The Anatomy of the New Keynesian Phillips Curve

PRELIMINARY AND INCOMPLETE

Nino Buliskeria Ali Elminejad Zuzana Havránková

Institute of Economic Studies, Charles University

November 8, 2022

1 Introduction

The price-setting equation for firms is a central component of dynamic stochastic general equilibrium (DSGE) models. This equation links current inflation to past inflation, expected inflation, and a measure of real aggregate demand by considering the costly adjustment of nominal prices. This equation is typically referred to as the New Keynesian Phillips curve (NKPC). The slope of the NKPC is important for the propagation of shocks and determines the output-inflation trade-off in an economy. The equation can also be used to forecast inflation. One can write the empirical NKPC as:

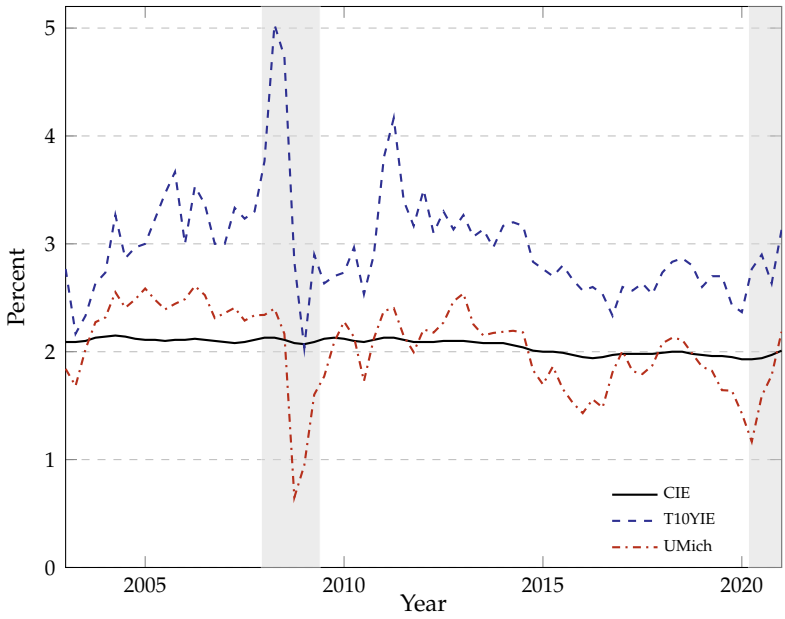
$$\pi_t = \alpha + \gamma_b \pi_{t-1} + \gamma_f \pi_t^e + \lambda x_t + \varepsilon_{\pi,t},$$

where π_t, π_{t-1}, and π_t^e are the actual inflation, the lagged inflation rate, and the expectation of inflation, respectively. The variable x_t is the *driving variable* capturing aggregate demand side pressures. This may be represented by real marginal costs (mc_t) or model-based output gap ($\tilde{y}_t$). The hybrid specification of NKPC contains both past and future expected inflation (Galí and Gertler, 1999). Alternatively, it can take a pure forward-looking formulation if $\gamma_b = 0$ and $\gamma_f = 1$, or pure backward-looking formulation in the opposite case. In this study, we focus on the pure forward-looking formulation of the NKPC with in the following form:

$$\pi_t = \beta \pi_t^e + \lambda x_t + \varepsilon_{\pi,t}. \tag{1}$$

Even though the NKPC has been found to provide a reasonable micro-founded explanation for the output-inflation dynamics, there have been empirical challenges in estimating its relevant

Figure 1: Inflation Expectation Indicators



Notes: UMich= Survey of University of Michigan, median expected price change next 12 months; T10YIE= 10-Year Break-even Inflation Rate; CIE= Index of Common Inflation Expectations, constructed using 21 inflation expectation indicators. Shaded regions are recessions according to the NBER. Sources: Federal Reserve Board; Federal Reserve Bank of St. Louis (FRED).

coefficients. First, a critical challenge involved in the estimation of the NKPC is to measure the expectations of future inflation, which are not directly observable. Since the NKPC is an essential part of monetary policy models, measuring inflation expectation is highly important for central banks to achieve sustainable employment and price stability. A significant share of literature uses realized inflation or survey-based inflation forecast in conjunction with Generalized Method of Moments (GMM) estimation or other instrument variable methods. However, Lindé (2005) shows that GMM and other one-equation methods can lead to imprecise and biased estimates for the NKPC. Besides, several studies argue that the NKPC estimated by GMM is likely to be either misspecified or weakly identified (see, e.g., Nason and Smith 2008). Researchers thus propose other proxies to measure the expectations of future inflation, e.g., the inflation-indexed bonds market price (Marfatia, 2017). Figure 1 shows that how different measures of inflation expectation may differ from each other. For example, as a representative of survey-based indicators, the University of Michigan survey seems to overstate expected inflation compared to the 10-year break-even inflation rate, which is a market-based indicator.

Moreover, the price rigidity in the majority of studies is based either on the assumption that firms face quadratic nominal price adjustment costs (Rotemberg, 1982) or that firms are unable to re-optimize their prices with a certain probability in each period (Calvo, 1983). Considering structural interpretation, the latter is preferred since it can be measured by microeconometric data, while the

former does not have a true equivalent in data.

Finally, choosing the real driving variable among marginal cost and the output gap is another source of controversy in estimating NKPC. Galí and Gertler (1999) argue that a marginal cost-based Phillips curve outperforms an output gap-based Phillips curve. Estimating a Phillips curve with real marginal cost as the real driving variable result in most cases in positive point estimates of the impact of labor share, while using a measure of the output gap results in generally negative coefficients. For this reason, the real marginal cost is a better candidate to be used in estimating the NKPC.

As discussed above, the estimates of NKPC are affected by various characteristics regarding inflation and the driving variable. In addition to the context in which the NKPC is estimated, publication bias can be a salient factor affecting the variation of estimates. Applying modern meta-analysis tools, we study the impact of publication bias and study characteristics of the estimated NKPC in the literature.

2 Publication bias

Table 1: Studies used in the meta-analysis

Abbas (2018)	Gillitzer (2016)	Mehra (2004)
Abbas and Sgro (2011)	Hall et al. (2009)	Neiss and Nelson (2005)
Abbas et al. (2016a)	Hondroyiannis et al. (2009)	Nunes (2010)
Abbas et al. (2016b)	Hubert and Mirza (2019)	Pattanaik et al. (2020)
Adam and Padula (2011)	Hung and Kwan (2022)	Ravenna and Walsh (2006)
Ahiadorme (2021)	Kara and Nelson (2003)	Rudd and Whelan (2005)
Allsopp et al. (2006)	Özer Karagedikli and McDermott (2018)	Rudd and Whelan (2007)
Basistha and Nelson (2007)	Kim and Subramanian (2009)	Rumler et al. (2008)
Batini et al. (2005)	Kobbi and Gabsi (2017)	Sakurai (2016)
Brissimis and Magginas (2008)	Lawless and Whelan (2011)	Salunkhe and Patnaik (2019)
Castle et al. (2014)	Lee (2009)	Saygili (2020)
Chin (2019)	Madeira (2014)	Sheedy (2010)
Coibion et al. (2018)	Martins and Verona (2021)	Singh et al. (2011)
Egan and Leddin (2017)	Matheron and Maury (2004)	Sovbetov and Kaplan (2019)
Fedderke and Liu (2018)	Mazumder (2010)	Tillmann (2009)
Furuoka et al. (2020)	Mazumder (2011a)	Vašíček (2011)
Gabriel and Martins (2010)	Mazumder (2011b)	Vavra (2014)
Galí and Gertler (1999)	Mazumder (2012)	Wimanda et al. (2011)
Galí et al. (2001)	McAdam and Willman (2004)	Yazgan and Yilmazkuday (2005)
Genberg and Pauwels (2005)	McLeay and Tenreyro (2020)	Zobl and Ertl (2021)

As the first step, we search for empirical estimates of the NKPC using Google Scholar because it provides a powerful full-text search. From 60 primary studies (Table 1), we collect 836 and 755 estimates for the expected inflation coefficient (β) and the driving variable (λ), respectively. Summary statistics of collected data are shown in Table 2.

Table 2: Summary Statistics

	#	Mean	Median	SD
β	836	0.882	0.925	0.342
S.E.	836	0.102	0.054	0.141
λ	755	-0.016	-0.004	0.561
S.E.	755	0.184	0.045	1.334

2.1 Linear Tests

To study publication bias, we test the asymmetry of the so-called funnel plot by regressing estimates on their standard errors. Different specifications are used in the regression, e.g., weighted and unweighted. The results of the regressions denote publication bias and the mean estimate corrected for the bias. Following tables show the preliminary results.

Figure 2: β & λ

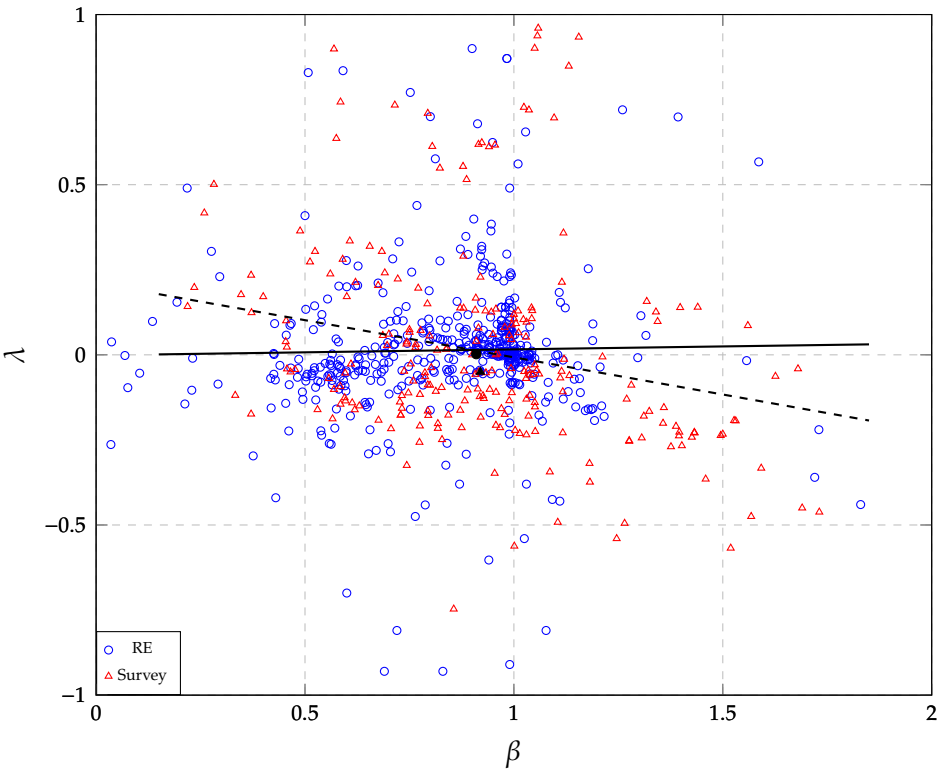


Figure 3: Histogram β

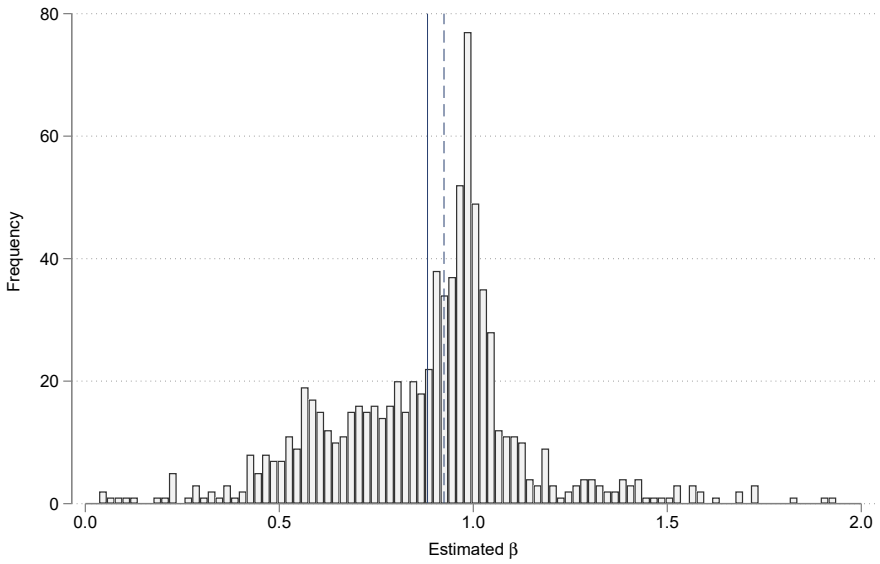


Figure 4: Funnel plot β

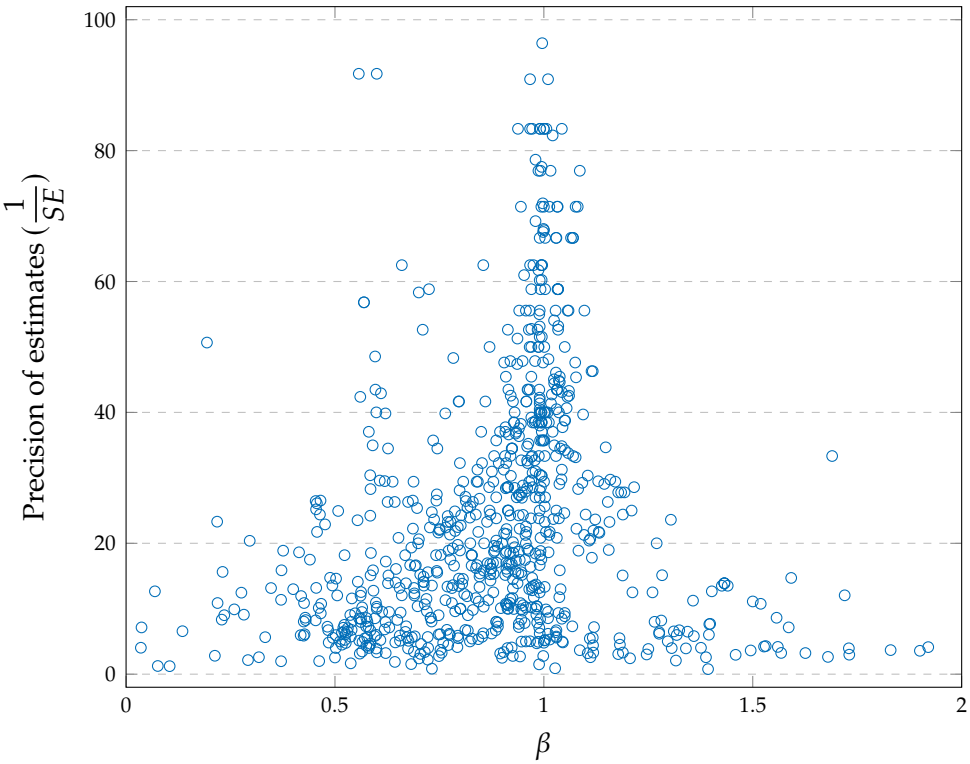


Table 3: Linear funnel asymmetry tests β

Panel A: All estimates						
	OLS	FE	BE	IV	Precision	Study
Standard error	-0.233	0.124	-0.575**	-1.352	-0.829*	-0.285
(*publication bias*)	(0.393)	(0.214)	(0.275)	(1.018)	(0.502)	(0.207)
	[-1.016, 0.770]				[-1.813, 0.438]	[-0.826, 0.153]
Constant	0.897***	0.865***	0.952***	0.997***	0.950***	0.931***
(*mean beyond bias*)	(0.024)	(0.019)	(0.026)	(0.092)	(0.026)	(0.020)
	[0.849, 0.954]				[0.883, 1.008]	[0.899, 0970]
Observations	836	836	836	836	836	836
Studies	60	60	60	60	60	60
Panel B: GDP deflator						
	OLS	FE	BE	IV	Precision	Study
Standard error	-1.672**	-1.223*	-1.677**	-3.404**	-1.831***	-2.033***
(*publication bias*)	(0.669)	(0.700)	(0.651)	(1.627)	(0.643)	(0.458)
	[-3.133, 0.220]				[-3.333, -0.320]	[-3.032, -0.561]
Constant	0.956***	0.935***	0.993***	1.037***	0.964***	1.003***
(*mean beyond bias*)	(0.036)	(0.033)	(0.036)	(0.066)	(0.034)	(0.017)
	[0.872, 1.039]				[0.878, 1.034]	[0.968, 1.034]
Observations	283	283	283	283	283	283
Studies	30	30	30	30	30	30
Panel C: CPI						
	OLS	FE	BE	IV	Precision	Study
Standard error	-0.127	0.167	-0.376	-1.369	-0.669	-0.127
(*publication bias*)	(0.363)	(0.221)	(0.355)	(1.384)	(0.516)	(0.218)
	[-0.841, 0.838]				[-1.717, 0.603]	[-0.681, 0.338]
Constant	0.892***	0.857***	0.939***	1.038***	0.955***	0.930***
(*mean beyond bias*)	(0.044)	(0.026)	(0.045)	(0.181)	(0.039)	(0.034)
	[0.770, 0.989]				[0.821, 1.030]	[0.850, 0.996]
Observations	495	495	495	495	495	495
Studies	32	32	32	32	32	32

