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The strength of the inflation-output link in China

Mikael Juselius Wenzhe Li*

Abstract

We systematically investigate the relationship between China's inflation, economic slack, and expectations through the lens of New Keynesian Phillips Curves (NKPC). Extending existing research, we employ inflation expectations from Consensus Economics over recent samples and assess the stability of the estimates. Despite China's unique and evolving institutions, NKPC estimates are stable and show significant roles for both the output gap and inflation expectations in contrast to previous findings. Incorporating open-economy variables marginally enhances the models performance. Our results suggest that the New Keynesian framework can be adopted to China without adjustments for specific institutional features.

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1 Introduction

Does China's inflation serve as a reliable barometer of the state of its economy, as in other major economies? This is an important issue both domestically and globally, given China's pivotal role in international trade and value chains.[1] Empirically, it boils down to whether a stable mapping exists between Chinese inflation, indicators of real activity, and expectations. If such a mapping holds, the logic of conventional frameworks, most notably the New Keynesian paradigm, would carry over to the Chinese context. This would, in turn, help authorities and market participants more reliably assess the business cycle and form expectations for variables such as interest rates, the exchange rate, and the terms of trade. Nevertheless, several factors specific to China could weaken or complicate the relationship in the data. These include decades of large-scale structural change and increasing openness, price management in key sectors, and measurement challenges (see e.g., Gong et al. 2025).

Against this backdrop, it is unsurprising that previous studies on the NKPC for China report mixed and often weak results.[2] For one, most extant studies rely on data reaching back to the 1980s, spanning periods of rapid economic and institutional change. Moreover, changes in price and output data may differ markedly pre-2000 versus post-2000 (Nakamura et al. 2016). Both issues could plausibly attenuate the relationship between inflation and output in line with the past findings.[3] A related problem has been the lack of publicly available measures of inflation expectations for China, for example, from surveys of professional forecasters or households.[4] Most studies circumvent this problem by imposing strict rational expectations, but this can lead to an upward bias in the weight attached to forward-looking behaviour in the Phillips curve (see Rudd and Whelan 2007). Finally, only Zhang and He (2016) considers an open-economy version of the NKPC

1. As noted by the IMF (2024), China's domestic shocks can explain about 10 percent of the variation in GDP in other emerging markets.

2. See Funke (2006), Chen (2008), Mehrotra et al. (2010), Zhang and Murasawa (2011), and Zhang and He (2016). Kojima et al. (2005) and Gerlach and Peng (2006) estimate backward-looking Phillips curves on Chinese data.

3. Mehrotra et al. (2010) argues that regulation makes marginal cost less relevant for pricing behavior.

4. One exception is Chen (2008), who proxies expectations using a diffusion index for one-quarter-ahead Chinese inflation, published by the People's Bank of China (PBC, China's central bank).

despite China's increasing integration into global trade over time.[5]

We contribute to this literature by systematically exploring the NKPC for China, aiming to overcome the key challenges in three specific ways. First, we use quarterly rather than annual data that, together with a more recent sample, allows us to assess the stability of the estimates. Second, we use quarterly forecasts by professional analysts from Consensus Economics as a measure of inflation expectations. These data improve the correspondence with theory and comparability with estimates for other major economies. Third, we consider several NKPC specifications, including four open-economy variants used in the broader literature. We estimate these models using a Generation Method of Moment (GMM) estimator with several instruments, including lagged covariates. Throughout our analysis, we assess how modeling choices and sample selection affect the results, focusing on significance and economic interpretability of the estimates. This enables us to identify stable structural features of Chinese inflation on which policymakers and market participants can rely.

Our main finding is that the NKPC framework fits China's inflation dynamics surprisingly well. Despite China's distinctive features, the fundamental structural relationship between inflation and slack nevertheless holds.[6] Specifically, most of the NKPCs that we estimate produce a stable and significant relationship between output and inflation, with a sizable role for inflation expectations. This result depends, however, to some extent on the post-2000 sample and on excluding highly volatile output-gap movements associated with the COVID-19 pandemic. Moreover, the estimated curves can account for a larger share of the variation in inflation than found in previous studies. While this result is not surprising given that most of our specifications include lags, the output gap and inflation expectations can nevertheless account for more than 80% of the variation on their own. That said, hybrid specifications are clearly favored by the data, assigning approximately equal weight to past inflation relative to inflation expectations.

5. Zhang and He (2016) uses the world output gap as the external driver, whereas real exchange rates or the terms of trade are more commonly employed (see e.g., Abbas et al. 2016a).

6. In other contexts, many studies have proposed tailor-made models for explaining Chinese growth (Song et al. 2011), bond market internationalization (Clayton et al. 2025), and capital account liberalization (Liu et al. 2021), among others. In other contexts, such as consumption around retirement e.g., Li et al. (2015), Chinese data appear to align more closely with theory.

On balance, open-economy models are preferred to closed-economy versions. Interestingly, incorporating external variables marginally increases the role of lagged inflation relative to inflation expectations. This happens, for example, if we add the real effective exchange rate, which produces significant theory-consistent estimates of reasonable magnitude. This suggests that agents incorporate such variables when forming their inflation expectations. The coefficient estimates of the open-economy variables are also mostly stable over time, highlighting their reliability as inputs to monetary policy across different environments.

Relative to prior studies estimating NKPCs for China, our study differs in several notable ways. For instance, we find a much larger role for output-gap movements in driving Chinese inflation. Two methodological choices underpin this result: (i) the use of a direct measure of inflation expectations that allows us to forego the imposition of strict rational expectations, and (ii) the use of a more recent sample that omits data from the volatile 1990s. We also find a statistically significant role for observed inflation expectations in Chinese inflation. This result complements the findings in studies that use the rational expectations assumption to substitute for inflation expectations with realized future inflation. Beyond existing results in the literature, we establish the benefits of accounting for external influences when estimating the curves.

Contrasting our estimates with those for advanced economies is also informative. Our estimates on inflation expectations are in the range of 0.5–0.7 across specifications and broadly aligned with those reported for advanced economies.[7] The estimates on lagged inflation, in the range of 0.5–0.7, are at the upper end of that found for other countries, suggesting that Chinese inflation is somewhat more inertial. In contrast, the coefficients on the output gap we estimate are much larger than those typically found in the literature. We estimate coefficients in the range 0.45–0.55 across specifications, whereas most studies report coefficients below 0.2.[8] However, this does not necessarily

7. See Galí and Gertler (1999), Rudd and Whelan (2005), Batini et al. (2005), Mihailov et al. (2011), Abbas et al. (2016b), and Abbas et al. (2016b). Our results are particularly well-aligned with studies that use survey measures of inflation expectations, e.g., Adam and Padula (2011) and Szafranek (2017).

