Forecasting Policy Analysis System (FPAS) Mark II: Financial-Cycle Output Gaps

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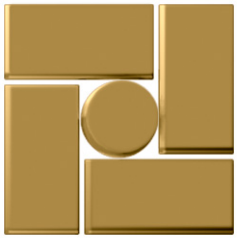

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Application to the US Economy and Update of Scenarios that Incorporate a Crisis in Confidence

by A. Kostanyan, D. Laxton, A. Nurbekyan[1]

ABSTRACT

All financial crises are preceded by the combination of an excessive credit expansion and asset price bubble. The second criteria was clearly established with an astronomical increase in asset prices during the COVID-19 pandemic in the US. Soon after the collapse in equity prices in the initial phase of COVID and its uncertainties, equity prices shot off to Mars and housing prices shot to the moon. These, in combination with an increase in financial savings, led to an expansion of the household assets (including non-profit organizations) of $41 trillion between 2020Q1 and 2023Q1. On the liabilities side, the U.S. household balance sheet does not seem to have been associated with excessive leverage in response to the rise in asset prices, in contrast to the pre-GFC era. However, as COVID-19 uncertainties diminish and precautionary savings decline, conditions may be ripe for households to consume part of this accumulated wealth via the credit market (driven by historically low real interest rates). Macroprudential policymakers need to be more concerned about this dangerous mix of high asset prices and excessive credit well before they emerge, highlighting the need for a framework to assess safe levels of debt. This paper is devoted to the estimation of financial cycle output gaps (FCMOD) that can help analyze these issues, albeit in a simplistic manner that does not try to capture the full complexity of the financial system. FCMOD projections are used as inputs into the monetary policy model (MPMOD) medium-term forecasts of potential output in the associated sister paper as FCMOD tends to outperform the traditional monetary-policy-relevant specification in predicting the medium-term projected level of GDP. This paper provides updates of a parent paper for the United States and a scenario based on latest data and assumption of an ongoing credit slowdown observed in the wake of the collapse of Silicon Valley Bank.

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I. INTRODUCTION

This paper is meant to apply the methodology laid out in Laxton and others (2019) and update the results within the context of the COVID-19 pandemic and its associated outlook. The methodology makes a clear distinction between the concepts of the output gap that are relevant for price and financial stability. This paper focuses on the former and the latter is covered in a sister paper. The distinction is highly relevant for policy making and is closely related to the "leaning against the wind" (LAW) debate, where a deeper discussion about the debate can be found in the parent paper.

We distinguish the terms "trend output" for the Financial Cycle Model (FCMOD) and the concept of potential output for the Monetary Policy Model (MPMOD). To construct the measures of the output gap relevant for financial-stability assessments, this paper uses a simple atheoretical model of the financial cycle. This involves specifying an atheoretical model that includes a cyclical and trend decomposition for output. We use information on real property price growth and real credit growth to help measure the lower-frequency cyclical component in US GDP. For FCMOD, we use the term trend output to distinguish it clearly from the concept of potential output, which is based on the notion of imbalances between aggregate demand and supply in the goods market. We emphasize that FCMOD is an atheoretical model, as there is no theoretical basis to support a structural link between deviations of aggregate demand and supply in the goods market and growth in these two financial variables.

In addition to the importance for monetary and macroprudential policies, measures of sustainable output also have important implications for fiscal policy. Information about the sustainable or trend level of output is important to obtain measures of the medium-term sustainable tax base, a key input for fiscal policy. Using standard techniques for combining forecasts, this paper shows how to condition medium-term projections of actual and potential output on measures of trend output that can account for the financial cycle.

The remainder of the paper is organized in the following way. Section II summarizes the model. Section III updates the historical estimates for the financial cycle output gap and trend output during the COVID-19 period. Section IV provides an outlook for the financial cycle output gap based on higher frequency data and some near-term assumptions. Section V provides some concluding remarks and comments on the future research agenda. In particular, a brief comparison to other traditional estimates of credit gaps as provided by the BIS and developing an alternative conceptual framework for thinking about financial stability.