Notes: Standard errors are reported in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Linear funnel asymmetry tests β - OLS and GMM

Panel A: OLS						
	OLS	FE	BE	IV	Precision	Study
Standard error	0.296	0.293	-0.028	-0.197	-0.283	-0.094
(*publication bias*)	(0.300)	(0.261)	(0.495)	(1.716)	(0.360)	(0.301)
	[-0.927, 1.870]				[-2.182, 0.954]	[-1.040, 0.538]
Constant	0.720***	0.720***	0.896***	0.798***	0.811***	0.906***
(*mean beyond bias*)	(0.055)	(0.041)	(0.069)	(0.284)	(0.066)	(0.051)
	[0.492, 0.970]				[0.714, 1.065]	[0.757, 1.019]
Observations	211	211	211	211	211	211
Studies	17	17	17	17	17	17
Panel B: GMM						
	OLS	FE	BE	IV	Precision	Study
Standard error	-0.473	-0.149	-0.926**	-1.765	-1.474***	-0.542*
(*publication bias*)	(0.363)	(0.429)	(0.448)	(2.316)	(0.456)	(0.289)
	[-1.819, 0.405]				[-2.660, -0.419]	[-1.849, 0.178]
Constant	0.911***	0.893***	0.960***	0.983***	0.967***	0.931***
(*mean beyond bias*)	(0.028)	(0.024)	(0.035)	(0.123)	(0.030)	(0.027)
	[0.851, 0.979]				[0.886, 1.033]	[0.874, 0.989]
Observations	486	486	486	486	486	486
Studies	37	37	37	37	37	37

Notes: Standard errors are reported in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Linear funnel asymmetry tests β - survey and RE

Panel A: Rational expectations						
	OLS	FE	BE	IV	Precision	Study
Standard error	-0.582*	0.128	-0.551*	-1.219	-1.350***	-0.236
(*publication bias*)	(0.322)	(0.263)	(0.286)	(1.337)	(0.320)	(0.205)
	[-1.169, 0.638]				[-2.013, -0.112]	[-0.788, 0.201]
Constant	0.911***	0.851***	0.950***	0.964***	0.975***	0.926***
(*mean beyond bias*)	(0.032)	(0.022)	(0.027)	(0.114)	(0.022)	(0.022)
	[0.846, 0.977]				[0.921, 1.021]	[0.884, 0.968]
Observations	601	601	601	601	601	601
Studies	51	51	51	51	51	51
Panel B: Survey expectations						
	OLS	FE	BE	IV	Precision	Study
Standard error	0.569*	0.146	-0.978	-1.566	0.531	-0.659
(*publication bias*)	(0.341)	(0.314)	(0.850)	(1.819)	(0.574)	(0.812)
	[-1.880, 0.967]				[-4.131, 26.060]	[-3.150, 0.864]
Constant	0.854***	0.897***	0.984***	1.072***	0.858***	0.966***
(*mean beyond bias*)	(0.031)	(0.032)	(0.075)	(0.212)	(0.035)	(0.050)
	[0.820, 1.031]				[0.160, 1.113]	[0.841, 1.090]
Observations	235	235	235	235	235	235
Studies	12	12	12	12	12	12

Notes: Standard errors are reported in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Linear funnel asymmetry tests β - countries

Panel A: US						
	OLS	FE	BE	IV	Precision	Study
Standard error	0.513*	-0.184	-0.448	1.186**	0.117	-0.141
(*publication bias*)	(0.269)	(0.136)	(0.285)	(0.536)	(0.564)	(0.184)
	[-1.443, 2.281]				[-3.186, 5.419]	[-2.557, 0.532]
Constant	0.889***	0.941***	0.961***	0.839***	0.919***	0.959***
(*mean beyond bias*)	(0.033)	(0.010)	(0.026)	(0.050)	(0.035)	(0.016)
	[0.826, 0.982]				[0.836, 1.010]	[0.926, 0.994]
Observations	353	353	353	353	353	353
Studies	30	30	30	30	30	30
Panel B: Europe						
	OLS	FE	BE	IV	Precision	Study
Standard error	0.024	0.419	-0.081	2.014	-0.875*	0.384
(*publication bias*)	(0.520)	(0.419)	(0.776)	(2.024)	(0.530)	(0.370)
	[-0.963, 1.593]				[-1.896, 0.889]	[-0.703, 1.187]
Constant	0.838***	0.795***	0.897***	0.618***	0.938***	0.872***
(*mean beyond bias*)	(0.056)	(0.046)	(0.080)	(0.199)	(0.036)	(0.048)
	[0.691, 0.967]				[0.795, 1.007]	[0.732, 0.962]
Observations	200	200	200	200	200	200
Studies	16	16	16	16	16	16
Panel C: Asia						
	OLS	FE	BE	IV	Precision	Study
Standard error	-0.193	0.619*	-0.885	-2.330	-0.578	-0.163
(*publication bias*)	(0.481)	(0.301)	(0.815)	(7.074)	(0.644)	(0.476)
	[-1.900, 0.931]				[-3.043, 1.251]	[-1.809, 1.116]
Constant	0.727***	0.613***	0.875***	1.026	0.781***	0.803***
(*mean beyond bias*)	(0.106)	(0.0422)	(0.115)	(0.955)	(0.124)	(0.103)
	[0.489, 1.122]				[0.589, 1.228]	[0.499, 1.055]
Observations	113	113	113	113	113	113
Studies	11	11	11	11	11	11
Panel D: Oceania						
	OLS	FE	BE	IV	Precision	Study
Standard error	-1.727***	-1.435**	-2.505***	-4.490	-1.976***	-1.782***
(*publication bias*)	(0.325)	(0.515)	(0.287)	(14.200)	(0.586)	(0.314)
	[-2.205, -0.074]				[-4.080, -0.386]	[-3.819, -0.140]
Constant	1.035***	1.020***	1.061***	1.175	1.047***	1.024***
(*mean beyond bias*)	(0.008)	(0.026)	(0.026)	(0.724)	(0.021)	(0.014)
	[1.011, 1.047]				[0.971, 1.079]	[0.932, 1.048]
Observations	108	108	108	108	108	108
Studies	6	6	6	6	6	6

Notes: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Linear funnel asymmetry tests β - CB and non CB

Panel A: Central bank						
	OLS	FE	BE	IV	Precision	Study
Standard error	0.582**	1.077**	0.042	0.124	0.034	0.125
(*publication bias*)	(0.297)	(0.520)	(0.333)	(1.186)	(0.335)	(0.216
	[-0.900, 1.071]				[-1.461, 0.605]	[-0.666, 0.843]
Constant	0.908***	0.873***	0.949***	0.939***	0.946***	0.937***
(*mean beyond bias*)	(0.033)	(0.036)	(0.032)	(0.092)	(0.025)	(0.027)
	[0.831, 0.989]				[0.887, 1.001]	[0.880, 0.993]
Observations	189	189	189	189	189	189
Studies	26	26	26	26	26	26
Panel B: Academia						
	OLS	FE	BE	IV	Precision	Study
Standard error	-0.344	-0.060	-1.060**	-1.469	-0.961	-0.615**
(*publication bias*)	(0.432)	(0.158)	(0.398)	(1.143)	(0.592)	(0.265)
	[-1.197, 0.881]				[-2.392, 0.614]	[-1.464, -0.0371]
Constant	0.888***	0.861***	0.962***	0.994***	0.946***	0.929***
(*mean beyond bias*)	(0.030)	(0.015)	(0.038)	(0.112)	(0.033)	(0.028)
	[0.825, 0.967]				[0.864, 1.030]	[0.871, 0.986]
Observations	647	647	647	647	647	647
Studies	34	34	34	34	34	34

Notes: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure 5: Histogram λ

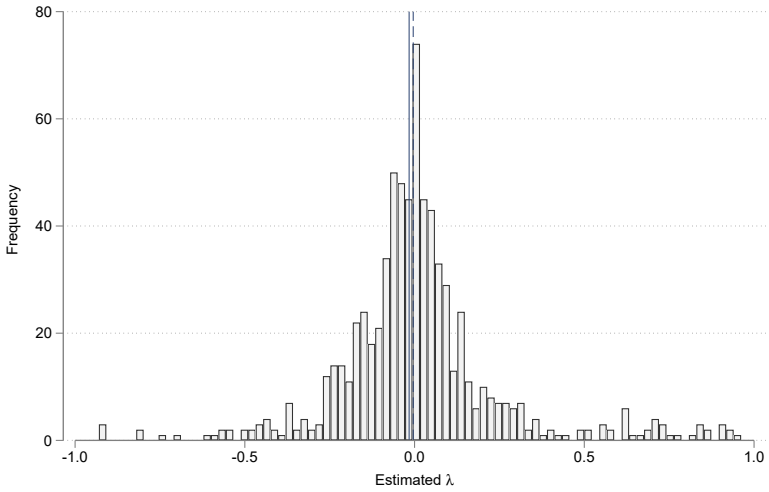


Figure 6: Funnel plot λ

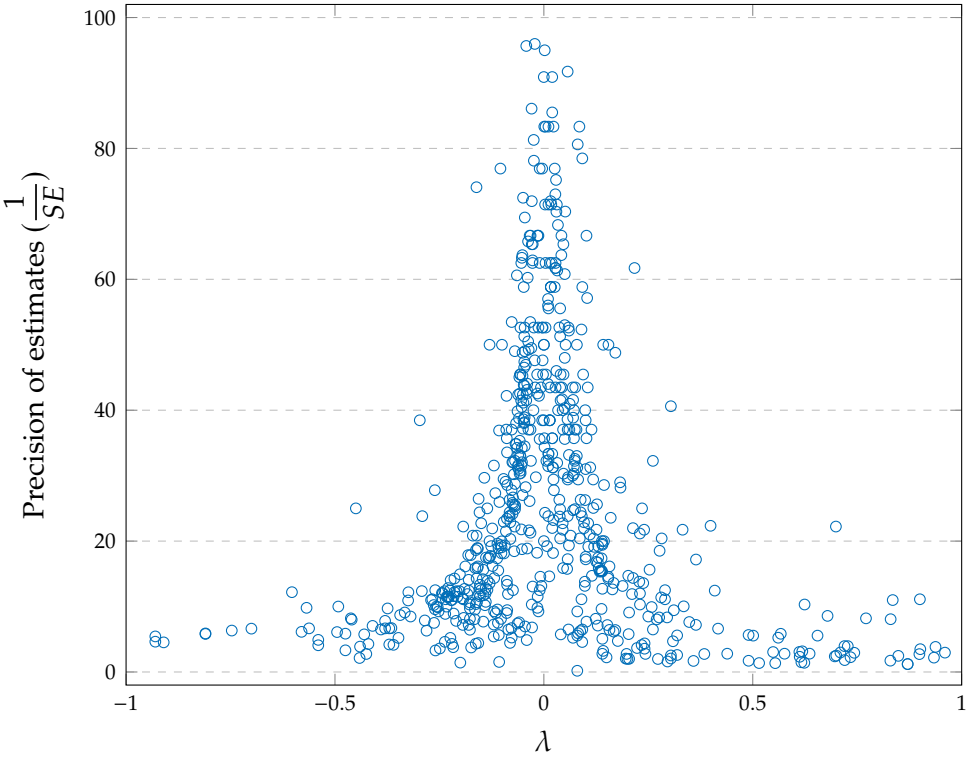


Table 8: Linear funnel asymmetry tests λ

Panel A: All estimates						
	OLS	FE	BE	IV	Precision	Study
Standard error	0.519	0.714	0.609***	1.597**	0.093	0.612*
(*publication bias*)	(0.339)	(0.462)	(0.215)	(0.752)	(0.421)	(0.335)
	[-0.436, 1.243]				[-1.012, 1.110]	[-0.428, 1.253]
Constant	-0.041*	-0.059	0.014	-0.138**	-0.003	0.013
(*mean beyond bias*)	(0.022)	(0.042)	(0.029)	(0.067)	(0.010)	(0.021)
	[-0.085, 0.021]				[-0.027, 0.023]	[-0.030, 0.059]
Observations	755	755	755	755	755	755
Studies	56	56	56	56	56	56
Panel B: Labor share						
	OLS	FE	BE	IV	Precision	Study
Standard error	0.966**	1.379***	0.377*	0.435	1.143***	0.418
(*publication bias*)	(0.433)	(0.0419)	(0.214)	(1.574)	(0.358)	(0.570)
	[-0.597, 1.544]				[-0.096, 1.642]	[-0.860, 1.459]
Constant	0.023	-0.009***	0.045	0.064	0.009	0.040*
(*mean beyond bias*)	(0.016)	(0.003)	(0.032)	(0.147)	(0.009)	(0.022)
	[-0.008, 0.067]				[-0.008, 0.034]	[-0.019, 0.101]
Observations	237	237	237	237	237	237
Studies	29	29	29	29	29	29
Panel C: Unemployment gap						
	OLS	FE	BE	IV	Precision	Study
Standard error	-0.304	-0.0254	0.730	4.355	-0.821*	0.370
(*publication bias*)	(0.365)	(0.142)	(2.072)	(3.919)	(0.429)	(0.985)
	[-2.428, 3.066]				[-2.055, 4.354]	[-2.128, 2.595]
Constant	-0.098***	-0.128***	-0.166	-0.597	-0.042***	-0.127***
(*mean beyond bias*)	(0.023)	(0.015)	(0.234)	(0.435)	(0.014)	(0.041)
	[-0.190, 0.023]				[-0.169, 0.185]	[-.212, -0.004]
Observations	235	235	235	235	235	235
Studies	7	7	7	7	7	7
Panel D: Output gap						
	OLS	FE	BE	IV	Precision	Study
Standard error	0.569*	-0.105	1.027***	1.697**	0.747**	0.854***
(*publication bias*)	(0.325)	(0.258)	(0.215)	(0.661)	(0.340)	(0.219)
	[-0.650, 1.188]				[-0.246, 1.706]	[-0.310, 1.387]
Constant	0.028	0.102***	0.015	-0.096	0.008	0.040
(*mean beyond bias*)	(0.020)	(0.028)	(0.027)	(0.098)	(0.01)	(0.0243)
	[-0.014, .070]				[-0.012, 0.031]	[-0.012, 0.089]
Observations	186	186	186	186	186	186
Studies	31	31	31	31	31	31

Notes: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 9: Linear funnel asymmetry tests λ - OLS and GMM

Panel A: OLS						
	OLS	FE	BE	IV	Precision	Study
Standard error	0.542	0.180	0.613	1.268**	-0.019	0.788*
(*publication bias*)	(0.363)	(0.113)	(0.471)	(0.505)	(0.488)	(0.406)
	[-0.988, 1.370]				[-1.439, 1.290]	[-0.520, 1.570]
Constant	-0.127***	-0.080***	-0.023	-0.221***	-0.055***	-0.008
(*mean beyond bias*)	(0.037)	(0.015)	(0.099)	(0.078)	(0.016)	(0.068)
	[-0.347, -0.049]				[-0.186, 0.061]	[-0.170, 0.159]
Observations	211	211	211	211	211	211
Studies	17	17	17	17	17	17
Panel B: GMM						
	OLS	FE	BE	IV	Precision	Study
Standard error	0.968**	1.554***	-0.477	3.318**	0.803*	0.142
(*publication bias*)	(0.480)	(0.158)	(0.282)	(1.623)	(0.435)	(0.529)
	[-1.438, 1.662]				[-1.023, 1.661]	[-1.143, 1.863]
Constant	-0.015	-0.052***	0.062*	-0.162	-0.005	0.037
(*mean beyond bias*)	(0.023)	(0.010)	(0.031)	(0.099)	(0.012)	(0.023)
	[-0.067, 0.048]				[-0.031, 0.026]	[-0.015, 0.091]
Observations	413	413	413	413	413	413
Studies	34	34	34	34	34	34

Notes: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 10: Linear funnel asymmetry tests λ - countries