8. More in line with our estimates, Mihailov et al. (2011) report coefficients in the range of 0.3–0.5 for UK data, and Szafranek (2017) report in the range 0.3–0.7 for Polish data.

translate into more volatile inflation. One likely culprit is the relative stability of Chinese real GDP figures, which, together with common statistical filters, produce much smaller output gaps than in other countries.

Our results are robust to alternative specifications and samples. First, our recursive estimates suggest that the specifications are reasonably stable over different sub-samples. This strengthens confidence that the estimates are reliable across a range of environments and conditions. Second, the precise choice of inflation or slack measure does not materially affect the results. For example, our results are qualitatively the same when we use producer price inflation (PPI) instead of CPI or an alternative real-activity indicator instead of the output gap. Finally, the results are not sensitive to the details of the specification. For instance, changing the set of GMM instruments or the lag length in the specifications does not materially change the results.

Our findings have clear implications for monetary policy. Foremost, the strong and stable fit of NKPCs for Chinese inflation suggests that policymakers can rely on the New Keynesian framework as a practical baseline. No major adjustments to account for China-specific features appears to be needed. This is advantageous as the framework's intellectual underpinnings are well-known and have been applied across many different circumstances that could become relevant. On the specifics, the presence of moderately high inflation persistence implies that short-run policy shifts have tempered immediate effects on inflation. The notable forward-looking component suggests the importance of expectations anchoring through policy consistency, credible guidance and communication. At the same time, the sizable coefficient on the output gap, implies that relevant measures can be highly effective in the Chinese context. Our estimates also underscore the role of external conditions and exchange-rate management in shaping domestic inflation. As such, they provide a coherent framework for assessing monetary-policy transmission in China and its international spillover effects.

The remainder of the paper is structured as follows. Section 2 reviews price-setting in China, outlines the empirical specifications, and describes the data. Section 3 presents the main empirical findings and robustness is discussed in Section 4. Section 5 concludes.

2 Empirical approach

We lay down our empirical approach for assessing the link between China's inflation and business cycle in this section. We first outline the institutional context, then present several empirical NKPC variants for estimation, and conclude by introducing the data.

2.1 Institutional context

Price setting in China reflects the interplay of legal rules, institutional arrangements, and market dynamics. This mix shapes how quickly and how far prices respond to domestic slack and external shocks.

The legal framework is well established. National prices are governed by the "Law of Price in PRC"[9] (effective since May 1998) and the "Regulations on price management in PRC"[10] (effective since September 1987). These policy documents were introduced as a part of China's reform and opening-up era from 1978 to the present, establishing the fundamental framework for market-oriented price reform and regulation, which remains effective today. The Law of Price inherited the main elements of the regulation, becoming the most important legislation in China on price-related regulation.

Institutional responsibilities are concentrated but distinct. The National Development and Reform Commission (NDRC) houses the Department of Price, responsible for broad price management policy. Its remit spans price monitoring, advisory on the inflation target, pricing reform, drafting pricing policy, and government pricing of important commodities and services.[11] The State Administration for Market Regulation (SAMR) hosts the Bureau of Price Supervision and Anti-Unfair Competition, which inspects pricing behaviors of market entities nationwide.[12] Before the 1990s, a separate National Price Bureau existed within the central government; it was later absorbed into the NDRC and other ministries.[13] Provincial governments have a similar institutional setup.

9. Law of Price in PRC, passed on December 27, 1997 by National Congress, effective on May 1 1998.
10. Regulations on price management in PRC, published by State Council and effective on September 11, 1987.
11. see: Function of Department of Price within NDRC.
12. see: Introduction of Bureau of Price Supervision and Anti-Unfair Competition within SAMR.
13. Reform of State Council in 1993, State Commission Office of Public Sectors Reform, 2010-9-25.

Authorities can influence specific prices directly and via market operations. Government-guided products and services usually include important agricultural and energy products. In agriculture, protective floor prices apply to staples such as rice and wheat. In energy, retail gasoline is priced by a mechanism announced every 10 business days by the NDRC. It sets a price ceiling and links domestic prices to international oil prices within a USD 40 to 130 per barrel range. Prices of natural gas and electricity are determined by provincial governments, with respective pricing formulas. Government–determined service charges are updated on the NDRC webpage and are limited in number. Centrally determined items include banking and port fees,[14] while provincial governments set items such as highway tolls and parking fees. Beyond direct pricing, authorities guide supply and demand to ensure price stability. For example, around the Spring Festival, the NDRC and its branches help organize production and transportation of vegetables and rice to reduce price fluctuations. As regulators, the NDRC and SAMR may also step in to contain excessive competition and irregular pricing behavior.[15]

Despite guidance from authorities, most prices in China are nevertheless set by market forces. This reflects decades of price reform. Since start of the reform and opening-up era, the share of products and services priced by the market has risen from 3% to 97.5%, while the remaining prices are managed by the government.[16]

Open-economy forces are material but have normalized over time. After China joined the WTO in 2001, the ratio of goods imports to nominal GDP rose from an average of 16% in the 1990s to 24% in the 2000s, about 10 percentage points higher than in the US and Japan. Synchronization between world prices and China's strengthened in the same period. Subsequently, this ratio fell back to 14%, similar to other major economies. With imports accounting for around one sixth of annual output, external factors should have similar explanatory power for domestic inflation as in other economies. DSGE models

14. Operational service charges list determined by the central government, Department of Price, NDRC, 2025-2-11.

15. Announcement on containing disorderly competition and maintaining well-running market pricing order, NDRC and SAMR, 2025-9-28.

16. Price reform: accomplishments and experiences, Department of Price, NDRC, 2018-11-19.
Identify directions of price reform–NDRC press communication regarding "Opinions about improving price management mechanism", Xinhuanet, 2025-4-2.

with imported intermediate input explain China's inflation dynamics well during 2012–2016 (Li and Li 2018).

Taken together, it is unclear at the outset if China's unique price-setting environment, with both market forces and guidance from authorities, can be adequately captured by a NKPC specification. On the one hand, most products and services are subject to market forces, implying that prices should respond to slack and external shocks. On the other hand, government pricing and regulatory actions can reduce the responsiveness of the transmission. While the New Keynesian framework does not incorporate such institutional factors explicitly, it is straightforward to reinterpret relevant model aspects, such as menu-costs and the Calvo parameter, in this light. On balance, it seems likely that these considerations moderate the roles of expectations and slack, and increase inertia, in the NKPC.

2.2 NKPC specifications

The NKPC is grounded in optimal price-setting with nominal rigidities and imperfectly competitive product and labor markets. An early modern formulation is Galí and Gertler (1999), who derives a forward-looking specification in which inflation depends on expected future inflation and real marginal cost. Extensions introduce lagged inflation to capture inertia, yielding the hybrid NKPC (Christiano et al. 2005; Smets and Wouters 2003). In empirical work, marginal cost is typically proxied by the output gap or the labor share, and the coefficients on expectations and cost terms reflect structural features such as the discount factor and the degree of pricing frictions.