II. MEASURING THE OUTPUT GAP AND TREND OUTPUT WITH FCMOD

The notion of financial cycle is generally understood as a cyclical term in financial variables, which is associated with a higher probability of financial crises. These financial variables most frequently include leverage, credit growth and asset prices. While the empirical literature about the characteristics of financial cycles has developed quite rapidly after the GFC (see, for example, Claessens, Kose and Terrones 2011), the theoretical understanding of financial cycles and their relationship with business cycles, has evolved only slowly suggesting little practical advice for policymakers responsible for monetary and macroprudential policies.[2]

[2] For example of a prototype model, which allows for financial crises in DSGE models, see Benes, Kumhof and Laxton (2014 a, b) and Benes, Laxton and Mongardini (2016).

Against this background, this section details a simple atheoretical model for the financial cycle. Our approach is to leverage empirical knowledge about financial cycles without taking a strong stance on underlying theory, about which there is little consensus. We refer to FCMOD explicitly as an atheoretical model and not a model of potential output. Potential and trend output, of course, are not disconnected-they both converge to the same levels in the long run, which is the only constraint that we use in the model. This underlines that sustainable output is very useful when thinking about long-term developments of the economy, but it is not the right concept for thinking about monetary policy tradeoffs.

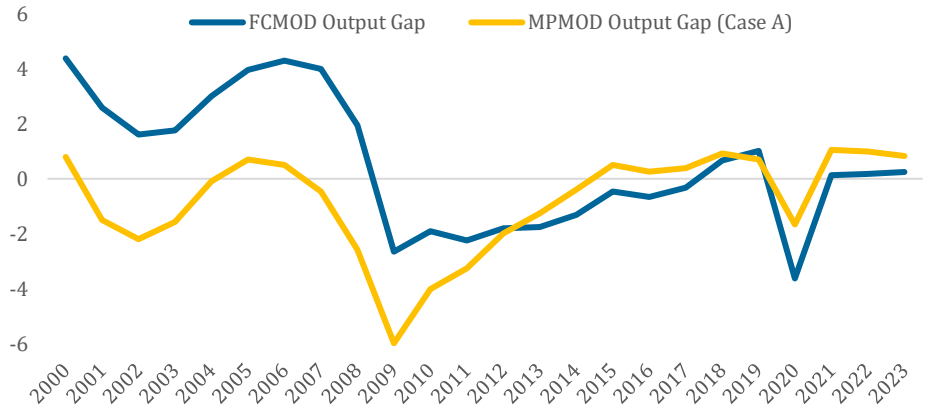
III. HISTORICAL NARRATIVE AND THE COVID-19 PANDEMIC

Figure 1 depicts the FCMOD estimates of the financial cycle and trend output growth based on the sample period of 1980-2022. It can be observed that financial cycle is more prolonged and has higher volatility compared to the MPMOD output gap. This comes as no surprise since financial cycles tend to last longer than business cycles. In addition, financial variables incorporated into the FC output gap contribute to its more prolonged buildups and sharp drops.

Corresponding to the more volatile output gap, FC trend output growth rate is much smoother compared to its MPMOD counterpart. By definition, FC trend output is neutral to the cyclical fluctuations in the financial system. As Borio (2013) claims, the main distinctive feature of finance neutral trend output is sustainability. Even when output is at its non-inflationary path (which is captured in MPMOD as potential output), it might still be unsustainable as long as the financial imbalances are building up.

While the resulting cyclical component of GDP from FCMOD is correlated with conventional measures of the output gap, the FCMOD output gaps were over double the size of the MPMOD output gaps before the Global Financial Crisis (GFC). This is consistent with the observation that financial imbalances were building up before the GFC with only modest increases in underlying inflationary pressures in the goods market.