Panel A: US						
	OLS	FE	BE	IV	Precision	Study
Standard error	0.748	1.192**	0.092	-3.092***	-0.115	0.444
(*publication bias*)	(0.842)	(0.570)	(0.609)	(1.188)	(0.988)	(0.595)
	[-1.442, 1.766]				[-1.778, 1.410]	[-1.407, 2.224]
Constant	-0.068**	-0.102**	0.016	0.229	-0.001	0.006
(*mean beyond bias*)	(0.032)	(0.044)	(0.031)	(0.145)	(0.021)	(0.022)
	[-0.137, 0.030]				[-0.049, 0.057]	[-0.040, 0.052]
Observations	316	316	316	316	316	316
Studies	36	36	36	36	36	36
Panel B: Europe						
	OLS	FE	BE	IV	Precision	Study
Standard error	0.140	0.259	0.948**	-0.476	-0.198	1.010***
(*publication bias*)	(0.541)	(0.535)	(0.369)	(0.883)	(0.626)	(0.263)
	[-2.381, 1.247]				[-1.716, 1.535]	[-0.702, 1.538]
Constant	-0.025	-0.036	-0.012	0.030	0.005	-0.023
(*mean beyond bias*)	(0.028)	(0.048)	(0.061)	(0.056)	(0.018)	(0.041)
	[-0.108, 0.050]				[-0.032, 0.057]	[-0.112, 0.065]
Observations	200	200	200	200	200	200
Studies	16	16	16	16	16	16
Panel C: Asia						
	OLS	FE	BE	IV	Precision	Study
Standard error	1.048***	0.305*	1.296**	2.959**	1.021***	1.004***
(*publication bias*)	(0.181)	(0.143)	(0.437)	(1.239)	(0.275)	(0.198)
	[0.507, 1.561]				[-0.313, 2.473]	[0.501, 1.883]
Constant	-0.016	0.083***	0.029	-0.269**	-0.0120	0.080
(*mean beyond bias*)	(0.070)	(0.019)	(0.071)	(0.112)	(0.030)	(0.053)
	[-0.168, 0.257]				[-0.087, 0.120]	[-0.041, 0.230]
Observations	113	113	113	113	113	113
Studies	11	11	11	11	11	11
Panel D: Oceania						
	OLS	FE	BE	IV	Precision	Study
Standard error	-0.789	-0.452	-2.052	-1.807**	-0.526	-1.445*
(*publication bias*)	(0.566)	(0.704)	(1.541)	(0.706)	(0.431)	(0.857)
	[-3.827, 49.260]				[-3.865, 1.591]	[-3.62, 3.903]
Constant	0.017	0.008	0.046	0.0433***	0.010	0.040
(*mean beyond bias*)	(0.012)	(0.019)	(0.050)	(0.016)	(0.007)	(0.028)
	[-0.303, 0.160]				[-0.715, 0.094]	[-0.009, 0.235]
Observations	64	64	64	64	64	64
Studies	5	5	5	5	5	5

Notes: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

2.2 Nonlinear Tests

In addition to linear regressions, we use a new technique developed in psychology by van Aert and van Assen (2020). Their technique, *p-uniform**, uses the statistical principle that the distribution of p-values should be uniform at the true mean effect size. This method is robust to heterogeneity and the endogeneity of the standard error in the funnel asymmetry test. W also employ methods considering the nonlinear relationship between estimates and their variances (e.g., Ioannidis et al. 2017; Andrews and Kasy 2019; Furukawa 2020). The Weighted Average of Adequately Powered (WAAP) technique, proposed by Ioannidis et al. (2017), takes into account the estimate when its statistical power is above an 80% threshold in order to compute a weighted mean corrected for bias. Furthermore, the method suggested by Andrews and Kasy (2019) re-weights estimates in each interval based on how they are present in the literature by assuming that publication probability changes noticeably after crossing conventional t-statistic's thresholds. Furukawa (2020) develops a stem-based method that concentrates only on the most precise estimates. Taking into account both efficiency and bias, this method calculates the optimal number of the most precise studies to include by minimizing the mean squared error:

$$\min_n \text{MSE}(n) = \text{Bias}^2(n) + \text{Var}(n).$$

The bias term can be estimated non-parametrically using two algorithms. The inner algorithm computes the bias-corrected mean given an assumed value of squared precision, and the outer algorithm computes the implied variance ensuring it is consistent with its assumed value. The inner algorithm ranks studies in an ascending order according to their standard error, SE, and for each $n = \{2, ..., N\}$ calculates the relevant bias squared and variance, given the assumed value of SE_0:

$$\text{Bias}^2(n) = \frac{\sum_{i=2}^{n}\sum_{j\neq i}^{n} w_i w_j \beta_i \beta_j}{\sum_{i=2}^{n}\sum_{j\neq i}^{n} w_i w_j} - 2\beta_1 \frac{\sum_{i=2}^{n} w_i \beta_i}{\sum_{i=2}^{n} w_i},$$

$$\text{Var}(n) = \sum_{i=1}^{n} w_i,$$

where $w_i = \frac{1}{SE_i^2 + SE_0^2}$. The outer algorithm then searches over SE_0^2 to validate the consistency of implied variance. The stem-based corrected estimate can be written as:

$$\hat{b}_{\text{stem}} = \frac{\sum_{i=1}^{n_{\text{stem}}} w_i \beta_i}{\sum_{i=1}^{n_{\text{stem}}} w_i}.$$

Following tables presents the relevant preliminary results.

Table 11: Nonlinear funnel asymmetry tests β

Panel A: All studies				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	0.942^{***}	0.920^{***}	0.942^{***}	0.983^{***}
	(0.022)	(0.013)	(0.005)	(0.017)
Observations	836	836	836	836
Studies	60	60	60	60
Panel B: GDP deflator				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	0.922^{***}	0.929^{***}	0.922^{***}	0.980^{***}
	(0.027)	(0.016)	(0.008)	(0.024)
Observations	283	283	283	283
Studies	30	30	30	30
Panel C: CPI				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	0.956^{***}	0.877^{***}	0.956^{***}	0.975^{***}
	(0.035)	(0.011)	(0.007)	(0.047)
Observations	495	495	495	495
Studies	32	32	32	32

Notes: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 12: Nonlinear funnel asymmetry tests β - OLS and GMM

Panel A: OLS				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	0.825^{***}	0.737^{***}	0.825^{***}	0.940^{***}
	(0.066)	(0.020)	(0.015)	(0.059)
Observations	211	211	211	211
Studies	17	17	17	17
Panel B: GMM				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	0.943^{***}	0.925^{***}	0.943^{***}	0.981^{***}
	(0.026)	(0.031)	(0.006)	(0.017)
Observations	486	486	486	486
Studies	37	37	37	37

Notes: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 13: Nonlinear funnel asymmetry tests β - survey and RE

Panel A: Rational expectations				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	0.957^{***}	0.878^{***}	0.957^{***}	0.984^{***}
	(0.018)	(0.008)	(0.005)	(0.017)
Observations	601	601	601	601
Studies	51	51	51	51
Panel B: Survey expectations				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	0.868^{***}	0.901^{***}	0.868^{***}	0.960^{***}
	(0.032)	(0.019)	(0.014)	(0.046)
Observations	235	235	235	235
Studies	12	12	12	12

Notes: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 14: Nonlinear funnel asymmetry tests β - countries

Panel A: US				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	0.934^{***}	0.925^{***}	0.943^{***}	0.973^{***}
	(0.031)	(0.013)	(0.007)	(0.022)
Observations	353	353	353	353
Studies	30	30	30	30
Panel B: Europe				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	0.937^{***}	0.839^{***}	0.937^{***}	0.947^{***}
	(0.026)	(0.015)	(0.009)	(0.043)
Observations	200	200	200	200
Studies	16	16	16	16
Panel C: Asia				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	0.754^{***}	0.688^{***}	0.755^{***}	0.887^{***}
	(0.098)	(0.028)	(0.023)	(0.119)
Observations	113	113	113	113
Studies	11	11	11	11
Panel D: Oceania				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	1.007^{***}	0.964^{***}	1.008^{***}	0.958^{***}
	(0.015)	(0.015)	(0.006)	(0.033)
Observations	108	108	108	108
Studies	6	6	6	6

Notes: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 15: Nonlinear funnel asymmetry tests β - CB and non CB

Panel A: Central bank				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	0.954^{***}	0.945^{***}	0.954^{***}	0.963^{***}
	(0.017)	(0.008)	(0.007)	(0.041)
Observations	189	189	189	189
Studies	26	26	26	26
Panel B: Academia				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	0.938^{***}	0.862^{***}	0.938^{***}	0.979^{***}
	(0.030)	(0.009)	(0.006)	(0.024)
Observations	647	647	647	647
Studies	34	34	34	34

Notes: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 16: Nonlinear funnel asymmetry tests λ

Panel A: All estimates				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	-0.006	-0.000	0.007**	0.018
	(0.006)	(0.001)	(0.003)	(0.008)
Observations	755	755	755	755
Studies	56	56	56	56
Panel B: Labor share				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	0.001	0.021**	0.004	0.029*
	(0.007)	(0.005)	(0.004)	(0.013)
Observations	237	237	237	237
Studies	29	29	29	29
Panel C: Unemployment gap				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	-0.042	-0.046***	-0.028***	-0.154 **
	(0.020)	(0.008)	(0.007)	(0.058)
Observations	235	235	235	235
Studies	7	7	7	7
Panel D: Output gap				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	0.000	0.003	-0.004	-0.005
	(0.007)	(0.002)	(0.006)	(0.015)
Observations	186	186	186	186
Studies	31	31	31	31

Notes: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 17: Nonlinear funnel asymmetry tests λ - OLS and GMM

Panel A: OLS				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	-0.042***	-0.038***	-0.028***	0.037
	(0.010)	(0.006)	(0.006)	(0.037)
Observations	211	211	211	211
Studies	17	17	17	17
Panel B: GMM				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	-0.003	0.002	0.003	0.001
	(0.004)	(0.001)	(0.004)	(0.001)
Observations	413	413	413	413
Studies	34	34	34	34

Notes: Standard errors are reported in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

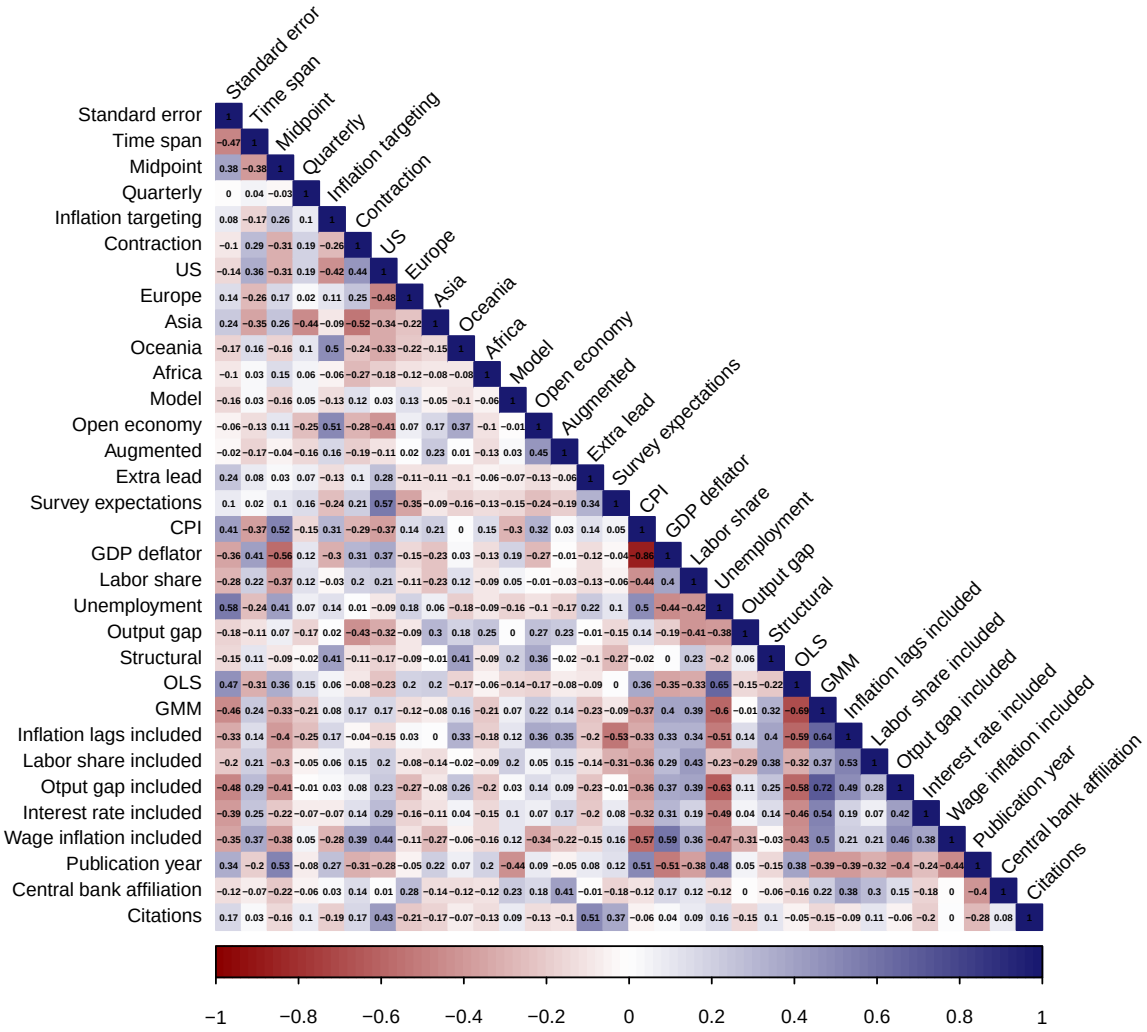
Table 18: Nonlinear funnel asymmetry tests λ - countries

Panel A: US				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	-0.009	-0.002	0.014***	0.005
	(0.003)	(0.003)	(0.004)	(0.011)
Observations	316	316	316	316
Studies	56	56	56	56
Panel B: Europe				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	NA 0.000	-0.001	0.002	0.019
	(0.004)	(0.002)	(0.005)	(0.025)
Observations	200	200	200	200
Studies	16	16	16	16
Panel C: Asia				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	NA 0.017	0.075	0.004	0.032
	(0.011)	(0.026)	(0.014)	(0.052)
Observations	113	113	113	113
Studies	11	11	11	11
Panel D: Oceania				
	Ioannidis et al. (2017)	Andrews and Kasy (2019)	Bom and Rachinger (2019)	Furukawa (2020)
Effect beyond bias	NA 0.002	0.001	0.007	-0.007
	(0.002)	(0.001)	(0.005)	(0.014)
Observations	64	64	64	64
Studies	5	5	5	5

Notes: Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

3 Heterogeneity

Figure 7: Correlation matrix



Notes: The figure shows Pearson correlation coefficients for the explanatory variables described in Table 19.

In addition to the reported estimates and their standard errors, we collect 31 extra explanatory variables on the context in which the estimates are obtained to study heterogeneity beyond publication bias. Table 19 presents more details on the collected variables. The collected information help identify the study design characteristics that systematically influence the reported estimates. Besides, we aim to obtain the mean estimates conditional on various characteristics and potential biases in the literature. Suppose a linear regression with a dependent variable y (the NKPC estimates in our case) and a set of explanatory variables capturing the estimation context of each estimate, denoted by X_n:

$$y = \alpha + \beta_n X_n + e,$$

where α is a constant, β_n are coefficients, and e is a normal IID error term.

Table 19: Definition and summary statistics of explanatory variables

Variable	Description	Mean	SD
β	The estimated coefficient of inflation expectations in the NKPC equation.	0.88	0.34
Standard error	The standard error of the estimated coefficient of inflation expectations.	0.10	0.14
Data characteristics			
Time span	The logarithm of the data time span used to estimate β.	3.46	0.42
Midpoint	The logarithm of the median year of the data used minus the earliest median year in primary studies.	3.10	0.55
Quarterly	= 1 if the data frequency is annual (reference category: monthly/annual).	0.93	0.25
Inflation targeting	=1 if the central bank employs inflation targeting regime during at least half of the estimation period.	0.19	0.40
Contraction	the ratio of contraction phase to the time span.	0.11	0.06
US	= 1 if the estimate is for the U.S. (reference category: other countries).	0.42	0.49
Europe	= 1 if the estimate is for European countries (reference category: other countries).	0.24	0.43
Asia	= 1 if the estimate is for Asian countries (reference category: other countries).	0.14	0.34
Oceania	= 1 if the estimate is for Australia and New Zealand countries (reference category: other countries).	0.13	0.34
Africa	= 1 if the estimate is for African countries (reference category: other countries).	0.04	0.20
Specifications			
Model	= 1 if β is estimated within a model.	0.06	0.25
Open economy	= 1 if the estimate is from an open economy specification (reference category: closed economy).	0.18	0.39
Augmented	= 1 if the NKPC includes other terms in addition to expected inflation and the economic activity.	0.28	0.45
Extra lead	= 1 if there are more than one inflation lead.	0.07	0.25
Survey expectations	= 1 if inflation expectations term is based on survey expectations (reference category: rational expectations).	0.28	0.45
CPI	= 1 if CPI is the measure of inflation (reference category: other inflation measures).	0.59	0.49
GDP deflator	= 1 if inflation is measured as GDP deflator (reference category: other inflation measures).	0.34	0.47
Labor share	= 1 if the labor income share (unit labor costs) are proxies for marginal costs (reference category: other proxies).	0.31	0.46
Unemployment gap	= 1 if unemployment is a proxy for marginal costs (reference category: other proxies).	0.28	0.45
Output gap	= 1 if output gap is a proxy for marginal costs (reference category: other proxies).	0.27	0.44
Estimation techniques			
Structural	= 1 if the estimate is based on an structural equation (reference category: reduced equation).	0.16	0.37
OLS	= 1 if ordinary least square (OLS) method is used for the estimation (reference category: other methods).	0.25	0.43
GMM	= 1 if the generalized method of moments (GMM) is used for the estimation (reference category: other methods).	0.58	0.49
Inflation lags included	= 1 if inflation lags are among instruments (reference category: inflation lags not among instruments).	0.52	0.50
Labor share included	= 1 if labor income share is among instruments (reference category: labor share not among instruments).	0.23	0.42
Output gap included	= 1 if output gap is among instruments (reference category: interest rate not among instruments).	0.50	0.50
Interest rate included	= 1 if the interest rate is among instruments (reference category: interest rate not among instruments).	0.38	0.49
Wage inflation included	= 1 if wage inflation is among instruments (reference category: interest rate not among instruments).	0.35	0.48
Publication characteristics			
Publication year	The logarithm of the publication year of the study minus the publication year of the first primary study.	2.70	0.45
Central bank affiliation	= 1 if at least one of the authors is affiliated with a central bank.	0.23	0.42
Citations	The logarithm of the number of per-year citations of the study, according to Google Scholar.	1.42	1.13

Notes: SD = standard deviation. The table excludes the definition and summary statistics of the reference categories, which are omitted from the regressions.

