impact on output.

5.2 Variance Decomposition

Table 5 decomposes the forecast-error variance of output, inflation and the nominal interest rate into the structural shocks identified by the Cholesky decomposition. Although debt monetisation affects all these variables as the impulse response functions just showed we find that, quantitatively, its relative influence is trivial.

Table 5: Variance decomposition of the business cycle variables

		Output			
Qtr. ahead	*Gov. shock*	*Output shock*	*Infl. shock*	*Mon. shock*	*Int. shock*
4	12.8	63.1	2.89	0.27	21.0
12	28.4	41.8	5.94	0.18	23.7
20	29.1	41.3	6.03	0.18	23.5
40	29.1	41.3	6.03	0.18	23.5
		Inflation			
Qtr. ahead	*Gov. shock*	*Output shock*	*Infl. shock*	*Mon. shock*	*Int. shock*
4	11.7	8.71	76.0	1.48	2.18
12	14.1	8.56	67.3	1.29	8.74
20	14.6	8.48	66.9	1.28	8.70
40	14.6	8.48	66.9	1.28	8.70
		Nominal interest rate			
Qtr. ahead	*Gov. shock*	*Output shock*	*Infl. shock*	*Mon. shock*	*Int. shock*
4	15.2	0.29	18.9	0.30	65.3
12	24.1	0.32	22.9	0.26	52.4
20	24.1	0.32	22.9	0.26	52.4
40	24.1	0.32	22.9	0.26	52.4

The variation of output is mostly affected by the output shock (41–63 per cent), which is related most likely to productivity and/or physical investment. The government expenditure shock and interest rate shock are about equally important; the former accounts for 13–29 per cent, while the latter accounts for just over 20 per cent. The inflation shock plays a small role, accounting for three to six per cent. The monetisation shock, i.e. shocks to adjusted-M0, has little impact. The inflation variation is dominated by the inflation shock (67–76 per cent). This, in a structural model (such as Smets and Wouters 2003), can be explained by labour supply and/or mark-up to production costs. The government expenditure shock, output shock and interest rate shock each contributes a small proportion – around 14 per cent, 8 per cent and 8 per cent, respectively. The monetisation shock accounts for just over 1 per cent.

Finally, the variation of the nominal interest rate is governed by the interest rate shock (52–65 per cent), but it is also affected substantially by the government expenditure shock (15–24 per cent) and the inflation shock (19–23 per cent). The interest rate shock can be interpreted as policy errors made by the PBoC in delivering the desired interest rate; whilst the inflation shock is likely to reflect the interest rate's responses to inflation in the spirit of a Taylor Rule. Again, the monetisation shock hardly plays a role. This is perhaps not surprising given that (as elaborated in Section 3) adjusted-M0 only constitutes a small part of aggregate M0.

The relative unimportance of debt monetisation in the determination of the business cycle could be as a result of either the transmission mechanism or the relative size of the shocks, or both. On this occasion we find that it is the former, as the VAR estimates (which we report in Table 6) suggest that none of the business cycle variables is significantly affected by the adjusted-M0, while the monetisation shock is clearly more sizable than the others (Table 7). The irrelevance seems to suggest that the efficiency of monetary transmission is very low. Hence, unless in extreme cases where radical moves are taken, or monetary reforms are implemented to facilitate monetary transmission, 'regular' debt monetisation is not likely to have an impact.

Table 6: Estimates of the VAR coefficients

	$\dot{g}_t$ equ.	$\dot{y}_t$ equ.	π_t equ.	$\dot{m}_{0,t}^{adj}$ equ.	R_t equ.
$\dot{g}_t(-1)$	0.6627***	0.1374**	–0.0742	0.0181	–0.1046*
$\dot{y}_t(-1)$	0.2552*	0.3836***	0.2594***	–1.6464	–0.002
$\pi_t(-1)$	–0.0069	0.3348***	0.4905***	4.0403*	0.4148***
$\dot{m}_{0,t}^{adj}(-1)$	0.0086	–0.0038	0.0068	–0.3309***	0.0051
$R_t(-1)$	0.0355	–0.3458***	0.0139	–1.6061	0.7447***
Const	0.0023	0.0218***	–0.0017	0.0852	0.0103**

a) ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.
b) Sample: 2000Q3 to 2018Q4.