Figure 1: A Comparison of the Financial Cycle (FC) and Monetary Policy (MP) Relevant Output Gaps

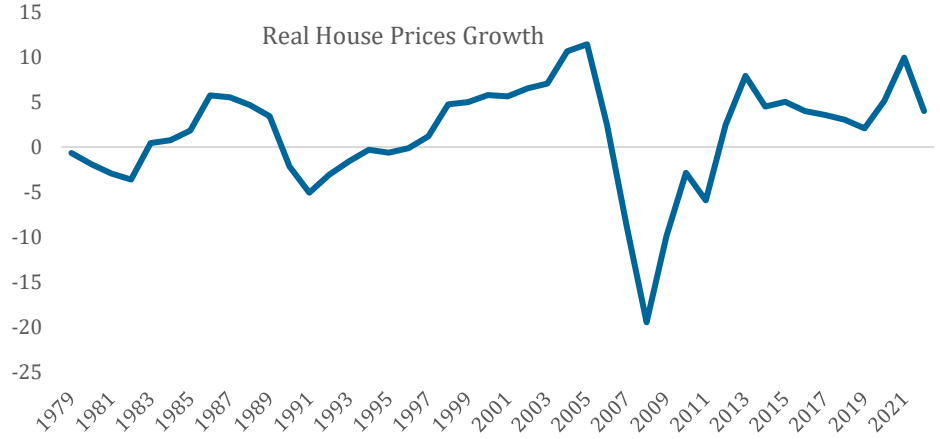


Source: Author Estimates

We turn our attention to the COVID-19 pandemic and provide some insight into how we are thinking about potential imbalances in the economy emanating from financial markets. Look no further than the response in real property prices which saw a boom and likely bubble (although hopefully short-lived), buoyed by cheap mortgages. In this respect, the fiscal response was perhaps sufficient and

more relevant for dealing with the COVID-19 shock. This is an added element as to why it may have been imprudent to maintain an ultra-easy monetary stance until full employment was reached and might be a source of financial instability moving forward as markets move markedly away from the ELB in a short time span and a large correction in house prices materialize.

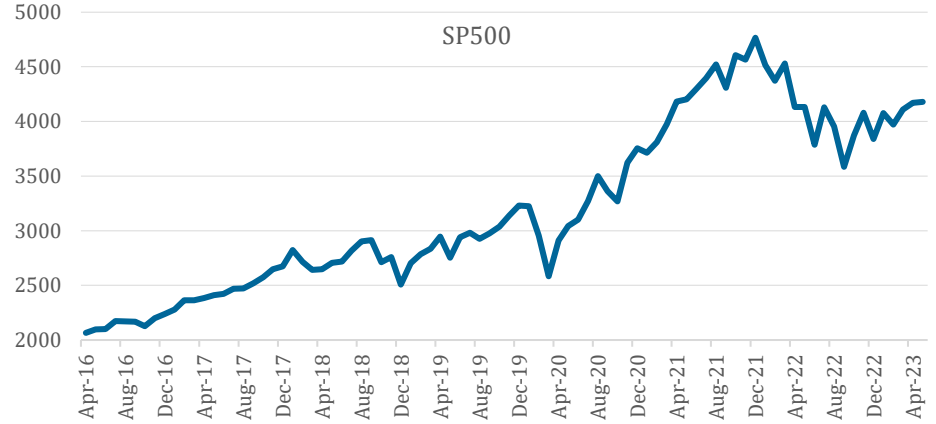
Figure 2: Real Property Prices Benefited Immensely, Coming Down to Earth?



Source: BIS, Author Estimates

Furthermore, although it is not captured explicitly in FCMOD, equity prices saw an equally high rate of return following the initial collapse in February-March of 2020. This boom in equities have shown up in household balance sheets from high corporate equity valuations. If you were to ask someone at the time when the pandemic first began what would you expect to happen to asset prices when there is a global pandemic that leads to widespread economic lockdowns. The answer would probably be a significant downward correction and only when the uncertainty around the pandemic had diminished that a strong recovery in equities would emerge. However, this is not what ended up happening and since the COVID pandemic, the net worth of US households including non-profit organizations has risen by an enormous $38 trillion from 2020Q1 and 2023Q1, largely on account of higher asset prices, but also a result of the accumulation of higher precautionary saving. In Tchanturia and others (2023), we delve into the US consumption function and illustrate how the real wealth effects from rising equity and real estate prices over the pandemic may be a contributing factor to lingering frothy demand by US consumers as the economy exits the direct impact of regular COVID-related lockdowns.