Empirical research has estimated numerous NKPC specifications across a range of settings. Closed-economy versions trace back to Galí and Gertler (1999), and subsequent work often adopts hybrid specifications (e.g., Rudd and Whelan 2005; Byrne et al. 2013). Open-economy extensions that incorporate external drivers—such as the terms of trade, the real exchange rate, and import price inflation—have been estimated by several authors (e.g., Galí and Monacelli 2005; Abbas et al. 2016a; Szafranek 2017; Saygılı 2020). Studies on China (e.g., Chen 2008; Mehrotra et al. 2010; Zhang and Murasawa 2011) primarily

Author	Years	Frequency	Model	Inflation	Expectations
Funke (2006)	1982–2002	Annual	hybrid closed	RPI	realized
Chen (2008)	2000–2007	Quarterly	hybrid closed	CPI (qoq)	PBC survey
Mehrotra et al. (2010)	1978–2004	Annual	hybrid closed	RPI	realized
Zhang and Murasawa (2011)	1979–2010	Quarterly	hybrid closed	CPI (yoy)	realized
Zhang and He (2016)	1984–2012	Quarterly	hybrid open	π_{GDP} (yoy)	realized

Table 1: Model settings of previous studies on the NKPC for China. Notes: "RPI" is the Retail Price Index, a historical composite price index published by the NBS before end-2022; "PBC survey" refers to the quarterly PBC survey on depositors, available at the PBC website on statistics. It reports the shares of respondents expecting prices to move up, remain unchanged, or move down; "realized" refers to using realized future inflation as a proxy for expectations under rational expectations; qoq refers quarter-on-quarter, while yoy refers year-on-year.

employ hybrid closed-economy models (see Table 1), with limited exploration of open-economy channels.[17]

Guided by the literature, our strategy is to progressively move from the canonical NKPC to increasingly more elaborate variants. We consider six main specifications:

$$\pi_t = \beta_0 + \beta_1 \pi^e_{t+1} + \beta_2 y_t + \varepsilon_t \tag{1}$$

$$\pi_t = \beta_0 + \beta_1 \pi^e_{t+1} + \beta_2 \pi_{t-1} + \beta_3 y_t + \varepsilon_t \tag{2}$$

$$\pi_t = \beta_0 + \beta_1 \pi^e_{t+1} + \beta_2 \pi_{t-1} + \beta_3 y_t + \alpha \Delta s_t + \beta_4 \Delta s^e_{t+1} + \varepsilon_t \tag{3}$$

$$\pi_t = \beta_0 + \beta_1 \pi^e_{t+1} + \beta_2 \pi_{t-1} + \beta_3 y_t + \alpha \Delta q_t + \beta_4 \Delta q^e_{t+1} + \varepsilon_t \tag{4}$$

$$\pi_t = \beta_0 + \beta_1 \pi^e_{t+1} + \beta_2 \pi_{t-1} + \beta_3 y_t + \beta_4 \pi^{IM}_t + \varepsilon_t \tag{5}$$

$$\pi_t = \beta_0 + \beta_1 \pi^e_{t+1} + \beta_2 \pi_{t-1} + \beta_3 y_t + \beta_4 \pi^{CO}_t + \beta_5 \pi^{US}_t + \beta_6 \Delta n q_t + \varepsilon_t \tag{6}$$

were π_t is year-on-year inflation at time t, π^e_t is expected inflation, y_t is the output gap, s_t is the terms of trade, q_t is the real effective exchange rate (REER), π^e_{IM} is import price inflation, π^{CO}_t is commodity price inflation, π^{US}_t is US inflation, nq_t is the nominal effective exchange rate (NEER), and ε_t is the error term. Models (1) and (2) represent closed economy variants, with (2) incorporating inflation persistence. Models (3)–(6) introduce open economy elements following Galí and Monacelli (2005), Abbas et al. (2016a), Szafranek (2017), and Saygılı (2020), respectively. All models include a constant term.

17. Kojima et al. (2005) (quarterly data, CPI yoy inflation) and Gerlach and Peng (2006) (annual data) both estimate China's inflation dynamics without expectation term.

We estimate equations (1)–(6) using a standard instrumental variables approach in a GMM framework.[18] We use two different sets of instruments. First, a "complete" set comprising lagged regressors from all models, the growth-rate differential of M2 over M1, changes in the USD/RMB exchange rate, and the U.S. federal funds rate (augmented near the zero lower bound using Wu and Xia (2016)). The M2–M1 differential captures liquidity preferences and broad monetary conditions which correlate with inflation expectations and the output gap. The USD/RMB exchange rate changes reflect external monetary spillovers and balance-of-payments pressures under China's managed float. The U.S. FFR proxies global monetary and financial conditions which are largely exogenous to China. Second, a "minimal" set containing only the lagged regressors of each model being estimated. This dual IV strategy allow us to obtain estimates using a broad set of instruments while safeguarding against overfitting and problems with weak instruments.

2.3 Data

For the main analysis, we use quarterly Chinese macroeconomic data from January 2000 to September 2025. Table 2 reports descriptive statistics. All changes and growth rates are expressed in year-on-year percentage terms. Inflation expectations are sourced from Consensus Economics.[19] The output gap is defined as the deviation of Chinese real GDP from its Hodrick–Prescott filter trend ($\lambda = 1600$).

Chinese inflation has been relatively high and variable in 2000s compared with other economies, particularly advanced economies (Figure 1a). It has averaged around 2% but featured spikes as high as 8% during the global financial crisis. In contrast to many other economies, Chinese inflation did not surge following the pandemic and has been close to zero in recent years. Inflation expectations track actual inflation closely but are smoother, a pattern consistent with evidence from other economies.

The link between inflation and output is also evident (Figure 1b). For example, the

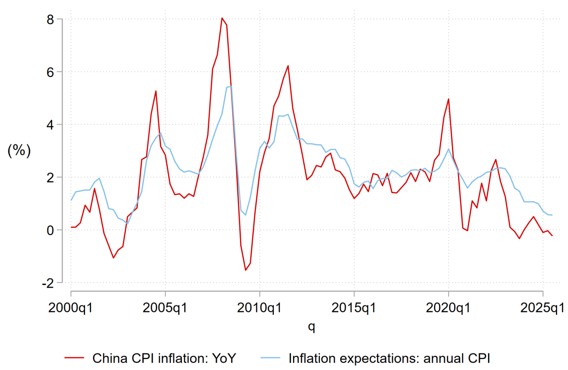
18. We use Stata's "ivregress" command where the weight matrix is estimated by 2SLS in an initial step using the Newey-West based HAC structure for the error term.