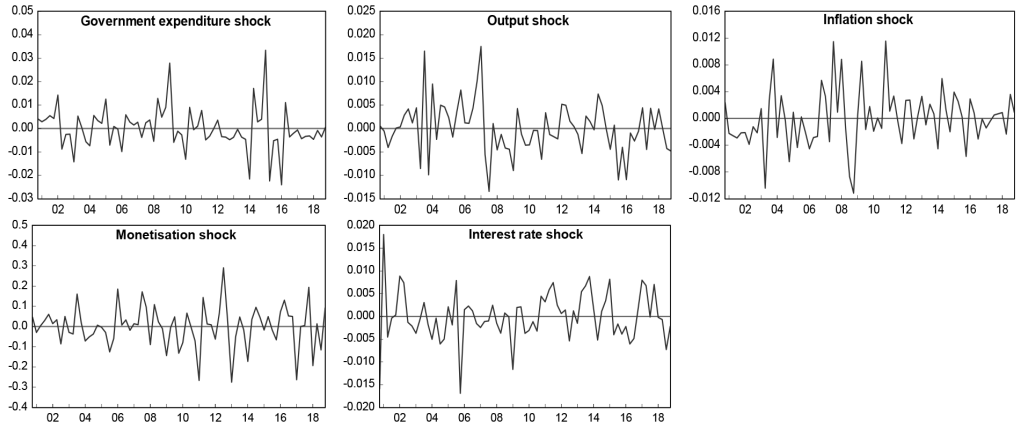
Table 7: Standard errors of the structural shocks

Gov. shock	*Output shock*	*Infl. shock*	*Mon. shock*	*Int. shock*
0.0094	0.0057	0.0044	0.1050	0.0057

5.3 Historical Decomposition

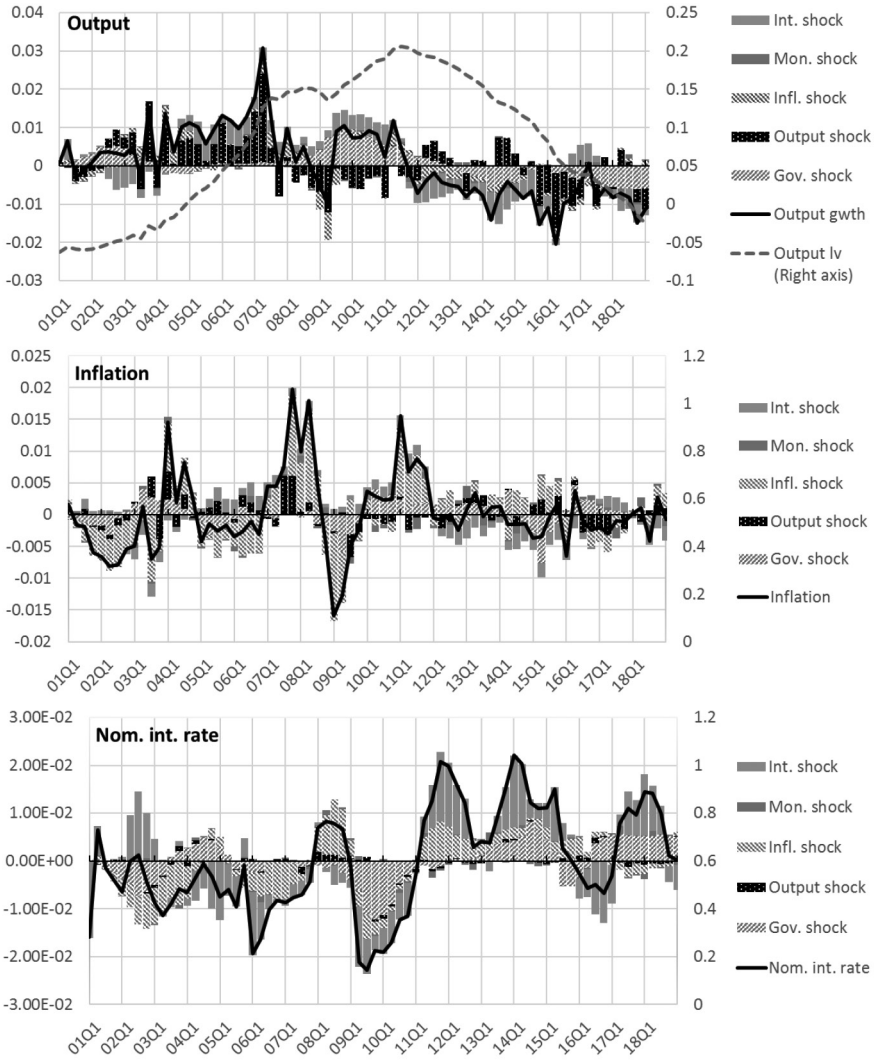
We can now look back at the sample period to disentangle how the business cycle was affected by debt monetisation and the other shocks over that time. We first calculate the historical shocks, which we plot in Figure 4, using the estimated VAR and the data. We then decompose the timelines of output, inflation and the nominal interest rate into the effects of these shocks in Figure 5.