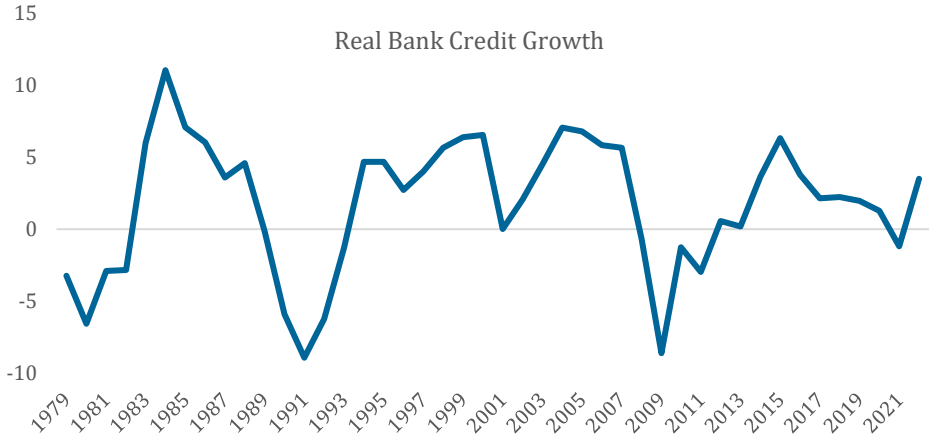
Figure 3: Equity Prices Benefitted from the "Fed Put" but that Might Change



Source: BIS, Author Estimates

On the other hand, the other main variable used in FCMOD, real credit, had not seen particularly high growth during the pandemic period but was beginning to tick up aggressively in 2022. However, in the aftermath of the collapse of SVB we observe there has been a moderation of credit growth so far in 2023 and has softened our concerns of the COVID-19 pandemic shock(s) leading to an excessive amount of borrowing based on unrealistic future valuations of asset prices.

Figure 4: Real Credit Growth, Backstopped Not Excessive

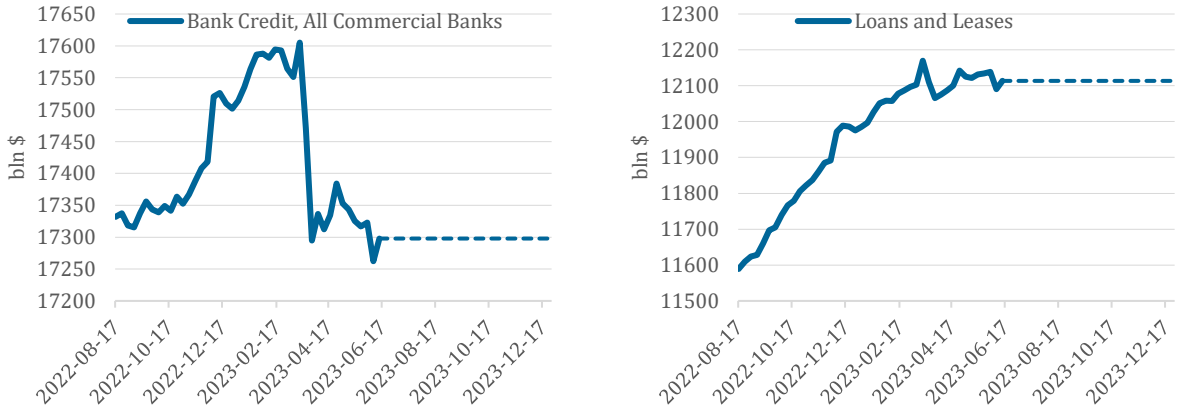


Source: BIS, Author Estimates

IV. THE POST-COVID OUTLOOK

Credit growth in 2023 by all intents and purposes has slowed in the aftermath of the collapse of SVB. Figure 5 looks at total bank credit and loans and leases (more directly related to the real economy) on a weekly frequency as provided by the Fed. The data show a visible decline in credit immediately following the collapse of SVB and subsequently has not showed any tendency of recovery. If credit were to stagnate at current levels for the rest of the year would result in nominal credit growth of around 0% and -4% in real terms for 2023. For comparison, during the recessions in the early 90's and the Global Financial Crisis, real credit growth troughed between 8-9%. Our FCMOD scenario reflects the stagnating credit growth as presented in Figure 5.