Since a simple regression ignores model uncertainty and consequently affects the precision of results, we employ Bayesian model averaging (BMA) method, which is a natural solution to model uncertainty in the Bayesian setting. Using all the possible subsets of explanatory variables, BMA runs numerous regression models and forms a weighted average over all of them. If the set of explanatory

variables contains k variables, there will be 2^k variable combinations and 2^k models. Using Bayes' theorem, one can obtain model weights from posterior model probabilities (PMP):

$$\pi\left(M_n \mid y, X\right) = \frac{\pi\left(y \mid M_n, X\right)\pi\left(M_n\right)}{\pi(y \mid X_n)} \equiv \frac{\pi\left(y \mid M_n, X\right)\pi\left(M_n\right)}{\sum_{s=1}^{2K}\pi\left(y \mid M_s, X_s\right)\pi\left(M_s\right)},$$

where $\pi(M_n)$ is the model prior, $\pi\left(y \mid M_n, X_n\right)$ is the marginal likelihood, and $\pi(y \mid X_n)$ is the integrated likelihood. The model weighted posterior distribution for the coefficient β can be written as:

$$\pi(\beta \mid y, X) = \sum_{n=1}^{2^k}\pi\left(\beta \mid M_n, y, X\right)\pi\left(M_n \mid y, X\right).$$

The model prior is a key factor in conducting BMA since it reflects the prior beliefs about the model. We employ Unit Information Prior (UIP) for Zellner's g-prior in which the prior that all regression parameters are zero has the same weight as one observation in the data (Eicher et al., 2011). We also use dilution prior suggested by George (2010). The dilution prior considers the collinearity of variables in each model by assigning higher weights to models that exhibit lower collinearity. Moreover, We conduct several robustness checks using different types of priors to confirm the results of the baseline BMA specification. We use the programming language `R` and the `BMS` package developed by Zeugner and Feldkircher (2015) to apply BMA method. Preliminary results are presented in the following tables and figures.

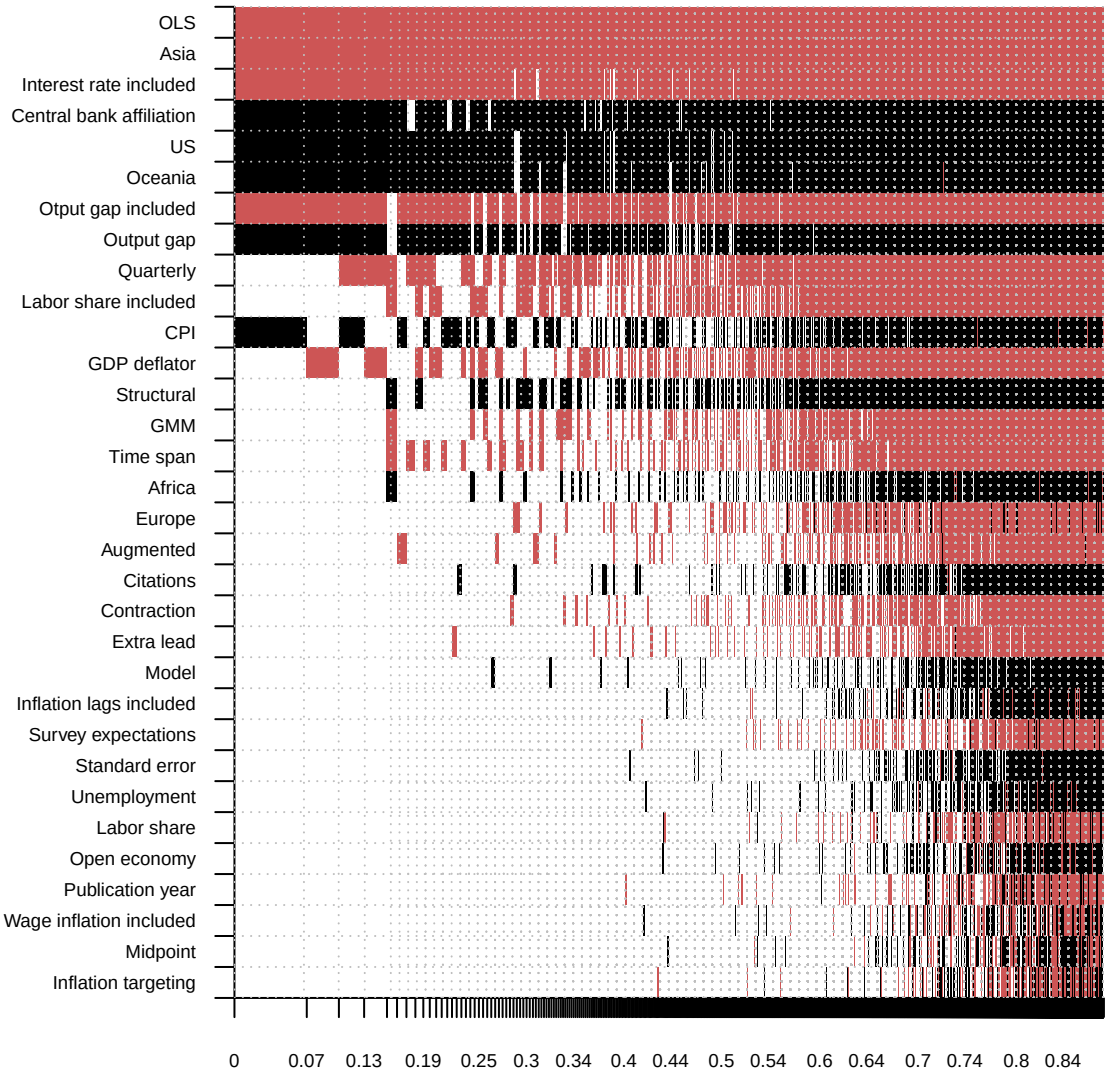
3.1 Coefficient of inflation expectations

Table 20: Explaining heterogeneity β

	Bayesian Model Averaging			Frequentist Check (OLS)		
Variable	Post. Mean	Post. SD	PIP	Coeff.	S.E.	P-val.
Intercept	1.029	N.A.	1.000	1.005	0.102	0.000
Standard error	0.003	0.024	0.023			
Data characteristics						
Time span	-0.014	0.026	0.251			
Midpoint	0.000	0.002	0.015			
Quarterly	-0.068	0.063	0.605	-0.100	0.106	0.352
Inflation targeting	0.000	0.003	0.015			
Contraction	-0.026	0.100	0.085			
US	0.130	0.048	0.917	0.132	0.043	0.003
Europe	-0.012	0.036	0.132			
Asia	-0.164	0.046	0.996	-0.168	0.046	0.001
Oceania	0.103	0.049	0.867	0.123	0.035	0.001
Africa	0.015	0.041	0.140			
Specifications						
Model	0.002	0.012	0.043			
Open economy	0.000	0.005	0.020			
Augmented	-0.004	0.014	0.092			
Extra lead	-0.004	0.019	0.067			
Survey expectations	-0.001	0.006	0.028			
CPI	0.025	0.032	0.404			
GDP deflator	-0.023	0.031	0.400			
Labor share	0.000	0.004	0.021			
Unemployment	0.001	0.007	0.023			
Output gap	0.060	0.038	0.773	0.094	0.025	0.000
Estimation techniques						
Structural	0.030	0.043	0.366			
OLS	-0.177	0.027	1.000	-0.151	0.045	0.001
GMM	-0.024	0.043	0.267			
Inflation lags included	0.001	0.008	0.030			
Labor share included	-0.035	0.045	0.436			
Output gap included	-0.073	0.038	0.841	-0.100	0.031	0.002
Interest rate included	-0.073	0.029	0.928	-0.091	0.028	0.002
Wage inflation included	0.000	0.003	0.016			
Publication characteristics						
Publication year	0.000	0.004	0.019			
Central bank affiliation	0.077	0.034	0.923	0.056	0.036	0.126
Citations	0.002	0.006	0.091			
Observations	836			836		
Studies	60			60		

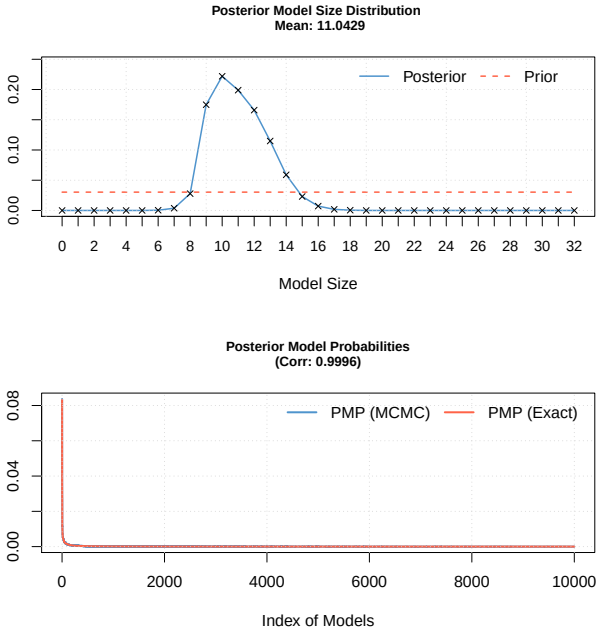
Notes: The response variable is the coefficient of the inflation expectations in the NKPC. SD = standard deviation, PIP = Posterior inclusion probability, S.E. = standard error. The left-hand panel applies BMA based on the UIP g-prior and the dilution prior (Eicher et al. 2011; George 2010). The right-hand panel reports a frequentist check using OLS, which includes variables with PIPs higher than 0.50 in BMA. Standard errors in the frequentist check are clustered at the study level. Table 19 presents a detailed description of all the variables.

Figure 8: Model inclusion in Bayesian model averaging β



Notes: The response variable is the coefficient of the inflation expectations in the NKPC. The columns denote individual models; variables are sorted by posterior inclusion probability in descending order. The horizontal axis denotes the cumulative posterior model probabilities. The estimation is based on the unit information prior (UIP) recommended by Eicher et al. (2011) and the dilution prior suggested by George (2010), which takes collinearity into account. Black color (darker in grayscale) = the variable has a positive estimated sign. Red color (lighter in grayscale) = the variable has a negative estimated sign. No color = the variable is excluded from the given model. Table 3 presents a detailed description of all variables. The numerical results are reported in Table 20.

Figure 9: Model size and convergence for the benchmark BMA model β



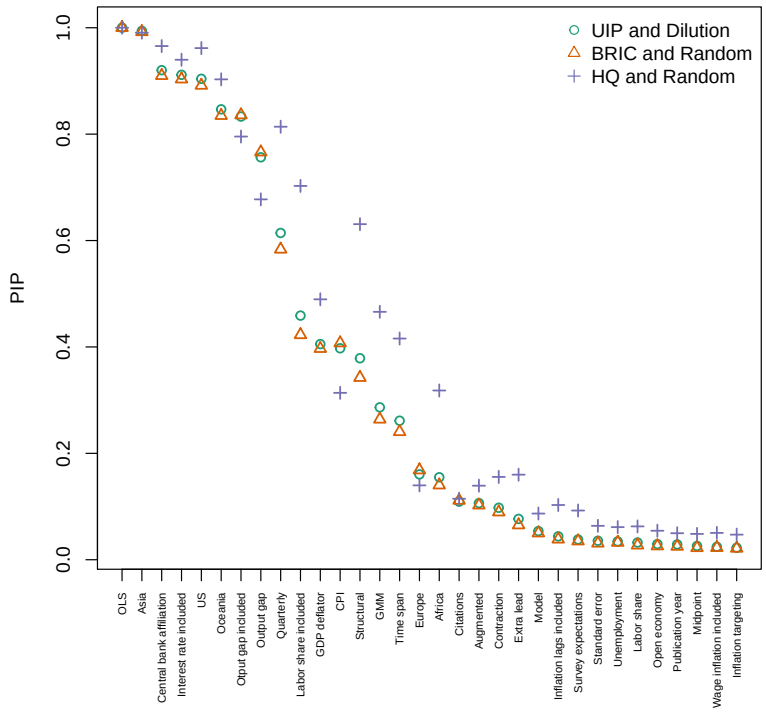
Notes: The figure illustrates the posterior model size distribution and the posterior model probabilities of the BMA exercise reported in Table 20.

Table 21: Alternative BMA priors β

	BRIC g-prior			HQ g-prior		
Variable	Post. Mean	Post. SD	PIP	Post. Mean	Post. SD	PIP
Intercept	1.023	N.A.	1.000	1.090	N.A.	1.000
Standard error	0.004	0.029	0.031	0.007	0.039	0.065
Data characteristics						
Time span	-0.013	0.026	0.241	-0.022	0.030	0.417
Midpoint	0.000	0.003	0.022	0.000	0.004	0.047
Quarterly	-0.064	0.063	0.574	-0.095	0.058	0.817
Inflation targeting	0.000	0.004	0.020	0.000	0.006	0.048
Contraction	-0.028	0.102	0.089	-0.044	0.122	0.155
US	0.126	0.051	0.898	0.144	0.045	0.959
Europe	-0.014	0.039	0.157	-0.008	0.032	0.144
Asia	-0.165	0.048	0.994	-0.165	0.045	0.992
Oceania	0.100	0.052	0.844	0.106	0.048	0.899
Africa	0.013	0.039	0.127	0.034	0.057	0.318
Specifications						
Model	0.002	0.013	0.051	0.003	0.015	0.085
Open economy	0.001	0.006	0.029	0.001	0.007	0.052
Augmented	-0.004	0.015	0.105	-0.005	0.015	0.138
Extra lead	-0.004	0.018	0.065	-0.011	0.029	0.162
Survey expectations	-0.001	0.007	0.033	-0.003	0.012	0.092
CPI	0.026	0.033	0.425	0.015	0.028	0.301
GDP deflator	-0.022	0.031	0.379	-0.027	0.031	0.498
Labor share	0.000	0.005	0.026	-0.001	0.007	0.065
Unemployment	0.001	0.008	0.032	0.001	0.010	0.062
Output gap	0.061	0.038	0.776	0.046	0.038	0.675
Estimation techniques						
Structural	0.026	0.042	0.328	0.052	0.045	0.635
OLS	-0.176	0.027	1.000	-0.179	0.030	1.000
GMM	-0.023	0.043	0.257	-0.039	0.048	0.471
Inflation lags included	0.001	0.009	0.037	0.004	0.017	0.102
Labor share included	-0.032	0.044	0.403	-0.059	0.045	0.709
Output gap included	-0.074	0.038	0.841	-0.063	0.040	0.788
Interest rate included	-0.071	0.031	0.906	-0.073	0.028	0.939
Wage inflation included	0.000	0.004	0.021	0.000	0.006	0.048
Publication characteristics						
Publication year	0.000	0.005	0.024	0.000	0.006	0.051
Central bank affiliation	0.075	0.035	0.905	0.085	0.031	0.964
Citations	0.002	0.006	0.107	0.002	0.005	0.116
Observations	836			836		
Studies	60			60		

Notes: The response variable is the coefficient of the inflation expectations in the NKPC. SD = standard deviation, PIP = Posterior inclusion probability. The left-hand panel applies BMA based on BRIC g-prior (the benchmark g-prior for parameters with the beta-binomial model prior). The right-hand panel reports the results of BMA based on HQ g-prior, which asymptotically mimics the Hannan-Quinn criterion. Table 19 presents a detailed description of all the variables.