19. For each month, $m = 1, \ldots, 12$, Consensus Economics reports the inflation expectation for the current year, $E_{t;m}\pi_t$, and the next year, $E_{t;m}\pi_{t+1}$, where t denotes the year. Following standard practice, we measure the one-year-ahead inflation rate at month m as: $((12-m)/12) \cdot E_{t;m}\pi_t + (m/12) \cdot E_{t;m}\pi_{t+1}$. The quarterly expectation is the averaging of three monthly values in the same quarter.

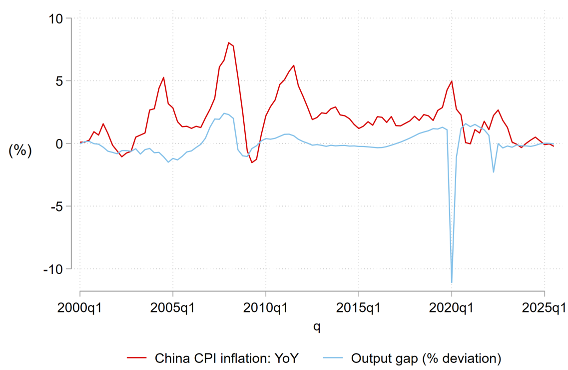
Variables	Obs	Mean	Std. dev.	Min	Max
Chinese CPI inflation	103	1.96	1.89	-1.53	8.03
Chinese PPI inflation	103	1.25	4.30	-7.68	12.23
Annual CPI Inflation expectations	103	2.27	1.06	0.23	5.45
Output gap (% deviation)	103	-0.04	1.38	-11.10	2.40
Term of trade change	103	-1.13	6.26	-16.20	16.19
Real effective exchange rate change	103	0.85	5.29	-10.20	16.39
Nominal effective exchange rate change	103	1.34	5.11	-7.60	17.47
Import price inflation (in RMB)	103	3.52	8.51	-18.63	20.93
Commodities price inflation (S&P GS)	103	5.67	26.68	-58.53	62.56
US CPI inflation	103	2.58	1.72	-1.63	8.67
US PPI inflation	103	3.06	6.69	-13.23	21.90
Growth rate difference of M2 over M1	103	2.01	5.28	-14.10	10.06
RMB exchange rate against USD	103	0.62	4.06	-10.29	10.45
Effective US Federal Funds Rate	103	1.56	2.53	-2.92	6.52

Table 2: Descriptive statistics. Notes: Source: NBS, PBC, CFETS, BIS, Consensus Economics, BLS, SHPGX, and Wind. The federal funds rate (FFR) is supplemented with the shadow rate from Wu and Xia (2016) at the zero lower bound (≤0.3%).

output gap was positive in the run-up to the global financial crisis, generating price pressures that materialized in higher inflation. One notable exception is the sudden drop in output associated with various containment measures at the onset of the COVID-19 pandemic, when inflation remained relatively stable. As these measures were lifted, output returned to its previous trend. We use a dummy variable to capture this exceptional period; it takes the value 1 for any quarter with an output gap larger than 5% and 0 otherwise.



(a) CPI inflation and expectations



(b) CPI inflation and output gaps

Figure 1: CPI inflation, output gaps, and expectations. Source: NBS; Consensus Economics; Wind and authors' calculations.

3 Results

We discuss our results in this section. We first present our estimates of the six New Keynesian Phillips Curve specifications and then contrast them with both previous estimates on Chinese data and data from advanced countries.

3.1 Baseline estimates

The NKPC specifications fit Chinese CPI inflation data well despite China's unique institutional features. R-squared is moving from 0.80 in the canonical closed-economy model (1) to a 0.85–0.88 range in the hybrid and open-economy variants (2)–(6). While this is not surprising given that most specifications include lagged inflation, the strong fit of the canonical model nevertheless gives us some reassurance. Chinese inflation is structurally marked by strong persistence and a statistically meaningful role for expectations. It is also responsive to slack, as measured by the output gap. Adding open-economy terms yields modest but systematic gains in fit, with the most comprehensive open specification attaining the highest explanatory power.

Both the forward-looking inflation and the backward-looking persistence play notable roles and are statistically significant. In the canonical closed-economy model (1), which excludes lagged inflation, the coefficient on inflation expectations is significant and larger than one. However, once we add lagged inflation in the hybrid closed-economy model (2), this coefficient is still significant but drops to 0.69. In contrast, lagged inflation has a consistent weight around 0.5, and together the two coefficients sum to slightly above one. Both the coefficients on lagged inflation and inflation expectations remain tightly estimated across models (3)–(6) and range from 0.47-0.55 and 0.52–0.67, respectively, with all estimates statistically highly significant.

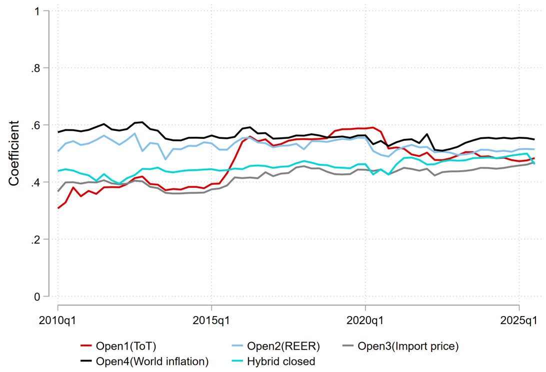
Inflation is materially responsive to the output gap across all specifications. However, it is important to control for large swings in output during the onset of the COVID-19 pandemic, which reflect policy measures such as lockdowns, as they compress the Phillips curve slope if left unaddressed. In the canonical closed-economy model (1), the output-

	(1) closed	(2) hybrid closed	(3) hybrid open-1	(4) hybrid open-2	(5) hybrid open-3	(6) hybrid open-4
Inflation $t-1$		0.462***	0.484***	0.515***	0.469***	0.549***
		(16.16)	(16.61)	(21.86)	(24.48)	(28.40)
Inflation expectation	1.457***	0.686***	0.652***	0.665***	0.583***	0.523***
	(53.85)	(11.02)	(11.34)	(15.74)	(15.44)	(14.28)
Output gap	0.518***	0.560***	0.508***	0.563***	0.476***	0.505***
	(8.166)	(14.45)	(11.08)	(12.95)	(10.35)	(12.64)
Term of trade change			-0.0187**			
			(-2.288)			
Expected ToT change			-0.00480**			
			(-2.158)			
REER change				-0.0264***		
				(-2.790)		
Expected REER change				-0.0171*		
				(-1.839)		
Import price inflation					0.0319***	
					(6.104)	
Comm price inflation						0.0114***
						(6.172)
US CPI inflation						-0.0846***
						(-3.108)
NEER change						-0.0437***
						(-10.22)
Dummy for 2020Q1	7.673***	7.641***	7.084***	7.559***	6.919***	6.953***
	(10.30)	(12.70)	(10.70)	(12.66)	(11.53)	(14.18)
Constant	-1.384***	-0.546***	-0.552***	-0.567***	-0.431***	-0.117
	(-21.70)	(-6.317)	(-6.248)	(-9.315)	(-8.556)	(-1.251)
Observations	100	100	100	100	100	100
R-squared	0.802	0.842	0.856	0.851	0.860	0.875
Wald chi2	3109	4820	4995	8806	10398	14816

