

Online Appendix for Bernanke-Blanchard: What Caused the U.S. Pandemic-Era Inflation?

Variable mnemonics used in the reporting of regression results are given in Table A1 below (see also Table 1 in the text). In Table A2, variables used in Figure 6 are provided. Bloomberg and Haver mnemonics are given in Table A3. Full estimation results in VAR form for both the pre-Covid and full samples are provided in Tables A4 and A5, respectively. (Recall that in the pre-Covid sample, the price equation is estimated over the entire sample period (1989 Q1 to 2023 Q2) and all other equations are estimated over the pre-COVID sample period (1989 Q1 to 2019 Q4). In the full sample, all equations are estimated over the entire sample period.) Estimates and selected statistics for the four equations of the model using alternative measures of the endogenous variables are given below (Tables A6 and A7). Tables A8 and A9 give alternative estimations of the price equation with an alternative measure for shortages and V/U included, respectively. Lastly, in Table A10, results on the non-linearity of v/u in the wage equation are given.

TABLE A1. VARIABLE MNEMONICS USED IN THIS APPENDIX

<i>WAGE EQUATION</i>		
Variable	Description	Source
gw	change in the log nominal wage (ECI)	Bureau of Labor Statistics; see footnote 9. FRED: ECIWAG
cf1	one-year inflation expectations	Federal Reserve Bank of Cleveland. FRED: EXPINF1YR
spf1	one-year inflation expectations	Federal Reserve Bank of Philadelphia. Survey of Professional Forecasters
v/u	vacancy-to-unemployment ratio	Bureau of Labor Statistics. FRED: JTSJOL (V); UMEMPLOY (U). For pre-2001 data, see Barnichon (2010).
catch-up	excess of the actual log price level over the expected log price level	See gcpi or gcpe and cf1 or spf1 (depending on specification).
gpty	8-quarter MA productivity trend	Bureau of Labor Statistics. FRED: OPHNFB

<i>PRICE EQUATION (Additional Variables from Above)</i>		
Variable	Description	Source
gp, gcpi	change in the log nominal price level (CPI)	Bureau of Labor Statistics. FRED: CPIAUCSL
gcpe	change in the log nominal price level (PCE)	Bureau of Economic Analysis. FRED: PCEPI
grpe	change in the log of CPI energy prices relative to the aggregate wage	Bureau of Economic Analysis. FRED: DFXARC1M027SBEA

grpfc	change in the log of CPI food prices relative to the aggregate wage	Bureau of Economic Analysis. FRED: DNRGRC1M027SBEA
shortage	index of Google searches for “shortage”, US.	Google Trends.
nyfed	global supply chain pressure index	Federal Reserve Bank of New York

<i>INFLATION EXPECTATIONS EQUATIONS (Additional Variables from Above)</i>		
Variable	Description	Source
cf10	ten-year inflation expectations	Federal Reserve Bank of Cleveland. FRED: EXPINF10YR
spf10	ten-year inflation expectations	Federal Reserve Bank of Philadelphia. Survey of Professional Forecasters

TABLE A2. VARIABLES USED IN FIGURE 6.

Variable (FRED Code)	Description	Source
MVATOTASSS	Total motor vehicle assemblies.	Federal Reserve Board of Governors FRED: MVATOTASSS
AUINSA	Domestic auto inventories.	Bureau of Economic Analysis FRED: AUINSA
NV_Change_Annualized	Annualized PCE inflation for new motor vehicles, US.	Bureau of Economic Analysis FRED: AB67RG3Q086SBEA
chipshortage	Index of Google searches for “chip shortage”, US.	Google Trends.
carshortage	Index of Google searches for “car shortage”, US.	Google Trends.

TABLE A3. BLOOMBERG AND HAVER VARIABLES USED FOR PCA.

For the PCA, we use the settlement price of 19 different commodity futures markets. These were constructed using the series below.