Figure 10: Posterior inclusion probabilities across different prior settings β



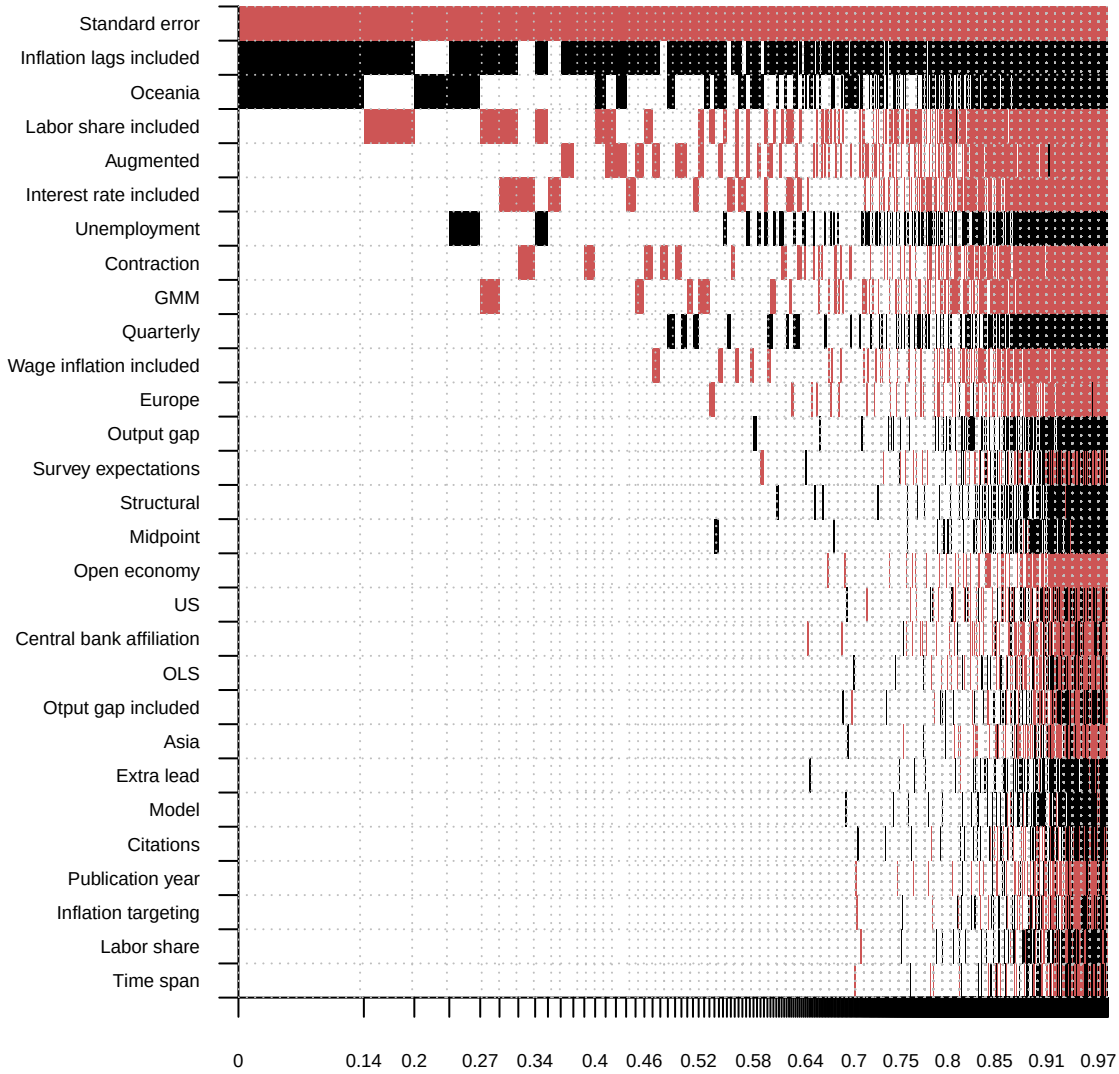
Notes: UIP and Dilution = priors according to Eicher et al. (2011) and George (2010); BRIC and Random = the benchmark g-prior for parameters with the beta-binomial model prior. The HQ prior asymptotically mimics the Hannan-Quinn criterion.

Table 22: Alternative weighted specifications of the baseline BMA model β

	Weighted			S.E. excluded		
Variable	Post. Mean	Post. SD	PIP	Post. Mean	Post. SD	PIP
Intercept	1.029	N.A.	1.000	1.035	N.A.	1.000
Standard error	0.003	0.024	0.023	N.A.	N.A.	N.A.
Data characteristics						
Time span	-0.014	0.026	0.251	-0.014	0.026	0.267
Midpoint	0.000	0.002	0.015	0.000	0.002	0.016
Quarterly	-0.068	0.063	0.605	-0.071	0.063	0.625
Inflation targeting	0.000	0.003	0.015	0.000	0.003	0.016
Contraction	-0.026	0.100	0.085	-0.028	0.102	0.090
US	0.130	0.048	0.917	0.132	0.047	0.924
Europe	-0.012	0.036	0.132	-0.011	0.035	0.129
Asia	-0.164	0.046	0.996	-0.163	0.045	0.996
Oceania	0.103	0.050	0.867	0.104	0.049	0.873
Africa	0.015	0.041	0.140	0.016	0.043	0.153
Specifications						
Model	0.002	0.012	0.043	0.002	0.013	0.045
Open economy	0.000	0.005	0.019	0.000	0.005	0.021
Augmented	-0.004	0.014	0.092	-0.004	0.014	0.093
Extra lead	-0.004	0.019	0.067	-0.005	0.020	0.072
Survey expectations	-0.001	0.006	0.028	-0.001	0.007	0.031
CPI	0.025	0.032	0.404	0.024	0.032	0.396
GDP deflator	-0.023	0.031	0.400	-0.024	0.031	0.407
Labor share	0.000	0.004	0.021	0.000	0.004	0.023
Unemployment	0.001	0.007	0.023	0.001	0.007	0.025
Output gap	0.060	0.038	0.773	0.059	0.038	0.763
Estimation techniques						
Structural	0.030	0.043	0.366	0.032	0.044	0.389
OLS	-0.177	0.027	1.000	-0.177	0.028	1.000
GMM	-0.024	0.043	0.267	-0.025	0.044	0.282
Inflation lags included	0.001	0.008	0.030	0.001	0.009	0.034
Labor share included	-0.035	0.045	0.436	-0.037	0.045	0.459
Output gap included	-0.073	0.038	0.841	-0.073	0.039	0.837
Interest rate included	-0.073	0.029	0.928	-0.073	0.029	0.932
Wage inflation included	0.000	0.003	0.016	0.000	0.003	0.017
Publication characteristics						
Publication year	0.000	0.004	0.019	0.000	0.004	0.020
Central bank affiliation	0.077	0.034	0.923	0.077	0.033	0.927
Citations	0.002	0.006	0.091	0.002	0.006	0.091
Observations	836			836		
Studies	60			60		

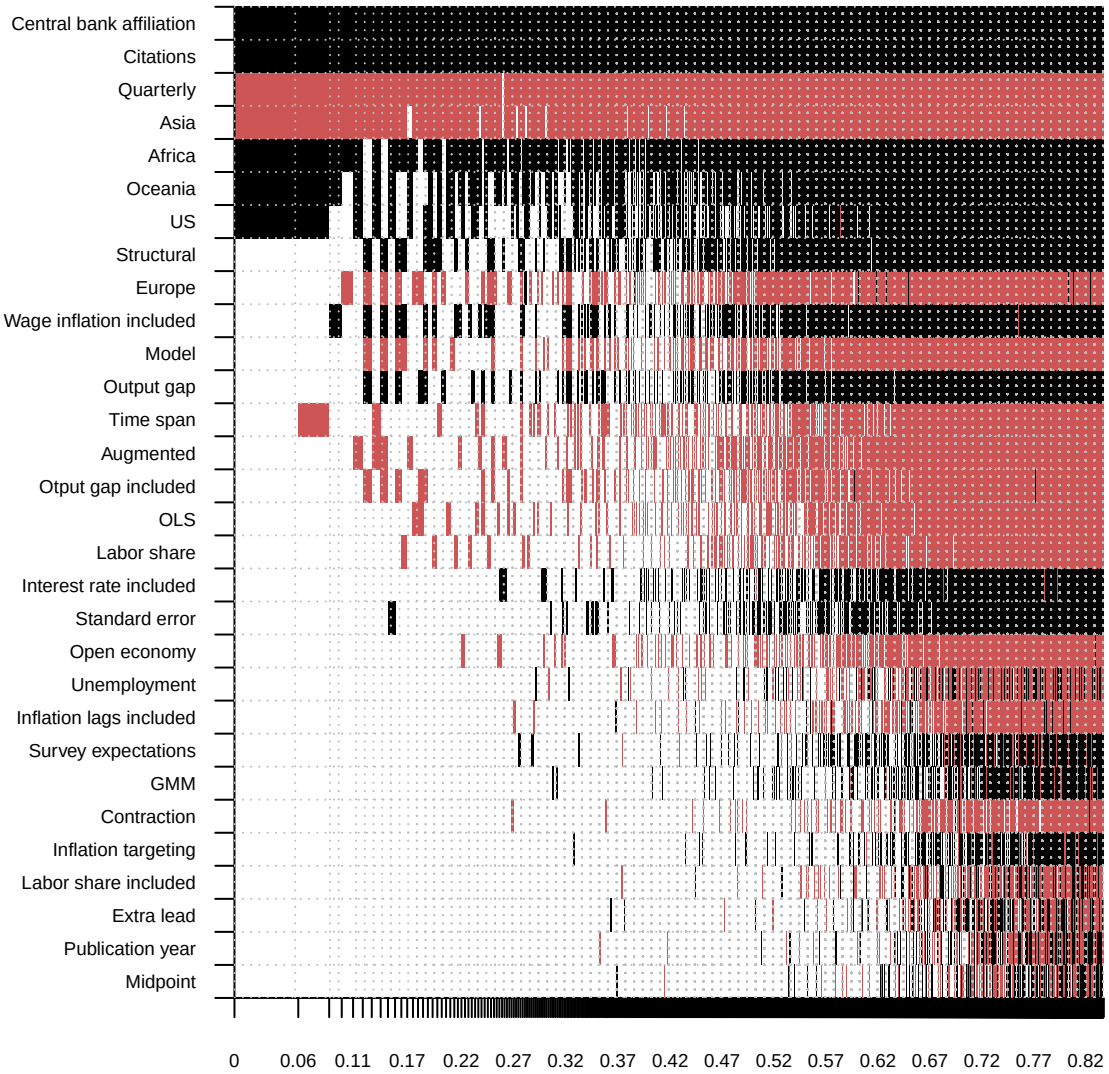
Notes: The response variable is the coefficient of the inflation expectations in the NKPC. SD = standard deviation, PIP = Posterior inclusion probability. The left-hand panel reports the results when variables are weighted by the inverse of the number of estimates per study. The right-hand panel reports the results of BMA when standard errors are excluded. In both panels we employ BMA based on the UIP g-prior and the dilution prior (Eicher et al. 2011; George 2010). Table 19 presents a detailed description of all the variables.

Figure 11: Model inclusion in BMA (GDP deflator)



Notes: The response variable is the coefficient of the inflation expectations in the NKPC when inflation is defined by the GDP deflator. The columns denote individual models; variables are sorted by posterior inclusion probability in descending order. The horizontal axis denotes the cumulative posterior model probabilities. The estimation is based on the unit information prior (UIP) recommended by Eicher et al. (2011) and the dilution prior suggested by George (2010), which takes collinearity into account. Black color (darker in grayscale) = the variable has a positive estimated sign. Red color (lighter in grayscale) = the variable has a negative estimated sign. No color = the variable is excluded from the given model. Table 3 presents a detailed description of all variables. The left-hand panel of Table 23 represents the corresponding numerical results.

Figure 12: Model inclusion in BMA (CPI)



Notes: The response variable is the coefficient of the inflation expectations in the NKPC when inflation is defined by the CPI. The columns denote individual models; variables are sorted by posterior inclusion probability in descending order. The horizontal axis denotes the cumulative posterior model probabilities. The estimation is based on the unit information prior (UIP) recommended by Eicher et al. (2011) and the dilution prior suggested by George (2010), which takes collinearity into account. Black color (darker in grayscale) = the variable has a positive estimated sign. Red color (lighter in grayscale) = the variable has a negative estimated sign. No color = the variable is excluded from the given model. Table 3 presents a detailed description of all variables. The right-hand panel of Table 23 represents the corresponding numerical results.

Table 23: Heterogeneity within different inflation measures β

	GDP deflator			CPI		
Variable	Post. Mean	Post. SD	PIP	Post. Mean	Post. SD	PIP
Intercept	0.927	N.A.	1.000	0.957	N.A.	1.000
Standard error	-1.964	0.287	1.000	0.029	0.091	0.114
Data characteristics						
Time span	0.000	0.003	0.011	-0.017	0.032	0.253
Midpoint	0.000	0.004	0.021	0.000	0.005	0.014
Quarterly	0.013	0.043	0.102	-0.198	0.052	0.987
Inflation targeting	0.000	0.007	0.011	0.001	0.007	0.023
Contraction	-0.078	0.213	0.141	-0.007	0.054	0.029
US	0.000	0.007	0.018	0.060	0.075	0.437
Europe	-0.002	0.013	0.044	-0.038	0.060	0.344
Asia	0.000	0.009	0.013	-0.155	0.076	0.935
Oceania	0.041	0.051	0.434	0.100	0.096	0.568
Africa	N.A.	N.A.	N.A.	0.218	0.109	0.865
Specifications						
Model	0.000	0.004	0.012	-0.127	0.233	0.267
Open economy	-0.001	0.010	0.019	-0.009	0.029	0.114
Augmented	-0.014	0.030	0.212	-0.018	0.035	0.248
Extra lead	0.000	0.008	0.013	0.000	0.010	0.020
Survey expectations	0.000	0.009	0.026	0.003	0.018	0.046
Labor share	0.000	0.002	0.011	-0.011	0.033	0.134
Unemployment	0.063	0.151	0.172	0.000	0.021	0.056
Output gap	0.001	0.008	0.028	0.028	0.054	0.266
Estimation techniques						
Structural	0.001	0.007	0.025	0.057	0.079	0.392
OLS	0.000	0.009	0.015	-0.014	0.035	0.171
GMM	-0.008	0.024	0.133	0.002	0.013	0.034
Inflation lags included	0.084	0.048	0.844	-0.005	0.025	0.055
Labor share included	-0.021	0.034	0.320	0.000	0.009	0.021
Output gap included	0.000	0.004	0.015	-0.022	0.046	0.218
Interest rate included	-0.010	0.024	0.180	0.013	0.038	0.126
Wage inflation included	-0.004	0.015	0.075	0.045	0.075	0.309
Publication characteristics						
Publication year	0.000	0.002	0.011	0.000	0.007	0.016
Central bank affiliation	0.000	0.005	0.018	0.257	0.046	1.000
Citations	0.000	0.001	0.012	0.069	0.020	0.999
Observations	283			495		
Studies	30			32		

Notes: The response variable in the left-hand panel is the coefficient of the inflation expectations in the NKPC when inflation is defined by the GDP deflator. The right-hand panel reports the results regarding the estimate of the same coefficient when inflation is defined by the CPI. SD = standard deviation, PIP = Posterior inclusion probability. In both panels we employ BMA based on the UIP g-prior and the dilution prior (Eicher et al. 2011; George 2010). Table 19 presents a detailed description of all the variables.