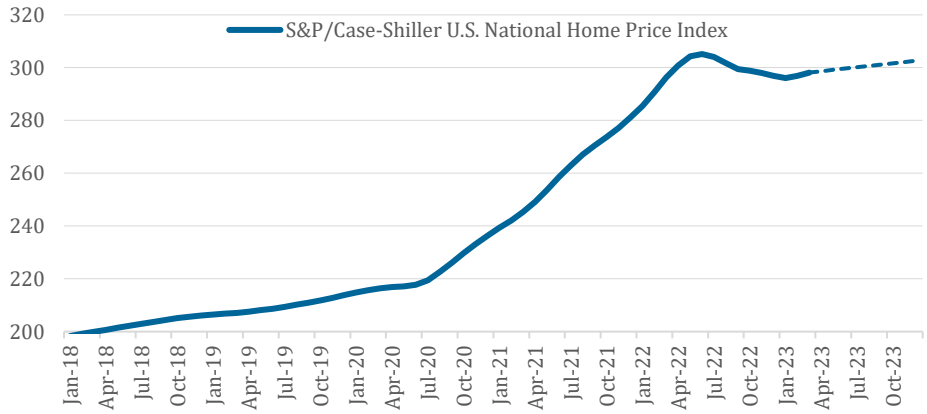
Figure 5: Real Credit Outlook



Source: FRED, Author Estimates

Meanwhile, despite house prices starting to increase once again as seen in Figure 6, real house price growth is expected to still decline in 2023 to around 0% and remain subdued going forward.

Figure 6: Real Property Price Outlook

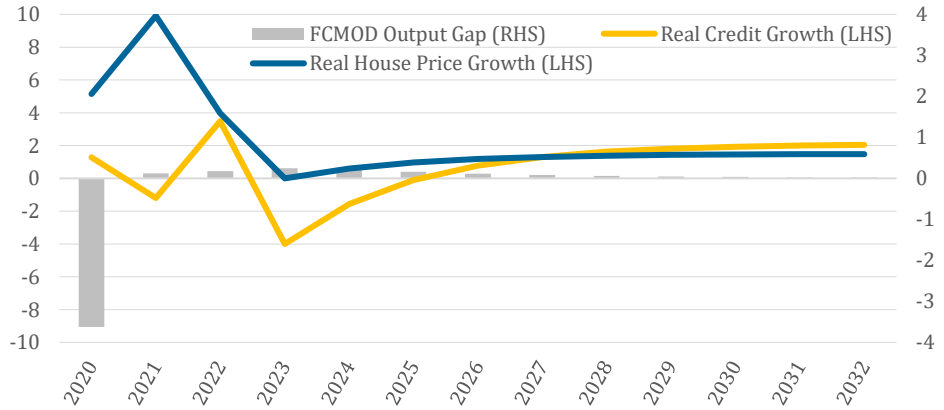


Source: FRED, Author Estimates

Under these assumptions, this combination of a decline and deceleration in real credit and house price growth appears to be the "perfect" mix that closes the output gap in the financial cycle that was worrisome in the context of a persistently overheated real economy. The cooling from the financial sector was necessary to achieve any notion of a "soft landing" and is the predominant narrative thrust for a Case B-type scenario where policy interest rates could already begin normalizing. However, the question now is whether the real economy will follow suit and begin to slow down as well and register below trend output.

We estimate that a negligible positive output gap formed during the recovery phase of the pandemic in 2021/22. However, with interest rates on the rise, the housing market cooling and credit conditions becoming tighter, as we enter 2023, these factors are likely to contribute to the financial cycle output gap remaining materially closed. However, as mentioned previously we are in a state of excess and perhaps real property prices could be more resilient and credit growth could pick up much stronger than we expect if the real economy continues to outperform expectations.

Figure 7: FCMOD Outlook, Subdued Credit and Moderating Property Prices Help Close the Gap



Source: BIS, Author Estimates

V. CONCLUSION AND FUTURE RESEARCH

This paper provides an update of FCMOD that utilizes financial information on real house price growth and real credit growth to help measure the cyclical component of GDP. This approach provides an estimate of the financial cycle output gap during the COVID-19 pandemic period where a rapid rise in property prices have opened a positive gap and a modest correction would be warranted to help close the gap. Indeed, this appears to be where the market is headed as house prices appear to be cooling in the second half of 2022 and we expect that to continue throughout 2023. Although, we have not observed a boom in credit growth over the same period which would have exacerbated the financial imbalances, it is also true that we have never seen such a large correction in house prices that have not led to at least some financial instability. However, the ongoing correction of the financial-cycle output gap creates a sustainable background for "soft landing" of the real economic demand and a scenario with gradual normalization of interest rates (a Case B-type scenario).