Figure 4: Historical structural shocks



We find that the rapid increase of output in the first half of the 2000s was mainly a result of the rise of the output shock (which would correspond to more advanced productivity in typical structural models such as Smets and Wouters 2003), aided by government expenditure and lower interest rate. The growth then slowed down after the global financial crisis, around 2007–2009, as adverse output shocks hit; but with government expenditure and interest rate both supporting, the level of output did not fall until 2011. However, as government expenditure was reduced thereafter (given the widespread debt predicament confronting local governments at the time) and interest rates started to rise, output declined. The strong negative output shocks that hit after 2015, followed by another round of negative government expenditure shocks, finally led output to fall below the steady-state level, showing a sign of real recession.

Figure 5: Historical decomposition



Inflation was driven mainly by the inflation shock (which would reflect labour market frictions and/or price mark-ups in a structural model), especially before 2012. The shock was clearly more volatile during this time, and was the most disturbed around the financial crisis (presumably reflecting the turbulence of oil prices[6]). The shock then moderated, as did inflation, from 2012. All the

other shocks, except the monetisation shock, had some impact, but at no point did any of them dominate the determination of inflation.

The evolution of the nominal interest rate roughly followed that of inflation with a lag, but it was smoother and much less volatile. Its path was affected mostly by the interest rate shock; but both the government expenditure shock (which had a crowding-out effect) and the inflation shock (which put pressure on nominal interest rates) were important drivers. The other two shocks – the output shock and the monetisation shock – hardly affected anything.

Thus, although the monetisation shock dominates the other shocks in size, and there were major realisations of it over the sample period (e.g., around 2006–07, 2011–13 and 2017), we find no evidence that debt monetisation played an important role in driving China's business cycle.

6. Conclusions

Debt monetisation – a process of financing public debt with seigniorage – has a long history of practice in central bank management of money. Although the topic has been widely studied for the US and EU (of which the nominal interest rate discussions have focused on the several rounds of QE and the eurozone debt crisis), it has not been discussed much for the Chinese economy until recently; and there remains little empirical evidence for China.

In this paper, we fill the gap by studying the impact of debt monetisation on China's business cycle, with a measure of debt monetisation carefully elaborated for it to reflect the practice of the People's Bank of China. Evidence from a standard VAR of key business cycle and policy variables suggests that debt monetisation has not contributed much to China's output growth pre-Covid. The reason seems to be that, while it promotes government expenditure, it crowds-out private demand sufficiently to offset the positive impact of the former. Yet, it is still inflationary as it generates sufficient inflation expectations.

These findings can inform potential post-Covid recovery strategies ahead. In particular, since the inefficacy of past monetisations was likely a result of the low efficiency of the monetary transmission mechanism, future proposals should allow for structural reforms that facilitate monetary transmission. Otherwise, 'regular' debt monetisations on a moderate scale would not help recovery much; and, if large-scale monetisation was implemented, it could cause severe inflation with the most parsimonious return on output. However, our findings do not reject the potential of fiscal stimuli themselves; according to our historical decomposition exercise, government expenditure has contributed positively to output (and negatively to inflation) and the impact of this shock was non-trivial. What this pre-Covid experience really challenges, therefore, is not whether fiscal stimuli are worth implementing, but how they should be financed. We find that monetising public debt – under the current economic structure at least – would be an inflation-costly option.

What we find in this paper is broadly echoed by previous work (as reviewed earlier) in that debt monetisation is inflationary, although our evidence from

China suggests that it does not always enhance growth. Understanding how output is determined as debt is monetised requires one to construct a structural model (such as a DSGE model) for the casual relationship between debt, money and the business cycle to be identified. This task is on our agenda for future research.

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Endnotes

1. We are grateful to the editor and referees for helpful comments. Any remaining errors are ours.

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4. The reform is generally thought to have started in the early 1980s and completed in the mid- to late 1990s.

5. The time series of adjusted-M0 is calculated as the sum of the PBoC's 'claims on government debts' and the (net) increase of reverse repo in a given period. The data are from the People's Bank of China (via the Wind database). The time series of unadjusted-M0 and total debt outstanding are from the Federal Reserve Bank of Atlanta (the CQER database) and the Federal Reserve Bank of St. Louis (FRED database), respectively.

6. The price of crude oil (Global price of WTI Crude) surged from $66/barrel in 2006 to $99.6/barrel in 2008; it then collapsed rapidly in 2009, to $61.7/barrel (FRED database).

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