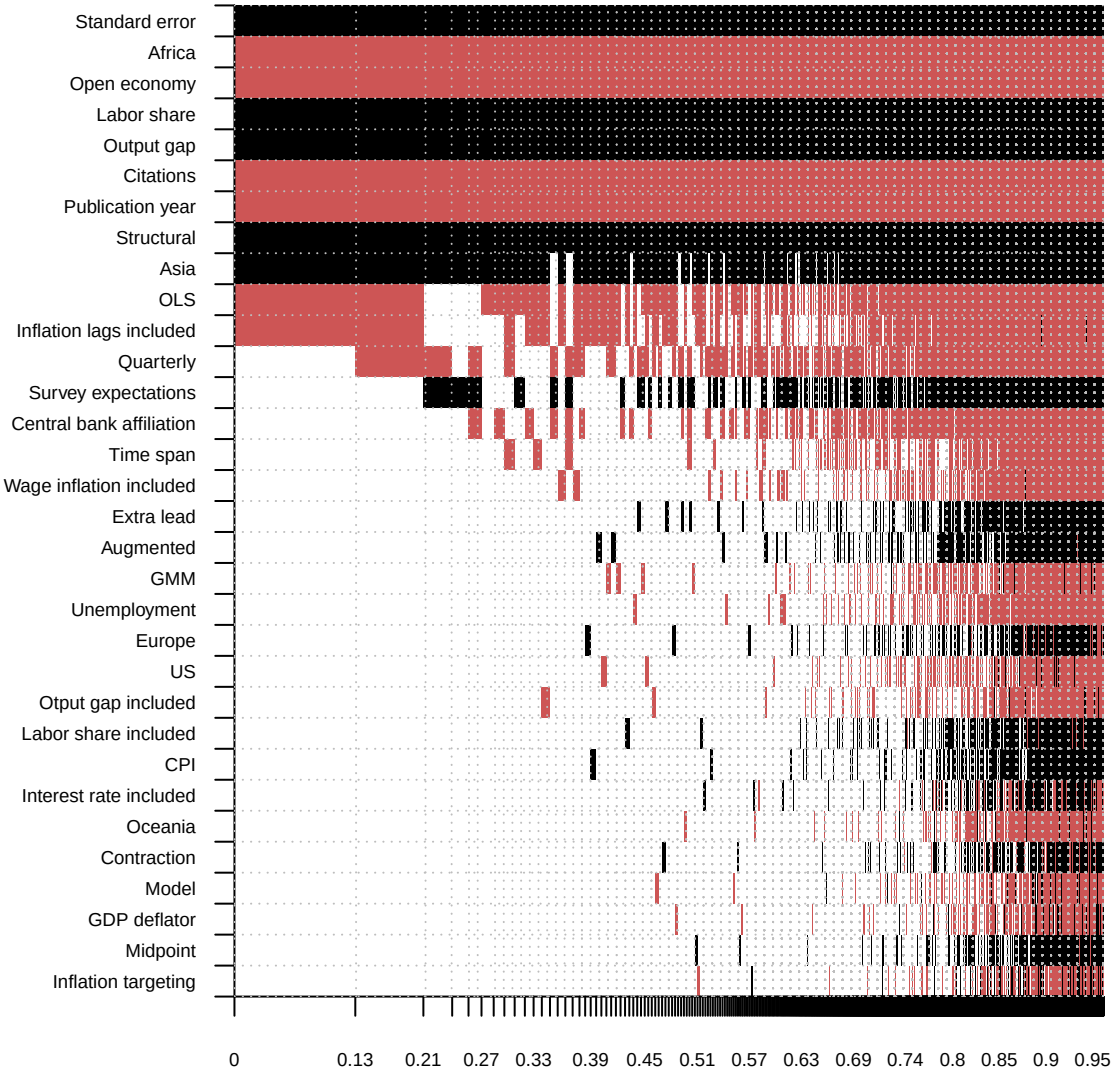
3.2 Slope of the NKPC (driving variable)

Table 24: Explaining heterogeneity λ

	Bayesian Model Averaging			Frequentist Check (OLS)		
Variable	Post. Mean	Post. SD	PIP	Coeff.	S.E.	P-val.
Intercept	0.286	N.A.	1.000	0.298	0.103	0.005
Standard error	0.692	0.067	1.000	0.707	0.223	0.003
Data characteristics						
Time span	-0.004	0.014	0.124			
Midpoint	0.000	0.002	0.024			
Quarterly	-0.043	0.048	0.511	-0.072	0.063	0.260
Inflation targeting	0.000	0.003	0.021			
Contraction	0.002	0.026	0.026			
US	-0.001	0.008	0.049			
Europe	0.001	0.008	0.050			
Asia	0.086	0.039	0.899	0.091	0.056	0.110
Oceania	-0.001	0.006	0.029			
Africa	-0.235	0.043	1.000	-0.253	0.071	0.001
Specifications						
Model	-0.001	0.007	0.026			
Open economy	-0.144	0.022	1.000	-0.148	0.066	0.029
Augmented	0.002	0.010	0.068			
Extra lead	0.004	0.016	0.073			
Survey expectations	0.020	0.029	0.360			
CPI	0.001	0.005	0.039			
GDP deflator	0.000	0.003	0.024			
Labor share	0.170	0.020	1.000	0.176	0.041	0.000
Unemployment	-0.002	0.013	0.057			
Output gap	0.174	0.022	1.000	0.176	0.040	0.000
Estimation techniques						
Structural	0.112	0.025	0.998	0.116	0.048	0.019
OLS	-0.055	0.041	0.710	-0.077	0.034	0.027
GMM	-0.002	0.011	0.065			
Inflation lags included	-0.037	0.037	0.556	-0.073	0.025	0.004
Labor share included	0.001	0.008	0.046			
Output gap included	-0.001	0.007	0.048			
Interest rate included	0.000	0.005	0.032			
Wage inflation included	-0.004	0.013	0.099			
Publication characteristics						
Publication year	-0.097	0.022	0.999	-0.091	0.030	0.003
Central bank affiliation	-0.015	0.026	0.299			
Citations	-0.056	0.008	1.000	-0.054	0.007	0.000
Observations	755			755		
Studies	56			56		

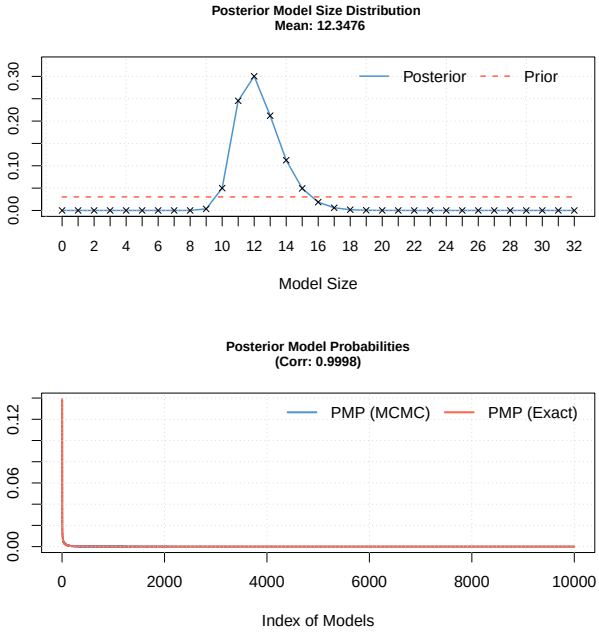
Notes: The response variable is the slope of the NKPC. SD = standard deviation, PIP = Posterior inclusion probability, S.E. = standard error. The left-hand panel applies BMA based on the UIP g-prior and the dilution prior (Eicher et al. 2011; George 2010). The right-hand panel reports a frequentist check using OLS, which includes variables with PIPs higher than 0.50 in BMA. Standard errors in the frequentist check are clustered at the study level. Table 19 presents a detailed description of all the variables.

Figure 13: Model inclusion in Bayesian model averaging λ



Notes: The response variable is the slope of the NKPC. The columns denote individual models; variables are sorted by posterior inclusion probability in descending order. The horizontal axis denotes the cumulative posterior model probabilities. The estimation is based on the unit information prior (UIP) recommended by Eicher et al. (2011) and the dilution prior suggested by George (2010), which takes collinearity into account. Black color (darker in grayscale) = the variable has a positive estimated sign. Red color (lighter in grayscale) = the variable has a negative estimated sign. No color = the variable is excluded from the given model. Table 3 presents a detailed description of all variables. The numerical results are reported in Table 24.

Figure 14: Model size and convergence for the benchmark BMA model λ



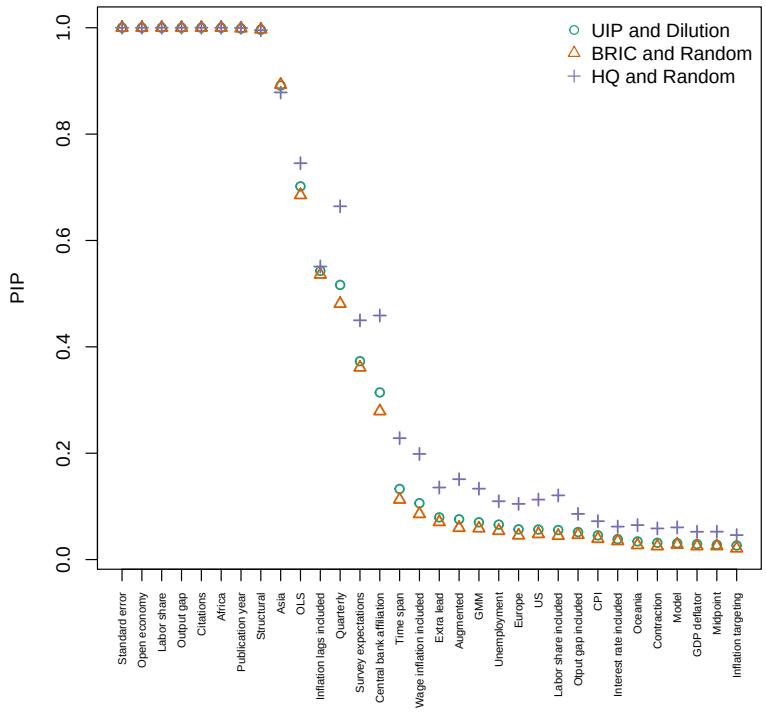
Notes: The figure illustrates the posterior model size distribution and the posterior model probabilities of the BMA exercise reported in Table 24.

Table 25: Alternative BMA priors λ

	BRIC g-prior			HQ g-prior		
Variable	Post. Mean	Post. SD	PIP	Post. Mean	Post. SD	PIP
Intercept	0.277	N.A.	1.000	0.333	N.A.	1.000
Standard error	0.692	0.067	1.000	0.684	0.068	1.000
Data characteristics						
Time span	-0.004	0.013	0.111	-0.008	0.018	0.231
Midpoint	0.000	0.002	0.023	0.000	0.004	0.050
Quarterly	-0.040	0.047	0.474	-0.056	0.047	0.666
Inflation targeting	0.000	0.004	0.024	0.000	0.005	0.050
Contraction	0.002	0.027	0.027	0.004	0.039	0.059
US	-0.001	0.008	0.046	-0.004	0.014	0.113
Europe	0.001	0.007	0.047	0.003	0.011	0.103
Asia	0.087	0.039	0.897	0.080	0.040	0.879
Oceania	-0.001	0.006	0.029	-0.002	0.010	0.068
Africa	-0.234	0.043	1.000	-0.235	0.044	1.000
Specifications						
Model	-0.001	0.007	0.026	-0.001	0.011	0.058
Open economy	-0.144	0.022	1.000	-0.146	0.023	1.000
Augmented	0.002	0.009	0.059	0.005	0.015	0.149
Extra lead	0.004	0.016	0.068	0.007	0.022	0.137
Survey expectations	0.019	0.029	0.353	0.025	0.032	0.446
CPI	0.001	0.005	0.037	0.001	0.007	0.073
GDP deflator	0.000	0.003	0.024	0.000	0.005	0.051
Labor share	0.170	0.020	1.000	0.171	0.021	1.000
Unemployment	-0.002	0.013	0.056	-0.005	0.018	0.110
Output gap	0.174	0.022	1.000	0.172	0.024	1.000
Estimation techniques						
Structural	0.112	0.025	0.997	0.110	0.026	0.995
OLS	-0.054	0.041	0.693	-0.057	0.040	0.743
GMM	-0.002	0.011	0.061	-0.005	0.016	0.132
Inflation lags included	-0.036	0.036	0.540	-0.036	0.037	0.553
Labor share included	0.001	0.008	0.042	0.004	0.014	0.118
Output gap included	-0.001	0.006	0.045	-0.002	0.008	0.086
Interest rate included	0.000	0.005	0.033	0.000	0.007	0.062
Wage inflation included	-0.003	0.012	0.086	-0.008	0.019	0.196
Publication characteristics						
Publication year	-0.096	0.022	0.998	-0.102	0.024	1.000
Central bank affiliation	-0.014	0.025	0.279	-0.024	0.030	0.456
Citations	-0.056	0.008	1.000	-0.058	0.008	1.000
Observations	755			755		
Studies	56			56		

Notes: The response variable is the slope of the NKPC. SD = standard deviation, PIP = Posterior inclusion probability. The left-hand panel applies BMA based on BRIC g-prior (the benchmark g-prior for parameters with the beta-binomial model prior). The right-hand panel reports the results of BMA based on HQ g-prior, which asymptotically mimics the Hannan-Quinn criterion. Table 19 presents a detailed description of all the variables.

Figure 15: Posterior inclusion probabilities across different prior settings λ



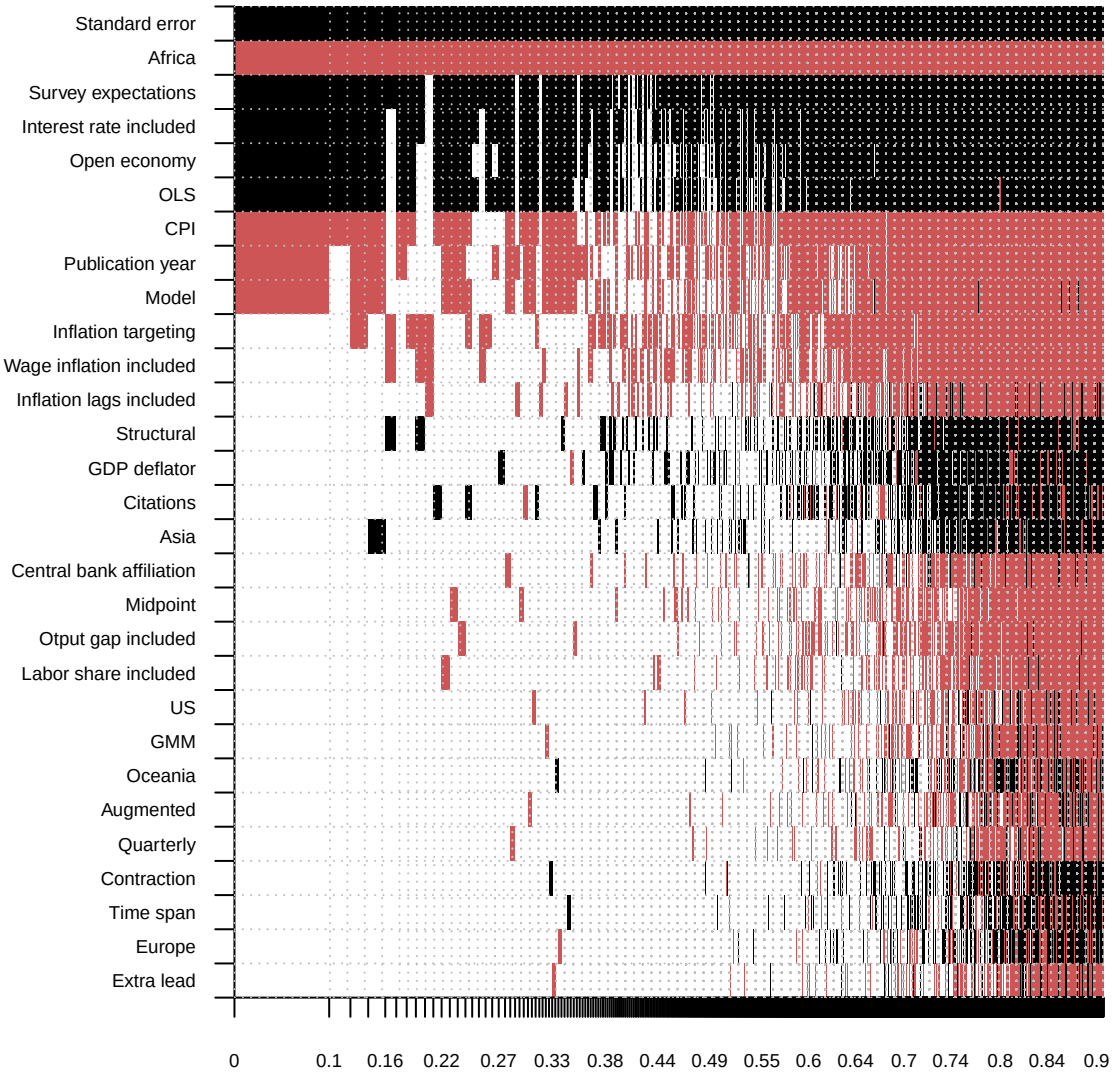
Notes: UIP and Dilution = priors according to Eicher et al. (2011) and George (2010); BRIC and Random = the benchmark g-prior for parameters with the beta-binomial model prior. The HQ prior asymptotically mimics the Hannan-Quinn criterion.