<i>Bloomberg Data</i>			
Code	Description	Category	Exchange
CL1	WTI Crude Oil	Crude Oil	NYMEX
HO1	Heating Oil	Refined Products	NYMEX
NG1	Natural Gas	Natural Gas	NYMEX
C1	Corn	Corn	CBOT
S1	Soybean	Soy	CBOT
LC1	Live Cattle	Livestock	CME
GC1	Gold	Precious Metals	COMEX (NYMEX)
LA1	Primary Aluminum	Base Metal	LME
HG1	Copper	Base Metal	COMEX (NYMEX)
SB1	Sugar #11	Foodstuff	ICE (US Softs)
CT1	Cotton #2	Fibers	ICE (US Softs)
CC1	Cocoa	Foodstuff	ICE (US Softs)
KC1	Coffee 'C'	Foodstuff	ICE (US Softs)
LN1	Nickel	Base Metal	LME
W1	Wheat	Wheat	CBOT
LH1	Lean Hogs	Livestock	CME
JO1	Orange Juice	Foodstuff	ICE (US Softs)
SI1	Silver (Generic 1 st 'S1' Future)	Precious Metals	COMEX (NYMEX)
XB1	RBOB Gasoline	Refined Products	NYMEX
HU1	Unleaded Gasoline Futures	Refined Products	NYMEX

<i>Haver Data</i>	
Mnemonic	Description
GSIAE@USECON	S&P GSCI Aluminum Index (EOP, Dec-31-90=100) Standard & Poor's
GSIKE@USECON	S&P GSCI Nickel Index (EOP, Dec-31-92=100) Standard & Poor's

TABLE A4. VAR SPECIFICATION OF THE PRE-COVID MODEL

	gw	gcpi	cf1	cf10
gw	---	0.368546	---	---
L1.gw	0.159863	0.175776	---	---
L2.gw	0.124386	0.038186	---	---
L3.gw	0.17291	0.035835	---	---
L4.gw	0.002845	0.04905	---	---
gcpi	---	---	0.037929	0.029264
L1.gcpi	---	0.042311	0.103528	0.00994
L2.gcpi	---	0.175917	0.000879	-0.0125
L3.gcpi	---	0.228081	0.006399	-0.00054
L4.gcpi	---	-0.1137	-0.02428	-0.00133
cf1	---	---	---	---
L1.cf1	0.336567	---	0.303436	---
L2.cf1	-0.02778	---	-0.22618	---
L3.cf1	0.204108	---	0.175996	---
L4.cf1	0.027107	---	0.116152	---
cf10	---	---	1.200845	---
L1.cf10	---	---	-0.46918	0.85425
L2.cf10	---	---	0.017141	-0.04568
L3.cf10	---	---	0.135057	0.199097
L4.cf10	---	---	-0.37771	-0.0325
vu	---	---	---	---
L1.vu	3.725841	---	---	---
L2.vu	-1.74191	---	---	---
L3.vu	-3.65373	---	---	---
L4.vu	2.362937	---	---	---
grpe	---	0.092194	---	---
L1.grpe	---	0.000594	---	---
L2.grpe	---	-0.01483	---	---
L3.grpe	---	-0.02128	---	---
L4.grpe	---	0.009342	---	---
grpf	---	0.111009	---	---
L1.grpf	---	-0.01556	---	---
L2.grpf	---	-0.00092	---	---
L3.grpf	---	-0.00442	---	---
L4.grpf	---	0.035942	---	---
shortage	---	0.107391	---	---
L1.shortage	---	-0.03303	---	---
L2.shortage	---	0.000704	---	---
L3.shortage	---	-0.03281	---	---
L4.shortage	---	-0.0235	---	---
catch-up	---	---	---	---
L1.catch-up	-0.00767	---	---	---
L2.catch-up	0.012653	---	---	---
L3.catch-up	-0.00475	---	---	---
L4.catch-up	-0.02418	---	---	---
gpty	---	-0.14413	---	---
L1.gpty	0.031259	---	---	---
constant	-0.26515	-0.10666	---	---