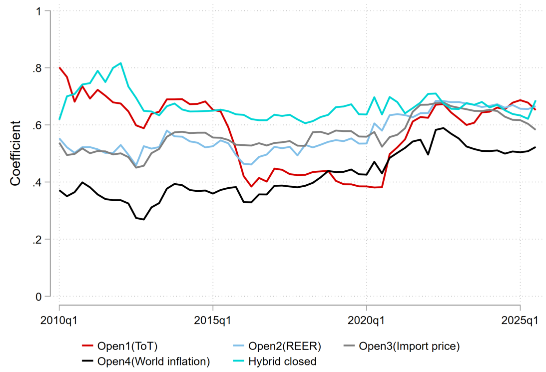
Table 3: Estimated NKPCs for China's CPI inflation. Notes: z-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1; IVs in this table are the "complete set" of instruments, including lagged variables from all models, growth rate difference of M2 over M1, changes in the USD/RMB exchange rate, and the US Federal Funds Rate (FFR); The columns correspond to specifications (1)–(6).

gap coefficient is as high as 0.52, and this estimate further increases to 0.56 in the hybrid closed-economy model (2). The estimate fluctuates around 0.5 across the open-economy variants, implying that a one percentage point (pp) increase in the output gap is associated with a 0.5 pp increase in inflation. These estimates indicate a stable, economically meaningful sensitivity of inflation to domestic slack, once persistence and external channels are taken into account.

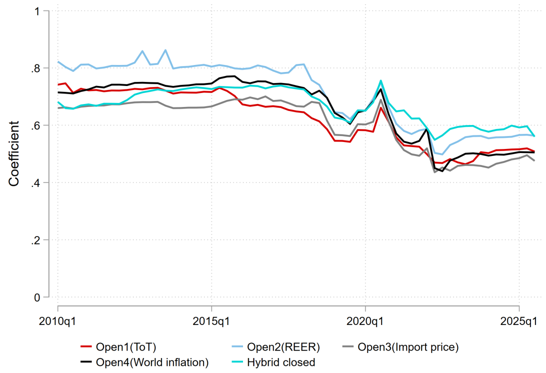
The open-economy variables add some explanatory power and enter with significant and economically interpretable signs. For example, in model (3), the contemporaneous change in the terms of trade enters significantly with a coefficient value of -0.02, implying that favorable trade shocks ease cost pressures and dampen inflation. Taking the volatility of changes in the terms of trade into account, the economic impact of this variable on inflation is about one seventh compared to the output gap (see Table A3). Similarly,



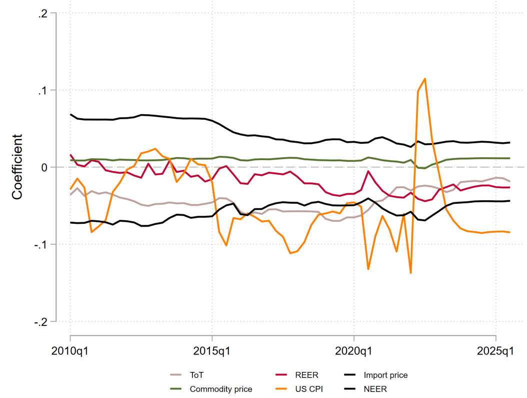
(a) Lagged inflation



(b) Inflation expectations



(c) Output gap



(d) Open economy variables

Figure 2: Expanding window estimates of the coefficients. Note: Lines Open1–Open4 refer to models (3)–(6), respectively, in Section 2.2, Hybrid closed refers to (2).

the contemporaneous change in the real effective exchange rate (REER), import price inflation, commodity price inflation, U.S. CPI inflation, and the change in the nominal effective exchange rate (NEER) all appear to contribute valuable information for Chinese inflation. The incremental fit moving from (3) to (6) is modest but consistent, with specification (6) yielding the highest overall R-squared.

Most coefficient estimates are fairly stable regardless of the specific sample. Using expanding samples starting from 2000-2010, the lagged inflation coefficient fluctuates around 0.5, whereas the coefficient on expected inflation is slightly more volatile, fluctuating around 0.6 on average (Figure 2). The output-gap elasticity is tightly estimated, but it starts to drop around 2018. It settles in the range 0.45–0.6 after the pandemic. In each specification, we add the dummy for the Covid-19 pandemic. Without this dummy, the coefficient on the output gap drops even further (see Table 5, column 2). With the exception of the coefficient on US CPI inflation in Specification (6), the open open-economy estimates display reasonable stability. Specifications (5) and (6) stand out in terms of impact on inflation given the degree of volatility in inflation (Table A3).

3.2 Connection to previous Chinese studies

It is instructive to compare our results with those of previous NKPC studies on Chinese data. Specifically, we assess how the estimates are impacted by the novel features of our study: that we use a measure of inflation expectations rather than future inflation, exclude the late 1990s when inflation was more volatile and likely structurally distinct, work with a more recent and up to date sample, and consider open-economy specifications.

Using measured inflation expectations is crucial for gauging the sensitivity of prices to domestic slack in China. Replacing survey expectations with realized future inflation effectively imposes a strict rational-expectations assumption, which tends to increase the forward-looking coefficient and compress the NKPC slope. In our estimates, however, this substitution raises the coefficient on lagged inflation, lowers the coefficient on forward-looking inflation, and pushes the slope of the curve to around 0.15 (Table 5, column 3).[20] While these patterns bring us closer to the near-zero slopes found in earlier studies (summarized in Table 4), the decrease in the coefficient on expected inflation is surprising. It suggests that other aspects, such as sample, might account for the differences.

