Quantitatative Macroeconomics. Labour share, mark-ups and the monetary policy in the New Keynesian model.

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I. Introduction.

The textbook New Keynesian model analysis implies that mark-ups are procyclical and the labor share is countercyclical conditional on the monetary policy shock. The motivation for this work is the Bank of England working paper *Missing link: monetary policy and the labor share* (April 2020) by Cristiano Cantore, Filippo Ferroni and Miguel León-Ledesma [2]. Using proxy variables for the monetary policy surprises and comparing the results from the VAR estimation from the corresponding IRF-s of the NK model they obtain robust results which point to an inherent weakness of the main monetary transmission mechanism in this class of models. Their work varies from other influential empirical research in the subject such as in Woodford, Rotemberg (1999) [6] in that it takes full advantage of the observability of the labor share instead of focusing on the behaviour of marginal cost and mark-ups. As Nekarda and Ramey (2020) point out, *estimating the cyclicality of the markup is one of the more challenging tasks in macroeconomics.* [5] as it is the average cost rather than the marginal cost, which can be seen in the data.

As Cantore, Ferroni and Ledesma point out the counter-cyclical response of the labor share is robust to more refined variants of the NK, including the fixed costs in production or wage rigidity in the heterogenous agents New Keynesian economy. My aim is to revisit the claim that the labor shares responds counter-cyclically to negative monetary policy shocks using the VAR analysis using alternative assumptions on the monetary transmission mechanism. In particular, I shall verify if the monetary policy lag could have an influence on the results. Moreover, I would like to estimate the NK Philips Curve with endogenous capital and perform further VAR analysis on this more refined version of the model not considered by Cantore, Ferroni and Ledesma. Intuitively, the counter-cyclical response of the labor share to the monetary policy could result from the substitution effect between capital and labor with investments going down sharply as a result of the monetary tightening. As Woodford points, in the model with endogenous capital *the relation between inflation and real activity*

is no longer as simple as in the exogenous capital case, which is the reason why the empirical literature has focused on the exogenous capital version of the model [7].
In the second part I shall present a simple two-sector staggered prices model which could help explain the missing link between the mark-ups and the labor share. The aim of my work is to fill an important gap in the literature, that is to say we do not have a micro-founded rigid prices business cycle model where the monetary transmission mechanism is consistent with the data. In particular there is need for a model with scope for welfare improving monetary policy, where the labor share is procyclical conditional on the monetary policy shock.

II. Monetary policy and the labour share in the basic NK model.

First let us restate the monetary transmission mechanism in the basic textbook version of the New-Keynesian model [4]. The solution of the model consists of solving the households' problem with endogenous labor, solving the final good aggregator's problem to find the demand function for intermediate goods. Next, taking the demand for intermediate goods as given and using the Calvo pricing scheme where each firm has a probability $1-\gamma$ that its price is staggered in a given period the intermediate firms problem is solved assuming that the sector is fully owned by the consumers who work in this sector (the production function is linear in labor). The goods produced by the intermediate firms are not perfectly substitutable and thus there are two sources of inefficiency in the model - the sticky prices and imperfect competition. The solution of the consumer problem, final and intermediate firms problem together with the price aggregator and the linear production function yields a set of equations defining the model. Since some of the key equations such as the intratemporal choice between consumption and labor and the intermediate firms' FOC combined with the price dynamics equations are non-linear, therefore log-linearization around the steady-state is applied. The simplest 3-equation version of the NK model expressed in the output gap terms looks as follows:

$$\begin{aligned}
&\pi_t = \beta E_t \pi_{t+1} + \kappa \tilde{y_t} \quad (IS) \\
&\tilde{y_t} = -\frac{1}{\sigma}(i_t - E_t\pi_{t+1} - r_t^n) + E_t \tilde{y_{t+1}} \quad (NKPC) \\
&i_t = \phi_\pi \pi_t + \phi_{\tilde{y}} \tilde{y_t} \quad \text{(Taylor rule)}
\end{aligned}$$

The New Keynesian Philips Curve implies the following marginal cost dynamics:

$$mc_t = \frac{\pi_t - E_t\pi_{t+1}}{\kappa} \quad : \quad \kappa = \frac{(1-\sigma)(1-\sigma\beta)}{\sigma}$$

where σ denotes the share of firms which can adjust prices in this period

As Cantore, Ferroni and Ledesma remark *From this expression, it is clear that a temporary decline in inflation (because of tighter monetary policy, for example) implies a decline in marginal costs (labor* *share) and an increase in the markup* [2]. This formula is a point of reference for one of the empirical strategies I put forward to perform additional testing of the impact of the monetary tightening on the labor share. That is to say, it is worthwhile to check if in the presence of the monetary policy lag the inflation expectations react *before* the real observed inflation. Such behavior could imply that the monetary tightening leads has no impact on current inflation but decreases inflation expectations thus increasing the marginal cost and the labor share on impact.