TABLE A5. VAR SPECIFICATION OF THE FULL SAMPLE MODEL

	gw	gcpi	cf1	cf10
gw	---	0.368546	---	---
L1.gw	0.156251	0.175776	---	---
L2.gw	0.197978	0.038186	---	---
L3.gw	0.207231	0.035835	---	---
L4.gw	-0.01775	0.04905	---	---
gcpi	---	---	0.035766	0.030374
L1.gcpi	---	0.042311	0.098022	0.010142
L2.gcpi	---	0.175917	0.006737	-0.01075
L3.gcpi	---	0.228081	0.016029	-0.0007
L4.gcpi	---	-0.1137	-0.02076	-0.00435
cf1	---	---	---	---
L1.cf1	0.287486	---	0.332086	---
L2.cf1	-0.04425	---	-0.28294	---
L3.cf1	0.149851	---	0.146456	---
L4.cf1	0.063201	---	0.099176	---
cf10	---	---	1.302491	---
L1.cf10	---	---	-0.54685	0.84699
L2.cf10	---	---	0.021946	-0.02171
L3.cf10	---	---	0.170279	0.186186
L4.cf10	---	---	-0.37844	-0.03618
vu	---	---	---	---
L1.vu	5.084046	---	---	---
L2.vu	-4.28581	---	---	---
L3.vu	-2.32646	---	---	---
L4.vu	2.216121	---	---	---
grpe	---	0.092194	---	---
L1.grpe	---	0.000594	---	---
L2.grpe	---	-0.01483	---	---
L3.grpe	---	-0.02128	---	---
L4.grpe	---	0.009342	---	---
grpf	---	0.111009	---	---
L1.grpf	---	-0.01556	---	---
L2.grpf	---	-0.00092	---	---
L3.grpf	---	-0.00442	---	---
L4.grpf	---	0.035942	---	---
shortage	---	0.107391	---	---
L1.shortage	---	-0.03303	---	---
L2.shortage	---	0.000704	---	---
L3.shortage	---	-0.03281	---	---
L4.shortage	---	-0.0235	---	---
catch-up	---	---	---	---
L1.catch-up	0.047322	---	---	---
L2.catch-up	-0.01637	---	---	---
L3.catch-up	-0.0285	---	---	---
L4.catch-up	-0.02355	---	---	---
gpty	---	-0.14413	---	---
L1.gpty	0.038322	---	---	---
constant	-0.29623	-0.10666	---	---
dummy Q2 2020	-1.06364	---	---	---
dummy Q3 2020	3.761904	---	---	---

TABLE A6. ESTIMATION WITH PCE INFLATION RATHER THAN CPI INFLATION

Dependent variable: gw

Independent variable	gw	v/u	catch-up	cf1	gpty
Lags	-1 to -4	-1 to -4	-1 to -4	-1 to -4	-1
Sum of coefficients	0.537	0.636	-0.001	0.463	0.053
p-stat (sum)	0.001	0.017	0.986	0.003	0.380
p-stat (joint)	0.005	0.000	0.954	0.026	0.380
R-squared	0.659				
No. observations	134				

Dependent variable: gpce

Independent variable	gpce	gw	grpe	grpf	shortage	gpty
Lags	-1 to -4	0 to -4	0 to -4	0 to -4	0 to -4	0
Sum of coefficients	0.625	0.375	0.017	0.151	0.012	0.042
p-stat (sum)	0.000	0.009	0.180	0.019	0.533	0.493
p-stat (joint)	0.000	0.000	0.000	0.008	0.656	0.493
R-squared	0.893					
No. observations	134					

Dependent variable: cf1

Independent variable	cf1	cf10	gpce
Lags	-1 to -4	0 to -4	0 to -4
Sum of coefficients	0.399	0.482	0.120
p-stat (sum)	0.004	0.000	0.001
p-stat (joint)	0.000	0.000	0.000
R-squared	0.900		
No. observations	134		

Dependent variable: cf10

Independent variable	cf10	gp
Lags	-1 to -4	0 to -4
Sum of coefficients	0.967	0.033
p-stat (sum)	0.000	0.016
p-stat (joint)	0.000	0.000
R-squared	0.932	
No. observations	134	