The choice of sample starting point has a sizable impact on the results. The late-1990s in China featured high and volatile inflation amid an evolving monetary framework and ongoing price reforms. Conditioning on this regime materially shifts the parameters and increases the weight on past inflation. Using a sample that is more directly comparable to previous studies, 1995–2005 specifically, increases the coefficient on lagged inflation and makes the forward-looking coefficient small and negative (Table 5, column 4). The coefficient on the output gap also becomes negative. Extending this sample to encompass the most recent observations, restores the output gap estimate, but is otherwise similar (column 5). Using realized future inflation in place of inflation expectations in the longer

20. Table A1 presents similar findings for Specification (6).

Paper	Economy	Model	Previous inflation	Expectation	Output gap
Funke (2006)	China	hybrid closed	0.55	0.47	0.015
Chen (2008)†	China	hybrid closed	0.6	1.7–7	≈0
Mehrotra et al. (2010)	China	hybrid closed	0.25–0.75	0.31–0.85	<0.01
Zhang and Murasawa (2011)	China	hybrid closed	0.3–0.53	0.5–1.2	0.18
Zhang and He (2016)	China	hybrid open	0.4	0.5–0.7	0.15
Galí and Gertler (1999)	US	hybrid closed	0.2–0.4	0.6–0.7	<0.04
Rudd and Whelan (2005)	US	non-hybrid closed	0.2–0.45	0.6–0.8	<0.02
Adam and Padula (2011)†	US	hybrid closed	0.6	0.36	0.04–0.1
Batini et al. (2005)	UK	hybrid open	0.1–0.3	0.4–0.8	<0.1
	UK	non-hybrid open		0.4–0.7	<0.1
Mihailov et al. (2011)	OECD	non-hybrid open		≈1	0.15–0.3 (UK, FR)
	OECD	non-hybrid closed		0.8–1.03	0.48 (UK) ≈0.12 (IT, FR)
	OECD	hybrid closed	0.2–0.7	0.3–0.7	≈0, 0.32(UK)
Abbas et al. (2016a)	AU	hybrid closed	0.03–0.3	0.7–0.9	
	AU	non-hybrid open		0.9–1	
Abbas et al. (2016b)	AU/CA/NZ/UK	non-hybrid closed		0.2–1.1	<0.04
	AU/CA/NZ/UK	non-hybrid open		0.6–1.1	≈0, 0.3 (UK)
Szafranek (2017)†	PL (core)	hybrid open	≈0.45	0.1–0.2	0.2–0.3
	PL (headline)	hybrid open	0.1–0.3	0.4–0.8	0.2–0.7

Table 4: NKPC estimates from previous studies. Note: † refers to those papers using surveyed expectations in their models.

	(1) Baseline	(2) No dummy	(3) $\pi_t^e = \pi_{t+1}$	(4) 1995-2005	(5) 1995-2025	(6) 1995-2025, $\pi_t^e = \pi_{t+1}$
Inflation $t-1$	0.462***	0.494***	0.716***	0.963***	0.866***	0.692***
	(16.16)	(13.73)	(51.02)	(27.92)	(27.58)	(88.75)
Inflation expectation	0.686***	0.738***	0.406***	-0.103***	-0.0589	0.405***
	(11.02)	(9.272)	(18.38)	(-2.655)	(-1.394)	(34.24)
Output gap	0.560***	0.269***	0.155***	-0.138**	0.547***	0.203***
	(14.45)	(4.834)	(2.726)	(-2.540)	(9.266)	(5.703)
Dummy for 2020Q1	7.641***		3.164***		7.168***	3.823***
	(12.70)		(4.259)		(7.966)	(6.923)
Constant	-0.546***	-0.665***	-0.269***	0.140**	0.274***	-0.219***
	(-6.317)	(-5.723)	(-6.973)	(1.992)	(4.836)	(-8.332)
Observations	100	100	96	39	118	114
R-squared	0.842	0.792	0.883	0.906	0.843	0.921
Wald chi2	4820	5010	7082	12666	5636	22797

Table 5: Exploring variations of the closed economy hybrid NKPC (2) that drive differences compared to previous studies on Chinese data. "No dummy": Covid-19 dummy is excluded from the regression; "$\pi_t^e = \pi_{t+1}$": Rational expectations imposed and measured inflation expectations swapped for future inflation. Notes: z-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

sample yields estimates on the dynamic terms that are more aligned with our baseline but also reduces the slope coefficients (column 6). These results reinforce our design choices to focus on the post-2000 era and to use survey expectations.

Allowing for open-economy channels is important for fit and interpretation, but it does not change the core domestic coefficients. This is consistent with Zhang and He (2016), where open-economy models strengthen identification of external channels while retaining a meaningful output-gap slope and moderate expectations coefficients.

3.3 Comparison to studies on other economies

How do our results compare with estimates from other economies? Investigating this provides information about how different China is from other economies, and therefore if tailored modelling may be required to capture its institutional specificities. This in turn tells us if insights from the larger literature can be applied to assessing the monetary transmission in China.

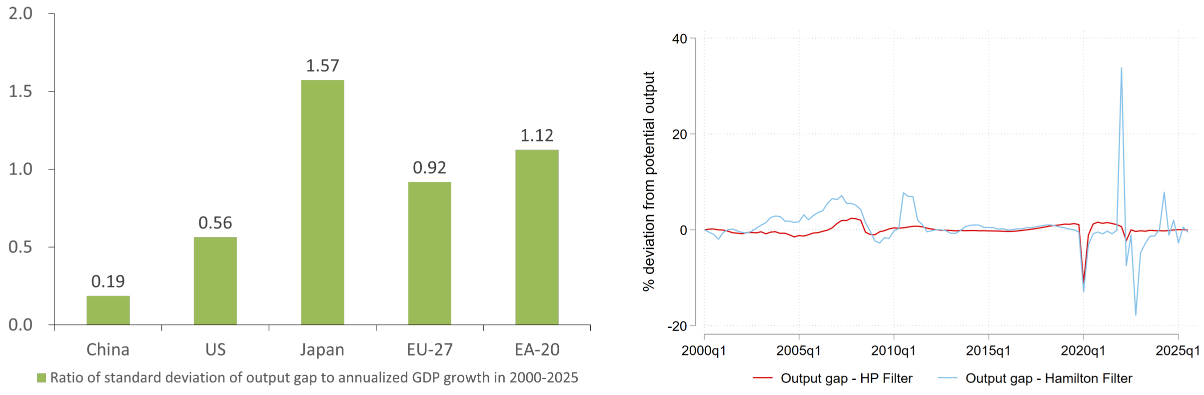
In broad terms, we find that the our estimates align with those from other economies surprisingly well. The estimated coefficients are within advanced economy (AE) ranges once expectations are measured directly rather than proxied by realized future inflation. At the same time, the relative contributions of persistence, expectations, and real activity differ marginally from typical AE estimates in ways consistent with China's institutional features and data environment. We highlight three aspects.

First, our estimates point to a somewhat more inertial process for China compared to much of the literature. In hybrid specifications, the loading on lagged inflation lies around 0.46–0.55 (Table 3). This is toward the upper end of values typically reported for AEs (0.2–0.6 in Table 4). This seems consistent with China's institutional context with administered or guided prices in parts of the CPI basket. By contrast, the magnitude of the forward-looking in the 0.52–0.69 range, which aligns well with most other studies in 4, especially those that use survey-based expectations.