Table 26: Alternative weighted specifications of the baseline BMA model λ

	Weighted			S.E. excluded		
Variable	Post. Mean	Post. SD	PIP	Post. Mean	Post. SD	PIP
Intercept	-0.009	N.A.	1.000	2.494	N.A.	1.000
Standard error	0.659	0.063	1.000	N.A.	N.A.	N.A.
Data characteristics						
Time span	0.000	0.004	0.039	-1.213	0.271	0.999
Midpoint	0.014	0.023	0.330	0.000	0.024	0.015
Quarterly	-0.001	0.006	0.037	0.000	0.055	0.016
Inflation targeting	-0.014	0.027	0.247	0.007	0.068	0.024
Contraction	-0.430	0.234	0.846	0.005	0.230	0.015
US	0.075	0.084	0.512	-0.011	0.150	0.064
Europe	0.131	0.085	0.917	0.376	0.439	0.484
Asia	0.102	0.090	0.662	0.425	0.545	0.428
Oceania	0.075	0.087	0.477	-0.148	0.369	0.169
Africa	-0.302	0.090	1.000	-0.145	0.417	0.135
Specifications						
Model	0.000	0.006	0.033	0.064	0.266	0.074
Open economy	-0.125	0.020	1.000	-1.346	0.344	0.996
Augmented	0.000	0.004	0.029	0.011	0.076	0.032
Extra lead	0.009	0.023	0.180	0.038	0.185	0.058
Survey expectations	0.008	0.018	0.193	0.060	0.194	0.112
CPI	0.082	0.018	1.000	0.006	0.066	0.023
GDP deflator	0.002	0.010	0.071	0.008	0.071	0.026
Labor share	0.114	0.048	0.920	3.444	0.276	1.000
Unemployment	-0.066	0.071	0.549	0.073	0.270	0.088
Output gap	0.127	0.053	0.924	2.654	0.338	1.000
Estimation techniques						
Structural	0.047	0.030	0.790	1.262	0.345	0.985
OLS	0.000	0.010	0.065	-0.169	0.335	0.237
GMM	0.001	0.007	0.060	0.023	0.126	0.049
Inflation lags included	0.043	0.033	0.707	0.027	0.132	0.060
Labor share included	0.002	0.009	0.092	-0.017	0.106	0.040
Output gap included	0.000	0.003	0.027	-0.004	0.047	0.020
Interest rate included	0.001	0.005	0.048	0.861	0.329	0.933
Wage inflation included	-0.034	0.032	0.607	-0.702	0.413	0.812
Publication characteristics						
Publication year	-0.051	0.027	0.884	-0.119	0.272	0.196
Central bank affiliation	-0.088	0.021	0.999	0.010	0.073	0.034
Citations	-0.001	0.004	0.074	-0.020	0.075	0.087
Observations	755			755		
Studies	56			56		

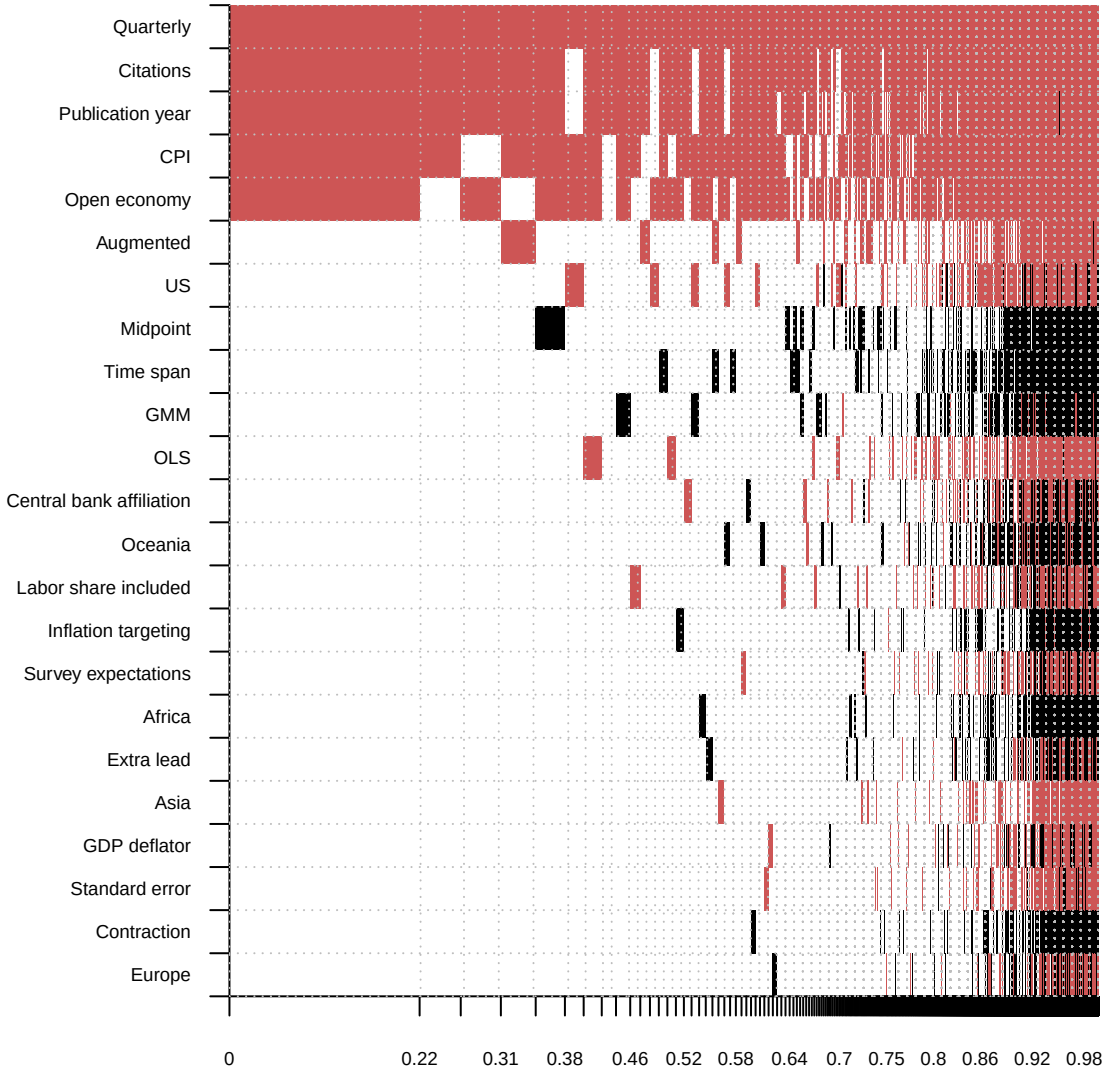
Notes: The response variable is the slope of the NKPC. SD = standard deviation, PIP = Posterior inclusion probability. The left-hand panel reports the results when variables are weighted by the inverse of the number of estimates per study. The right-hand panel reports the results of BMA when standard errors are excluded. In both panels we employ BMA based on the UIP g-prior and the dilution prior (Eicher et al. 2011; George 2010). Table 19 presents a detailed description of all the variables.

Figure 16: Model inclusion in BMA (Labor share)



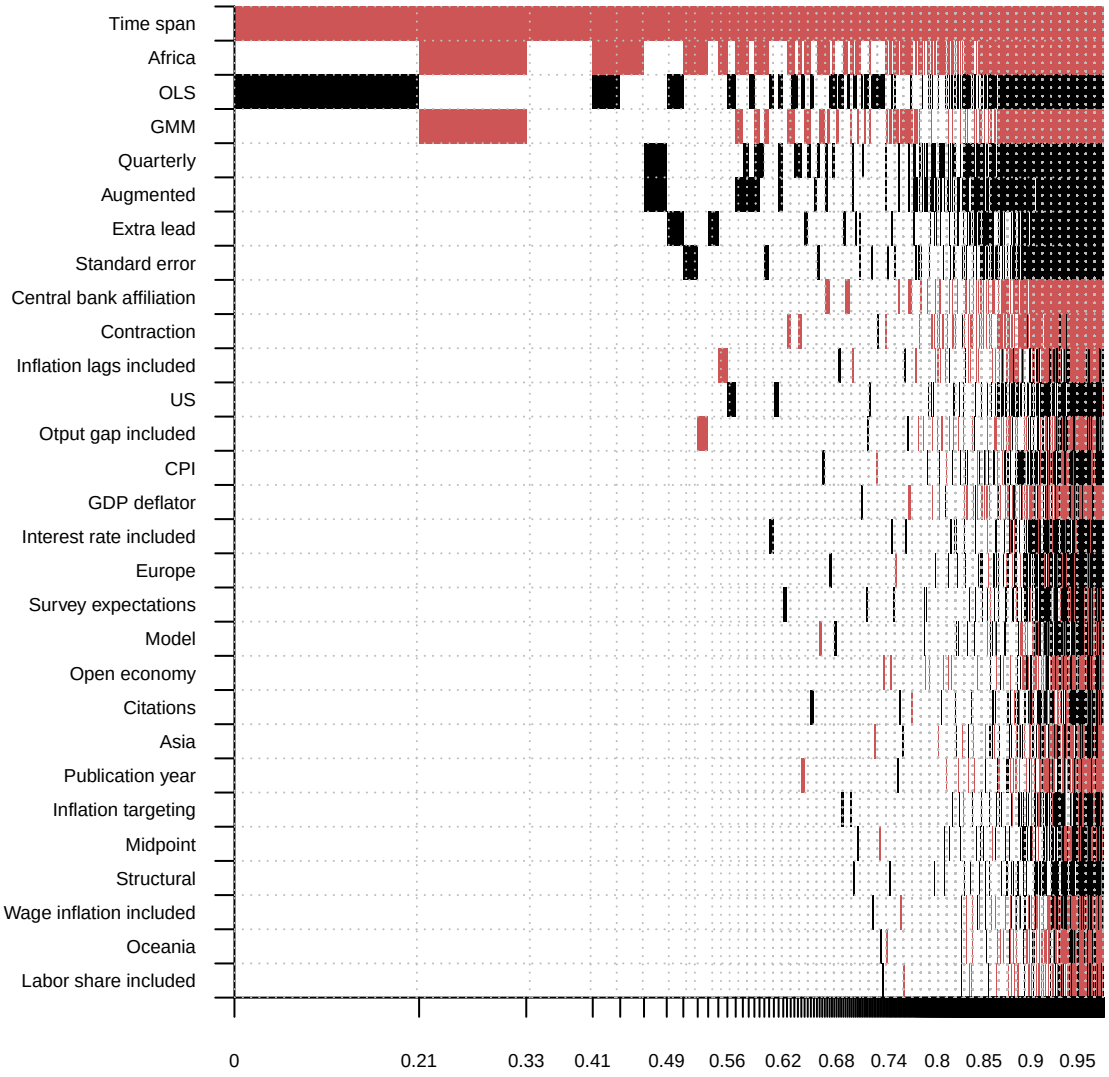
Notes: The response variable is the slope of the NKPC when the forcing variable is represented by labor income share. The columns denote individual models; variables are sorted by posterior inclusion probability in descending order. The horizontal axis denotes the cumulative posterior model probabilities. The estimation is based on the unit information prior (UIP) recommended by Eicher et al. (2011) and the dilution prior suggested by George (2010), which takes collinearity into account. Black color (darker in grayscale) = the variable has a positive estimated sign. Red color (lighter in grayscale) = the variable has a negative estimated sign. No color = the variable is excluded from the given model. Table 3 presents a detailed description of all variables. The left-hand panel of Table 27 represents the corresponding numerical results.

Figure 17: Model inclusion in BMA (Unemployment)



Notes: The response variable is the slope of the NKPC when the forcing variable is measured by unemployment gap/rate. The columns denote individual models; variables are sorted by posterior inclusion probability in descending order. The horizontal axis denotes the cumulative posterior model probabilities. The estimation is based on the unit information prior (UIP) recommended by Eicher et al. (2011) and the dilution prior suggested by George (2010), which takes collinearity into account. Black color (darker in grayscale) = the variable has a positive estimated sign. Red color (lighter in grayscale) = the variable has a negative estimated sign. No color = the variable is excluded from the given model. Table 3 presents a detailed description of all variables. The right-hand panel of Table 27 represents the corresponding numerical results.

Figure 18: Model inclusion in BMA (Output gap)



Notes: The response variable is the slope of the NKPC when marginal costs are proxied by the output gap. The columns denote individual models; variables are sorted by posterior inclusion probability in descending order. The horizontal axis denotes the cumulative posterior model probabilities. The estimation is based on the unit information prior (UIP) recommended by Eicher et al. (2011) and the dilution prior suggested by George (2010), which takes collinearity into account. Black color (darker in grayscale) = the variable has a positive estimated sign. Red color (lighter in grayscale) = the variable has a negative estimated sign. No color = the variable is excluded from the given model. Table 3 presents a detailed description of all variables. The right-hand panel of Table 27 represents the corresponding numerical results.

Table 27: Heterogeneity among different forcing variables λ

	Labor share			Unemployment			Output gap		
Variable	Post. Mean	Post. SD	PIP	Post. Mean	Post. SD	PIP	Post. Mean	Post. SD	PIP
Intercept	0.056	N.A.	1.000	5.415	N.A.	1.000	0.633	N.A.	1.000
Standard error	1.183	0.059	1.000	-0.001	0.020	0.024	0.022	0.092	0.067
Data characteristics									
Time span	0.000	0.003	0.026	0.004	0.016	0.092	-0.174	0.046	0.981
Midpoint	-0.001	0.005	0.075	0.012	0.039	0.113	0.000	0.005	0.013
Quarterly	-0.001	0.008	0.030	-0.606	0.077	1.000	0.026	0.064	0.173
Inflation targeting	-0.023	0.035	0.369	0.001	0.007	0.035	0.001	0.009	0.014
Contraction	0.002	0.028	0.030	0.002	0.025	0.024	-0.026	0.144	0.045
US	0.000	0.004	0.035	-0.015	0.048	0.131	0.003	0.017	0.034
Europe	0.000	0.003	0.026	0.000	0.004	0.023	0.001	0.013	0.020
Asia	0.007	0.029	0.077	-0.001	0.006	0.029	0.000	0.009	0.015
Oceania	0.000	0.005	0.032	0.004	0.029	0.058	0.000	0.007	0.012
Africa	-0.801	0.065	1.000	0.003	0.020	0.034	-0.077	0.091	0.470
Specifications									
Model	-0.057	0.069	0.463	N.A.	N.A.	N.A.	0.000	0.011	0.017
Open economy	0.073	0.059	0.677	-0.123	0.098	0.720	0.000	0.009	0.016
Augmented	0.000	0.004	0.031	-0.014	0.042	0.139	0.017	0.045	0.154
Extra lead	0.000	0.007	0.024	0.000	0.009	0.032	0.009	0.035	0.076
Survey expectations	0.085	0.034	0.900	-0.001	0.016	0.035	0.001	0.009	0.019
CPI	-0.042	0.037	0.623	-0.183	0.113	0.792	0.001	0.012	0.024
GDP deflator	0.004	0.013	0.125	0.001	0.031	0.027	-0.001	0.015	0.021
Estimation techniques									
Structural	0.006	0.018	0.139	N.A.	N.A.	N.A.	0.001	0.010	0.013
OLS	0.079	0.062	0.671	-0.004	0.017	0.083	0.055	0.071	0.414
GMM	-0.001	0.006	0.035	0.008	0.032	0.083	-0.026	0.049	0.242
Inflation lags included	-0.011	0.032	0.149	N.A.	N.A.	N.A.	-0.002	0.016	0.037
Labor share included	-0.001	0.006	0.055	-0.003	0.025	0.051	0.000	0.008	0.010
Output gap included	-0.002	0.009	0.067	N.A.	N.A.	N.A.	-0.002	0.014	0.033
Interest rate included	0.048	0.028	0.814	N.A.	N.A.	N.A.	0.001	0.008	0.021
Wage inflation included	-0.013	0.024	0.269	N.A.	N.A.	N.A.	0.000	0.007	0.012
Publication characteristics									
Publication year	-0.026	0.027	0.547	-1.547	0.851	0.843	0.000	0.006	0.015
Central bank affiliation	-0.002	0.010	0.076	-0.004	0.036	0.059	-0.004	0.020	0.050
Citations	0.002	0.007	0.123	-0.065	0.026	0.898	0.000	0.003	0.015
Observations	237			235			186		
Studies	29			7			31		

Notes: The response variable in the left-hand panel is the slope of the NKPC when marginal costs are measured by labor costs. The middle panel is the results when unemployment is used as the forcing variable. The right-hand panel reports the results regarding the estimate of the NKPC's slope when the slack variable is measured by the output gap. SD = standard deviation, PIP = Posterior inclusion probability. In both panels we employ BMA based on the UIP g-prior and the dilution prior (Eicher et al. 2011; George 2010). Table 19 presents a detailed description of all the variables.

3.3 Frequentist model averaging

Table 28: Results of frequentist model averaging β

	β			$0 < \beta < 1$		
Variable	Coeff.	S.E.	P-val.	Coeff.	S.E.	P-val.
Intercept	1.009	0.126	0.000	0.619	0.140	0.000
Standard error	1.045	0.113	0.000	0.607	0.070	0.000
Standard error * Theory	-1.959	0.110	0.000	N.A.	N.A.	N.A.
Data characteristics						
Time span	-0.020	0.020	0.303	-0.035	0.020	0.077
Midpoint	0.005	0.015	0.755	0.002	0.016	0.908
Quarterly	-0.020	0.031	0.523	-0.097	0.032	0.002
Inflation targeting	-0.005	0.025	0.835	0.005	0.025	0.845
Contraction	-0.165	0.145	0.256	0.117	0.147	0.429
US	0.190	0.042	0.000	-0.050	0.043	0.240
Europe	0.035	0.038	0.349	0.003	0.038	0.941
Asia	-0.024	0.043	0.576	0.061	0.043	0.153
Oceania	0.160	0.040	0.000	-0.029	0.044	0.509
Africa	0.083	0.053	0.115	-0.264	0.054	0.000
Specifications						
Model	0.033	0.030	0.268	-0.035	0.040	0.373
Open economy	-0.016	0.025	0.503	-0.173	0.027	0.000
Augmented	-0.047	0.020	0.019	0.042	0.024	0.080
Extra lead	-0.057	0.035	0.102	0.022	0.035	0.542
Survey expectations	-0.027	0.026	0.288	0.066	0.027	0.015
CPI	0.057	0.029	0.053	0.034	0.031	0.268
GDP deflator	-0.010	0.028	0.712	0.045	0.029	0.127
Labor share	0.023	0.021	0.278	0.166	0.024	0.000
Unemployment	0.018	0.034	0.591	-0.044	0.035	0.208
Output gap	0.061	0.029	0.036	0.151	0.030	0.000
Estimation techniques						
Structural	0.046	0.025	0.060	0.094	0.029	0.001
OLS	-0.118	0.030	0.000	-0.098	0.031	0.001
GMM	-0.066	0.027	0.013	-0.035	0.029	0.233
Inflation lags included	0.037	0.030	0.213	-0.060	0.031	0.054
Labor share included	-0.054	0.023	0.021	0.057	0.025	0.025
Otput gap included	-0.061	0.021	0.004	-0.009	0.023	0.684
Interest rate included	-0.036	0.020	0.076	-0.024	0.024	0.329
Wage inflation included	0.019	0.023	0.408	-0.036	0.024	0.138
Publication characteristics						
Publication year	-0.029	0.024	0.212	-0.140	0.026	0.000
Central bank affiliation	0.089	0.023	0.000	-0.080	0.024	0.001
Citations	-0.007	0.009	0.428	-0.066	0.010	0.000
Observations	836			600		

Notes: We use Mallow's weights by Hansen (2007) and the orthogonalization of the covariate space suggested by Amini and Parmeter (2012) to conduct the frequentist model averaging (FMA) exercise.