TABLE A7. ESTIMATION WITH SURVEY OF PROFESSIONAL FORECASTERS RATHER THAN CLEVELAND FED FORECASTS

Dependent variable: gw

Independent variable	gw	v/u	catch-up	spf1	gpty
Lags	-1 to -4	-1 to -4	-1 to -4	-1 to -4	-1
Sum of coefficients	0.246	1.144	0.057	0.754	0.160
p-stat (sum)	0.139	0.000	0.379	0.000	0.017
p-stat (joint)	0.240	0.000	0.193	0.000	0.017
R-squared				0.686	
No. observations				134	

Dependent variable: gcpi

Independent variable	gcpi	gw	grpe	grpf	shortage	gpty
Lags	-1 to -4	0 to -4	0 to -4	0 to -4	0 to -4	0
Sum of coefficients	0.333	0.667	0.066	0.126	0.019	-0.144
p-stat (sum)	0.037	0.000	0.000	0.049	0.225	0.025
p-stat (joint)	0.063	0.000	0.000	0.048	0.000	0.025
R-squared				0.947		
No. observations				134		

Dependent variable: spf1

Independent variable	spf1	spf10	gcpi
Lags	-1 to -4	0 to -4	0 to -4
Sum of coefficients	0.846	0.104	0.048
p-stat (sum)	0.000	0.029	0.000
p-stat (joint)	0.000	0.000	0.000
R-squared			0.928
No. observations			134

Dependent variable: spf10

Independent variable	spf10	gcpi	
Lags	-1 to -4	0 to -4	
Sum of coefficients	0.976	0.024	
p-stat (sum)	0.000	0.002	
p-stat (joint)	0.000	0.003	
R-squared			0.941
No. observations			134

TABLE A8. FULL ESTIMATION RESULTS FOR ALTERNATIVE MEASURE OF SHORTAGES, PRICE EQUATION

Price equation estimated with the New York Fed Global Supply Chain Pressure Index.

Independent variable	gcpi	gw	grpe	grpf	nyfed	gpty
Lags	-1 to -4	0 to -4	0 to -4	0 to -4	0 to -4	0
Sum of coefficients	0.166	0.834	0.078	0.194	0.271	-0.138
p-stat (sum)	0.317	0.000	0.000	0.003	0.016	0.042
p-stat (joint)	0.004	0.000	0.000	0.003	0.024	0.042
R-squared	0.940					
No. observations	134					

TABLE A9. V/U ADDED TO THE PRICE EQUATION.

Independent variable	gcpi	gw	grpe	grpf	shortage	gpty	vu
Lags	-1 to -4	0 to -4	0 to -4	0 to -4	0 to -4	0	0 to -4
Sum of coefficients	0.169	0.831	0.073	0.167	0.031	-0.123	-0.602
p-stat (sum)	0.308	0.000	0.000	0.005	0.185	0.065	0.031
p-stat (joint)	0.115	0.000	0.000	0.002	0.000	0.065	0.000
R-squared	0.960						
No. observations	134						

TABLE A10. NONLINEARITY OF V/U IN THE WAGE EQUATION

To test for nonlinearities in the wage equation when $V/U \geq 1$, we run the following regression:

$$gw_t = \beta_0 + \beta_1 \left(\frac{V}{U}\right)_t + \beta_2 \mathbf{1}(V \geq U) \left(\frac{V}{U}\right)_t + \beta_3 gw_{t-1} + \beta_4 D_i + \beta_5 D_j + \varepsilon_t$$

where $D_i = 1$ if $i = 2020$ Q2 and $D_j = 1$ if $j = 2020$ Q3. The results are as follows:

Variable	Coefficient	Std. Error	P-Value
V/U	1.072	0.346	0.004
$V/U * \mathbf{1}(V \geq U)$	-0.244	0.252	0.335
$L1.gw$	0.530	0.072	0.000
$D_{2020\ Q2}$	-1.765	0.804	0.030
$D_{2020\ Q3}$	0.256	0.796	0.758
Constant	0.777	0.232	0.001

Notice that the coefficient on $V/U * \mathbf{1}(V \geq U)$, the coefficient capturing the effect of possible nonlinearities of V/U at 1, is both negative and insignificant, indicating that nonlinearities are not present in the wage equation.