Second, China's inflation is more sensitive to domestic slack than in most large AEs. Across our specifications, the output-gap elasticity lies between 0.48 and 0.56 (Table 3), compared with values often below 0.1 for the US or euro area (see Table 4). The magnitudes are closer to those reported for small open economies. For instance, Batini et al. (2005) and Mihailov et al. (2011) report estimates around 0.1–0.3 for the UK, and Szafranek (2017) find even higher estimates for Poland at around 0.2–0.7. However, our estimates do not necessarily imply unusually volatile inflation dynamics in China. The reason is that the Chinese output gap has been small and smooth compared to output growth in other economies (Figure 3a), so higher elasticities translate into moderate price movements.

Third, the open-economy channels line up well both in sign and scale with evidence from other studies. The coefficient estimates on the real or nominal effective exchange rate, terms-of-trade, import-price inflation, and commodity-price inflation are comparable to those documented for small open economies (cf. Mihailov et al. 2011; Batini et al. 2005).

Taken together, the cross-study comparison confirms that Chinese inflation conforms to the same underlying NKPC logic as in other economies. This suggests that policymakers and market participants can largely interpret the monetary transmission in China though the lens of the New Keynesian framework. That said, recognizing the institutional differences is important.



(a) Volatility across major economies.

(b) Different filters for China.

Figure 3: Variability of output gaps. The left-hand panel shows the ration between the standard deviations of the estimated gap and the GDP growth rates. The right-hand panel shows the HP and Hamilton filtered gaps for China. Source: NBS; BEA; Japan Cabinet; Eurostat; Wind and authors' calculation.

4 Robustness

How sensitive are the key parameters in Table 3 to alternative modeling choices and variables? For instance, Chinese business-cycle measurement can be noisy and price dynamics might not be captured by a single lag. To address such concerns, we conduct a series of targeted robustness checks. Specifically, we vary the measure of economic slack, enrich the lag structure, compare instrument sets, and replace CPI with PPI in the specifications. The aim is to identify features of the Chinese NKPC that remain stable across plausible modeling choices.

4.1 Alternative measures of slack

Output-gap measurement in China is inherently uncertain. GDP figures may understate high-frequency cyclical movements and filter-based gaps can differ in amplitude. We gauge sensitivity by reporting estimates from using an output gap based on the Hamilton filter and an arithmetic average of four higher-frequency indicators; industrial production, electricity output, rail cargo, and real imports (Tables 6, columns 2 and 3).[21] The NKPC relation remains intact under both alternatives, with coefficients retaining statistical significance. However, the output-gap coefficient declines to just above 0.1, bringing it

21. Table A2 reports similar estimates for Specification (6).

	(1) Baseline	(2) Hamilton	(3) Gap index	(4) Few instruments	(5) PPI inflation	(6) Four lags
Inflation $t-1$	0.462***	0.434***	0.608***	0.541***	0.856***	0.575***
	(16.16)	(9.632)	(18.12)	(4.840)	(30.99)	(14.40)
Inflation expectation	0.686***	0.770***	0.425***	0.482**	0.0620	0.660***
	(11.02)	(9.923)	(5.584)	(2.220)	(0.400)	(13.61)
Output gap	0.560***	0.128***	0.138***	0.617***	1.122***	0.463***
	(14.45)	(9.156)	(9.534)	(3.656)	(5.168)	(12.11)
Inflation $t-2$						0.0815*
						(1.809)
Inflation $t-3$						-0.156**
						(-2.253)
Inflation $t-4$						-0.139***
						(-3.062)
Dummy for 2020Q1	7.641***	3.320***	2.582***	8.679***	13.80***	6.307***
	(12.70)	(3.476)	(4.784)	(2.607)	(3.535)	(9.736)
Constant	-0.546***	-0.775***	-0.222**	-0.238	-0.204	-0.280***
	(-6.317)	(-7.691)	(-2.347)	(-0.863)	(-0.558)	(-3.937)
Observations	100	100	100	100	100	97
R-squared	0.842	0.768	0.831	0.833	0.769	0.897
Wald chi2	4820	3559	6249	1618	1535	5389

Table 6: Robustness with respect to the closed economy NKPC (2). "Hamilton gap": The output hap is obtained using the Hamilton filter; "Gap index": An average of four growth variables are used as measure of economic slack; "Few instruments": The minimal set of instruments is used; "PPI inflation": PPI inflation is used in place of CPI inflation. Notes: Coefficients with z-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

closer to values commonly reported for advanced economies. A primary reason is scaling. The Hamilton-filter gap is substantially more volatile than the HP-filter gap (Figure 3b), so a smaller slope can deliver comparable price responses. Nevertheless, it also less well attuned to cyclical changes in inflation, as witnessed by the drop in statistical precision. Similar observations apply to the composite slack indicator – even if we separate out its individual components (not shown).

4.2 Parsimonious instruments

GMM estimates can be sensitive to instrument choice, and overfitting or weak instruments may distort inference. We therefore assess how moving from the "complete" set of instruments to the "minimal" set, containing only lagged regressors, changes our results (Table 6, column 4). The resulting coefficients are largely the same. The main change is that the coefficient on inflation expectations drops slightly and the coefficient on the output gap rises marginally. This indicates that identification is not driven by instrument selection and that our estimates are stable to reasonable instrument parsimony.

4.3 PPI inflation

Producer price inflation is more flexible and exposed to external conditions than consumer price inflation and, hence, provide a useful alternative measure for the NKPC. PPI inflation turns out to be more responsive to slack in absolute terms, but its statistical precision is much lower (Table 6, column 5). The coefficient on lagged inflation increases while the coefficient on inflation expectations drops and becomes statistically insignificant. This is perhaps not surprising given that the expectations measure is related to CPI inflation. Nevertheless, it is reassuring that the relationship between slack and inflation also holds in the PPI case.

4.4 Lag-structure

Chinese price-setting may involve inertia beyond a single lag, and omitting additional lags could bias the contribution of backward- versus forward-looking components. To check if this is the case, we add up to four lags of inflation to the baseline specification (Tables 6, column 6). The coefficient on expected inflation and the output gap remain stable with this adjustment. Interestingly, together with the forward-looking term, the coefficients on lagged inflation sum to exactly one in line with what is expected from theory.

5 Conclusion

This paper re-examines China's inflation dynamics through the lens of the New Keynesian Phillips Curve. The novel aspects relative to prior work on China are that we use a direct survey-based measure of inflation expectations, employ a more recent quarterly sample, and explicitly consider open-economy extensions. We benchmark our findings against previous estimates and pay particular attention to features that are robust across specifications and to small variations in the setup.