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APPENDIX

A. FCMOD Equations

In this section, we present the equations of the model. Parameter values and the standard errors of shock terms for these equations are estimated using Bayesian estimation techniques and are provided (see Table B).

The three observable variables of the model are the GDP, the growth rate of property prices and credit growth. In FCMOD the financial cycle output gap ($\hat{y}_t^{fc}$) is defined as the deviation of log real GDP (y_t) from its trend level ($\overline{y}_t^{fc}$):

(1) $\hat{y}_t^{fc} = y_t - \overline{y}_t^{fc}$

The stochastic process for trend output is comprised of three equations, (2)-(4), and are subject to four types of shocks:

(2) $\overline{y}_t^{fc} = \overline{y}_{t-1}^{fc} + g_t^{fc} + \epsilon_{\overline{y}^{fc},t}$

(3) $g_t^{fc} = \theta * g_{fc}^{ss} + (1-\theta) * g_{t-1}^{fc} + \epsilon_{g^{fc},t}$

(4) $\hat{y}_t^{fc} = \chi_1 * \hat{y}_{t-1}^{fc} - \chi_2 \hat{y}_{t-2}^{fc} + \epsilon_{\hat{y}^{fc},t} + 0.4\,\epsilon_t^{fc}$

The level of trend output $\left(\overline{y}_t^{fc}\right)$ evolves according to trend potential growth $\left(g_t^{fc}\right)$ and a level-shock term $\left(\epsilon_{\overline{y}^{fc},t}\right)$. Potential growth is also subject to a shock $\left(\epsilon_{g^{fc},t}\right)$, whose impact fades away with persistence parameter of 0.9. The output gap $\left(\hat{y}_t^{fc}\right)$ is a function of one-year lagged values of output gap and the deviation of real and potential output growth rates. The output gap incorporates a shock (ϵ_t^{fc}) with the weight 0.4, which is the common component of the shock driving both credit and property prices. The output gap is also subject to and idiosyncratic shock $\left(\epsilon_{\hat{y}^{fc},t}\right)$.

Real credit growth (Δrbc_t) and real house price growth (Δrph_t) are both modeled as autoregressive processes that gradually revert to their long-run steady-state rates (Δrbc^{ss} and Δrph^{ss}), respectively. Each of the processes has two types of innovations: one idiosyncratic, i.e. specific to that equation ($\epsilon_t^{\Delta rbc}$ and $\epsilon_t^{\Delta rph}$, respectively), and one common component that enters both equations $\left(\epsilon_{\hat{y}^{fc},t}\right)$ capturing a positive cross-correlation between credit and house prices during financial cycles.

(5) $\Delta rbc_t = \rho_1 \Delta rbc_{t-1} + (1.0-\rho_1)\Delta rbc^{SS} + \epsilon_t^{\Delta rbc} + \epsilon_t^{fc}$

(6) $\Delta rph_t = \rho_2 \Delta rph_{t-1} + (1.0-\rho_2)\Delta rbc^{SS} + \epsilon_t^{\Delta rbc} + \epsilon_t^{fc}$

The idea behind the commons shock $\left(\epsilon_{\hat{y}^{fc},t}\right)$ is the key in FCMOD. It appears in three equations in the model- financial cycle, real credit growth and real house price growth equations-creating a simple mechanism, which simultaneously generates a boom in output, credit, and house prices. If the high growth rate of GDP is accompanied with simultaneous rapid increase in credit and house prices, the model will deem part of the growth unsustainable. If, on the other hand, the idiosyncratic shocks

explain the data better, that would point to lower systemic imbalances. This reflects one of the most robust empirical regularities about financial crises mentioned earlier.

B. MPMOD Parameters

Parameter	Calibration
θ	0.1
χ_1	1.0
χ_2	0.2
ρ_1	0.6
ρ_2	0.6