Table 29: Results of frequentist model averaging λ

	λ			λ $(0 < \beta < 1)$		
Variable	Coeff.	S.E.	P-val.	Coeff.	S.E.	P-val.
Intercept	0.619	0.140	0.000	0.768	0.148	0.000
Standard error	0.607	0.070	0.000	0.516	0.078	0.000
Data characteristics						
Time span	-0.035	0.020	0.077	-0.076	0.023	0.001
Midpoint	0.002	0.016	0.908	0.006	0.016	0.703
Quarterly	-0.097	0.032	0.002	-0.137	0.036	0.000
Inflation targeting	0.005	0.025	0.845	-0.012	0.026	0.662
Contraction	0.117	0.147	0.429	0.156	0.165	0.344
US	-0.050	0.043	0.240	-0.046	0.045	0.311
Europe	0.003	0.038	0.941	0.005	0.039	0.892
Asia	0.061	0.043	0.153	0.049	0.044	0.257
Oceania	-0.029	0.044	0.509	-0.008	0.047	0.870
Africa	-0.264	0.054	0.000	-0.193	0.060	0.001
Specifications						
Model	-0.035	0.040	0.373	0.000	0.040	0.992
Open economy	-0.173	0.027	0.000	-0.136	0.029	0.000
Augmented	0.042	0.024	0.080	0.057	0.026	0.031
Extra lead	0.022	0.035	0.542	0.117	0.045	0.009
Survey expectations	0.066	0.027	0.015	0.077	0.030	0.011
CPI	0.034	0.031	0.268	0.066	0.037	0.070
GDP deflator	0.045	0.029	0.127	0.073	0.036	0.043
Labor share	0.166	0.024	0.000	0.155	0.026	0.000
Unemployment	-0.044	0.035	0.208	-0.025	0.040	0.540
Output gap	0.151	0.030	0.000	0.140	0.033	0.000
Estimation techniques						
Structural	0.094	0.029	0.001	0.076	0.032	0.017
OLS	-0.098	0.031	0.001	-0.047	0.037	0.205
GMM	-0.035	0.029	0.233	-0.068	0.031	0.029
Inflation lags included	-0.060	0.031	0.054	-0.033	0.035	0.342
Labor share included	0.057	0.025	0.025	0.077	0.028	0.006
Otput gap included	-0.009	0.023	0.684	0.028	0.025	0.261
Interest rate included	-0.024	0.024	0.329	-0.017	0.029	0.548
Wage inflation included	-0.036	0.024	0.138	-0.018	0.026	0.483
Publication characteristics						
Publication year	-0.140	0.026	0.000	-0.160	0.027	0.000
Central bank affiliation	-0.080	0.024	0.001	-0.104	0.027	0.000
Citations	-0.066	0.010	0.000	-0.077	0.012	0.000
Observations	755			548		

Notes: We use Mallow's weights by Hansen (2007) and the orthogonalization of the covariate space suggested by Amini and Parmeter (2012) to conduct the frequentist model averaging (FMA) exercise.

References

Abbas, S. K. (2018). Global slack hypothesis: evidence from China, India and Pakistan. *Empirical Economics*, 54(2):593–627. 3

Abbas, S. K., Bhattacharya, P. S., Mallick, D., and Sgro, P. (2016a). The new Keynesian Phillips curve in a small open economy: Empirical evidence from Australia. *Economic record*, 92(298):409–434. 3

Abbas, S. K., Bhattacharya, P. S., and Sgro, P. (2016b). The new Keynesian Phillips curve: An update on recent empirical advances. *International Review of Economics & Finance*, 43:378–403. 3

Abbas, S. K. and Sgro, P. M. (2011). New Keynesian Phillips curve and inflation dynamics in Australia. *Economic Modelling*, 28(4):2022–2033. 3

Adam, K. and Padula, M. (2011). Inflation dynamics and subjective expectations in the United States. *Economic Inquiry*, 49(1):13–25. 3

Ahiadorme, J. W. (2021). Inflation, output and unemployment trade-offs in sub-saharan Africa countries. *Macroeconomics and Finance in Emerging Market Economies*, pages 1–20. 3

Allsopp, C., Kara, A., and Nelson, E. (2006). United Kingdom inflation targeting and the exchange rate. *The Economic Journal*, 116(512):F232–F244. 3

Amini, S. M. and Parmeter, C. F. (2012). Comparison of model averaging techniques: Assessing growth determinants. *Journal of Applied Econometrics*, 27(5):870–876. 44, 45

Andrews, I. and Kasy, M. (2019). Identification of and correction for publication bias. *American Economic Review*, 109(8):2766–94. 14, 15, 16, 17, 18, 19, 20, 21

Basistha, A. and Nelson, C. R. (2007). New measures of the output gap based on the forward-looking new Keynesian Phillips curve. *Journal of Monetary Economics*, 54:498–511. 3

Batini, N., Jackson, B., and Nickell, S. (2005). An open-economy new Keynesian Phillips curve for the U.K. *Journal of Monetary Economics*, 52:1061–1071. 3

Bom, P. R. and Rachinger, H. (2019). A kinked meta-regression model for publication bias correction. *Research Synthesis Methods*, 10(4):497–514. 15, 16, 17, 18, 19, 20, 21

Brissimis, S. N. and Magginas, N. S. (2008). Inflation forecasts and the new keynesian phillips curve. *International Journal of Central Banking*. 3

Calvo, G. A. (1983). Staggered prices in a utility-maximizing framework. *Journal of Monetary Economics*, 12(3):383–398. 2

Castle, J. L., Doornik, J. A., Hendry, D. F., and Nymoen, R. (2014). Misspecification testing: Non-invariance of expectations models of inflation. *Econometric Reviews*, 33:553–574. 3

Chin, K. H. (2019). New Keynesian Phillips curve with time-varying parameters. *Empirical Economics*, 57:1869–1889. 3

Coibion, O., Gorodnichenko, Y., and Kamdar, R. (2018). The formation of expectations, inflation, and the Phillips curve. *Journal of Economic Literature*, 56:1447–1491. 3

Egan, P. G. and Leddin, A. J. (2017). The Chinese Phillips curve–inflation dynamics in the presence of structural change. *Journal of Chinese Economic and Business Studies*, 15:165–184. 3

Eicher, T. S., Papageorgiou, C., and Raftery, A. E. (2011). Default priors and predictive performance in bayesian model averaging, with application to growth determinants. *Journal of Applied Econometrics*, 26(1):30–55. 24, 25, 26, 29, 30, 31, 32, 33, 34, 35, 38, 39, 40, 41, 42, 43

Fedderke, J. and Liu, Y. (2018). Inflation in South Africa: An assessment of alternative inflation models. *South African Journal of Economics*, 86:197–230. 3

Furukawa, C. (2020). Publication bias under aggregation frictions: from communication model to new correction method. Working paper, MIT, mimeo. 14, 15, 16, 17, 18, 19, 20, 21

Furuoka, F., Ling, P. U., Chomar, M. A., and Nikitina, L. (2020). Trade openness and the Phillips curve: Evidence from ASEAN countries. *Singapore Economic Review*. 3

Gabriel, V. J. and Martins, L. F. (2010). The cost channel reconsidered: A comment using an identification-robust approach. *Journal of Money, Credit and Banking*, 42. 3

Galí, J. and Gertler, M. (1999). Inflation dynamics: A structural econometric analysis. *Journal of Monetary Economics*, 44(2):195–222. 1, 3

Galí, J., Gertler, M., and López-Salido, J. D. (2001). European inflation dynamics. *European Economic Review*, 45:1237–1270. 3

Genberg, H. and Pauwels, L. L. (2005). Wage-price dynamics and deflation in Hong Kong. *Pacific Economic Review*, 10(2):191–216. 3

George, E. I. (2010). Dilution priors: Compensating for model space redundancy. In *Borrowing Strength: Theory Powering Applications–A Festschrift for Lawrence D. Brown*, pages 158–165. Institute of Mathematical Statistics. 24, 25, 26, 29, 30, 31, 32, 33, 34, 35, 38, 39, 40, 41, 42, 43

Gillitzer, C. (2016). The sticky information Phillips curve: Evidence for Australia. *Economic Record*, 92:548–567. 3

Hall, S. G., Hondroyiannis, G., Swamy, P., and Tavlas, G. S. (2009). The new Keynesian Phillips curve and lagged inflation: a case of spurious correlation? *Southern Economic Journal*, 76(2):467–481. 3

Hansen, B. E. (2007). Least squares model averaging. *Econometrica*, 75(4):1175–1189. 44, 45

Hondroyiannis, G., Swamy, P. A., and Tavlas, G. S. (2009). The new Keynesian Phillips curve in a time-varying coefficient environment: Some European evidence. *Macroeconomic Dynamics*, 13:149–166. 3

Hubert, P. and Mirza, H. (2019). The role of forward- and backward-looking information for inflation expectations formation. *Journal of Forecasting*, 38:733–748. 3

Hung, T. H. and Kwan, Y. K. (2022). Hong Kong's new Keynesian Phillips curve: Sticky information or sticky price? *Pacific Economic Review*, 27:42–55. 3

Ioannidis, J. P., Stanley, T. D., and Doucouliagos, H. (2017). The power of bias in economics research. *The Economic Journal*, 127(605):F236–F265. 14, 15, 16, 17, 18, 19, 20, 21

Kara, A. and Nelson, E. (2003). The exchange rate and inflation in the UK. *Scottish Journal of Political Economy*, 50(5):585–608. 3

Kim, H. and Subramanian, C. (2009). Velocity of money and inflation dynamics. *Applied Economics Letters*, 16:1777–1781. 3

Kobbi, I. and Gabsi, F. B. (2017). The nonlinearity of the new Keynesian Phillips curve: The case of Tunisia. *Economies*, 5. 3

Lawless, M. and Whelan, K. T. (2011). Understanding the dynamics of labor shares and inflation. *Journal of Macroeconomics*, 33:121–136. 3

Lee, J. (2009). Evaluating monetary policy of the euro area with cross-country heterogeneity: Evidence from a new Keynesian model. *Economic Systems*, 33:325–343. 3

Lindé, J. (2005). Estimating New-Keynesian Phillips curves: A full information maximum likelihood approach. *Journal of Monetary Economics*, 52(6):1135–1149. 2

Madeira, J. (2014). Overtime labor, employment frictions, and the new Keynesian Phillips curve. *Review of Economics and Statistics*, 96:767–778. 3

Marfatia, H. A. (2017). Estimating the New Keynesian Phillips curve for the UK: evidence from the inflation-indexed bonds market. *The BE Journal of Macroeconomics*, 18(1). 2

Martins, M. M. and Verona, F. (2021). Inflation dynamics and forecast: frequency matters. *Bank of Finland Research Discussion Paper*, 1(8). 3

Matheron, J. and Maury, T. P. (2004). Supply-side refinements and the new Keynesian Phillips curve. *Economics Letters*, 82:391–396. 3

Mazumder, S. (2010). The new Keynesian Phillips curve and the cyclicality of marginal cost. *Journal of Macroeconomics*, 32:747–765. 3

Mazumder, S. (2011a). The empirical validity of the new Keynesian Phillips curve using survey forecasts of inflation. *Economic Modelling*, 28:2439–2450. 3

Mazumder, S. (2011b). Inflation and marginal cost: On the importance of their covariance. *Applied Economics Letters*, 18:1083–1089. 3

Mazumder, S. (2012). European inflation and the new Keynesian Phillips curve. *Southern Economic Journal*, 79:322–349. 3

McAdam, P. and Willman, A. (2004). Supply, factor shares and inflation persistence: Reexamining Euro-area new Keynesian Phillips curves. *Oxford Bulletin of Economics and Statistics*, 66:637–670. 3

McLeay, M. and Tenreyro, S. (2020). Optimal inflation and the identification of the Phillips curve. *NBER Macroeconomics Annual*, 34(1):199–255. 3

Mehra, Y. P. (2004). The output gap, expected future inflation and inflation dynamics: Another look the output gap, expected future inflation and inflation dynamics: Another look *. *Topics in Macroeconomics*, 4. 3

Nason, J. M. and Smith, G. W. (2008). Identifying the New Keynesian Phillips curve. *Journal of Applied Econometrics*, 23(5):525–551. 2

Neiss, K. S. and Nelson, E. (2005). Inflation dynamics, marginal cost, and the output gap: Evidence from three countries. *Source: Journal of Money, Credit and Banking*, 37:1019–1045. 3

Nunes, R. (2010). Inflation dynamics: the role of expectations. *Journal of Money, Credit and Banking*, 42(6):1161–1172. 3

Pattanaik, S., Muduli, S., and Ray, S. (2020). Inflation expectations of households: do they influence wage-price dynamics in India? *Macroeconomics and Finance in Emerging Market Economies*, 13:244–263. 3

Ravenna, F. and Walsh, C. E. (2006). Optimal monetary policy with the cost channel. *Journal of Monetary Economics*, 53:199–216. 3

Rotemberg, J. J. (1982). Monopolistic price adjustment and aggregate output. *The Review of Economic Studies*, 49(4):517–531. 2

Rudd, J. and Whelan, K. (2005). New tests of the new-Keynesian Phillips curve. *Journal of Monetary Economics*, 52:1167–1181. 3

Rudd, J. and Whelan, K. (2007). Modeling inflation dynamics: A critical review of recent research. *Journal of Money, Credit and Banking*, 39:155–170. 3

Rumler, F., Valderrama, M. T., et al. (2008). Do aggregate demand factors influence current inflation developments. *Monetary Policy & The Economy Q*, 2:70–82. 3

Sakurai, H. (2016). The new Keynesian Phillips curve in Thailand through two financial crises. *Asian Economic and Financial Review*, 6:190–195. 3

Salunkhe, B. and Patnaik, A. (2019). Inflation dynamics and monetary policy in india: A new Keynesian Phillips curve perspective. *South Asian Journal of Macroeconomics and Public Finance*, 8:144–179. 3

Saygili, H. (2020). The nature of trade, global production fragmentation and inflationary dynamics: Cross-country evidence. *World Economy*, 43:2007–2031. 3

Sheedy, K. D. (2010). Intrinsic inflation persistence. *Journal of Monetary Economics*, 57:1049–1061. 3

Singh, B. K., Kanakaraj, A., and Sridevi, T. O. (2011). Revisiting the empirical existence of the Phillips curve for India. *Journal of Asian Economics*, 22:247–258. 3

Sovbetov, Y. and Kaplan, M. (2019). Empirical examination of the stability of expectations-augmented Phillips curve for developing and developed countries. *Theoretical & Applied Economics*, 2(2). 3

Tillmann, P. (2009). The time-varying cost channel of monetary transmission. *Journal of International Money and Finance*, 28:941–953. 3

van Aert, R. C. and van Assen, M. (2020). Correcting for publication bias in a meta-analysis with the p-uniform* method. Working paper, Tilburg University & Utrecht University. 14

Vavra, J. S. (2014). Time-varying Phillips curves. Technical report, National Bureau of Economic Research. 3

Vašíček, B. (2011). Inflation dynamics and the new Keynesian Phillips curve in four central European countries. *Emerging Markets Finance and Trade*, 47:71–100. 3

Wimanda, R. E., Turner, P. M., and Hall, M. J. (2011). Expectations and the inertia of inflation: The case of Indonesia. *Journal of Policy Modeling*, 33:426–438. 3

Yazgan, M. E. and Yilmazkuday, H. (2005). Inflation dynamics of Turkey: a structural estimation. *Studies in nonlinear dynamics & econometrics*, 9(1). 3

Zeugner, S. and Feldkircher, M. (2015). Bayesian model averaging employing fixed and flexible priors: The bms package for r. *Journal of Statistical Software*, 68(4):1–37. 24

Zobl, F. X. and Ertl, M. (2021). The condemned live longer new evidence of the new Keynesian Phillips curve in central and eastern Europe. *Open Economies Review*, 32:671–699. 3

Özer Karagedikli and McDermott, C. J. (2018). Inflation expectations and low inflation in New Zealand*. *New Zealand Economic Papers*, 52:277–288. 3