Three findings stand out. First, the coefficients on the backward- and forward-looking inflation terms are roughly equal and sum to about one. While the weight on the forward-looking term is smaller than in studies that use a lead of inflation under the rational-expectations assumption, it is nevertheless sizable—and arguably more plausible. The somewhat higher degree of backward-looking persistence relative to advanced economies is consistent with China's price-setting process, which includes price management. Second, domestic slack exerts a substantial, stable, and economically meaningful influence on prices, in contrast with findings in previous studies. This is especially true for data after the turn of the millennium, once pandemic-driven outliers are accounted for. Third, open-economy channels improve fit and sharpen interpretation without crowding out core domestic drivers.

Looking ahead, two extensions of our work appear particularly promising. First, one could develop and estimate specifications that explicitly incorporate the institutional features of China's price-setting process, such as price guidance and regulation. This would allow a more direct assessment of how they shape the relative weights on expectations, inertia, and slack over time. Second, one could aim to recover underlying structural parameters, such as the discount factor and Calvo probability. However, doing so would likely require careful treatment of known data issues, including measurement biases in prices and activity.

Taken together, our findings suggest that China's inflation can be reliably linked to real activity and expectations in a manner consistent with the New Keynesian paradigm. This provides a practical baseline for policymakers and market participants with which to assess the state of the business cycle and form expectations about prices, interest rates, and other key variables. While China's institutional features are distinctive, its inflation dynamics may not be so different after all.

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A Robustness test results

	(1) Baseline	(2) No dummy	(3) $\pi_t^e = \pi_{t+1}$	(4) 1995-2005	(5) 1995-2025	(6) 1995-2025, $\pi_t^e = \pi_{t+1}$
Previous CPI inflation	0.549***	0.584***	0.705***	0.622***	0.849***	0.684***
	(28.40)	(19.48)	(83.90)	(19.84)	(30.27)	(64.61)
Inflation expectation	0.523***	0.561***	0.366***	0.202***	-0.0408	0.365***
	(14.28)	(11.62)	(23.44)	(5.911)	(-0.955)	(18.68)
Output gap	0.505***	0.264***	0.159***	-0.388***	0.512***	0.222***
	(12.64)	(3.850)	(4.426)	(-6.712)	(8.510)	(4.947)
Comm price inflation	0.0114***	0.0117***	0.0114***	0.0259***	0.0126***	0.00808***
	(6.172)	(4.899)	(9.851)	(18.61)	(6.041)	(6.905)
US CPI inflation	-0.0846***	-0.0862***	-0.00855	-0.338***	-0.0809***	0.0292*
	(-3.108)	(-2.681)	(-0.578)	(-7.965)	(-2.708)	(1.908)
NEER change	-0.0437***	-0.0515***	-0.0176***	-0.0212***	-0.0602***	-0.0198***
	(-10.22)	(-9.317)	(-2.812)	(-7.123)	(-7.744)	(-3.489)
Dummy for 2020Q1	6.953***		3.428***		6.973***	4.181***
	(14.18)		(7.370)		(9.761)	(7.960)
Constant	-0.117	-0.209*	-0.165***	0.257***	0.508***	-0.208***
	(-1.251)	(-1.917)	(-2.668)	(2.705)	(4.976)	(-4.788)
Observations	100	100	96	39	118	114
R-squared	0.875	0.826	0.910	0.940	0.886	0.936
Wald chi2	14816	5699	17586	52291	8259	25611

Table A1: Exploring variations of the open economy hybrid NKPC (6) that drive differences compared to previous studies on Chinese data. "No dummy": Covid-19 dummy is excluded from the regression; "$\pi_t^e = \pi_{t+1}$": Rational expectations imposed and measured inflation expectations swapped for future inflation. Notes: z-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

	(1) Baseline	(2) Hamilton	(3) Gap index	(4) Few instruments	(5) PPI inflation	(6) Four lags
Inflation $t-1$	0.549***	0.518***	0.558***	0.575***	0.532***	0.579***
	(28.40)	(18.63)	(14.90)	(18.01)	(14.26)	(11.99)
Inflation expectation	0.523***	0.645***	0.528***	0.444***	0.201**	0.609***
	(14.28)	(20.01)	(8.224)	(8.330)	(2.536)	(11.25)
Output gap	0.505***	0.114***	0.0501*	0.557***	0.771***	0.462***
	(12.64)	(7.905)	(1.674)	(6.207)	(6.808)	(10.28)
Comm price inflation	0.0114***	0.00242	0.0136**	0.0121***	0.00416	0.00565*
	(6.172)	(0.942)	(2.545)	(3.222)	(0.593)	(1.853)
US CPI/PPI inflation	-0.0846***	0.00121	-0.133*	-0.118**	0.227***	-0.0950***
	(-3.108)	(0.0333)	(-1.824)	(-2.076)	(6.791)	(-3.114)
NEER change	-0.0437***	-0.0594***	-0.0431***	-0.0380***	-0.186***	-0.0111**
	(-10.22)	(-11.67)	(-4.659)	(-5.025)	(-11.60)	(-2.054)
Inflation $t-2$						0.0980**
						(1.980)
Inflation $t-3$						-0.145**
						(-2.016)
Inflation $t-4$						-0.128***
						(-2.735)
Dummy for 2020Q1	6.953***	2.693***	2.549**	6.534***	6.757***	6.269***
	(14.18)	(4.044)	(2.559)	(2.792)	(2.871)	(9.039)
Constant	-0.117	-0.577***	-0.0900	0.101	-0.382*	-0.0149
	(-1.251)	(-6.192)	(-0.654)	(0.538)	(-1.731)	(-0.149)
Observations	100	100	100	100	100	97
R-squared	0.875	0.806	0.852	0.868	0.897	0.903
Wald chi2	14816	10149	4037	3762	5983	5512

Table A2: Robustness with respect to the open economy NKPC (6). "Hamilton gap": The output hap is obtained using the Hamilton filter; "Gap index": An average of four growth variables are used as measure of economic slack; "Few instruments": The minimal set of instruments is used; "PPI inflation": PPI inflation is used in place of CPI inflation. Notes: Coefficients with z-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

	(1) closed	(2) hybrid closed	(3) hybrid open-1	(4) hybrid open-2	(5) hybrid open-3	(6) hybrid open-4
Previous CPI inflation		0.874	0.916	0.974	0.887	1.039
Inflation expectation	1.541	0.726	0.690	0.703	0.617	0.553
Output gap	0.714	0.772	0.700	0.776	0.656	0.696
Term of trade change			-0.117			
REER change				-0.140		
Import price inflation					0.271	
Comm price inflation						0.304
US CPI inflation						-0.145
NEER change						-0.223

Table A3: Current period inflation response to one standard deviation change in regressors.