$$i_t \uparrow \wedge i_t \perp \pi_t \implies E_t\pi_{t+1} \downarrow \implies \frac{\pi_t - E_t\pi_{t+1}}{\kappa} \uparrow \implies mc_t \uparrow$$

III. Empirical evidence against the counter-cyclical labour share.

III.1. The data and the stationarity issues

For the VAR analysis of the relationship between the monetary policy shocks and the labor share I have prepared a time series data set of the key US macroeconomic variables spanning from the onset of The Great Moderation until 2020. The data are obtained from the Federal Reserve Economic Database and include the quarterly real GDP, monthly CPI growth, the Federal funds rate, the University of Michigan 5-year median inflation expectations, the average hourly earnings in the production sector and the real gross private domestic investment. These time series are necessary to perform the extensive testing of the relationship between the monetary policy shocks and the labor share and account for the potential investment channel in the labor share monetary policy transmission mechanism.

Moreover, I have performed extensive stationarity testing (results in Tables 1 2) of the variables of interest to check if spurious correlations may be a problem. Accounting for the autocorrelation of the error term by including the appropriate lag structure in the Augmented Dickey-Fuller test I find that the labor share is non-stationary but difference-stationary, output is difference stationary, inflation and inflation expectations are stationary. Wage growth, employment growth and investment growth variables are stationary. Importantly, the effective federal funds rate is clearly non-stationary. Even when accounting for the lag structure, we can absolutely not reject the null about the lack of stationarity. However, the federal funds rate is indeed difference stationary. Since there is no consensus in the literature on whether the federal funds rate is ([1]) or is not ([3]) stationary, I will only use the differenced federal funds rate. I additionally check the results for the federal funds rate and labor share detrended by a quadratic polynomial in time. The lag structure for the structural VAR is chosen using the most conservative information criterion (minimize the maximum loss of information).

III.2. Baseline VAR analysis

First I test the simple two variable structural VAR of the relationship between the difference of the interest rate and the labor share. Accounting for the optimal lag structure I do not find any statistically significant contemporaneous relationship between these two variables. In the Granger causality test I cannot reject the null about the causal relation ship from the interest rate to the growth of labor share (result in Table 3).

Next, I move on to test various VAR specifications consistent with the NK model with all input variables defined at the current period. To find a statistically significant causal relationship five variables are required. I have assumed a diagonal shock structure consistent with the standard NK transmission mechanism and in line with the formula for the labor share derived before:

$$LS_t = mc_t = \frac{\pi_t - E_t\pi_{t+1}}{\kappa} \quad : \quad \kappa = \frac{(1-\sigma)(1-\sigma\beta)}{\sigma}$$

where σ denotes the share of firms which can adjust prices in this period

Hence the following matrix of restrictions:

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ -\beta_{21} & 1 & 0 & 0 & 0 \\ -\beta_{31} & -\beta_{32} & 1 & 0 & 0 \\ -\beta_{41} & -\beta_{42} & -\beta_{43} & 1 & 0 \\ -\beta_{51} & -\beta_{52} & -\beta_{53} & -\beta_{54} & 1 \end{bmatrix} \begin{bmatrix} \Delta i_t \\ g_{Y,t} \\ \pi_t \\ E_t\pi_{t+1} \\ g_{LS,t} \end{bmatrix} = \begin{bmatrix} \gamma_{11} & \gamma_{12} & \gamma_{13} & \gamma_{14} & \gamma_{15} \\ \gamma_{21} & \gamma_{22} & \gamma_{23} & \gamma_{24} & \gamma_{25} \\ \gamma_{31} & \gamma_{32} & \gamma_{33} & \gamma_{34} & \gamma_{35} \\ \gamma_{41} & \gamma_{42} & \gamma_{43} & \gamma_{44} & \gamma_{45} \\ \gamma_{51} & \gamma_{52} & \gamma_{53} & \gamma_{54} & \gamma_{55} \end{bmatrix} \begin{bmatrix} \Delta i_{t-1} \\ g_{Y,t-1} \\ \pi_{t-1} \\ E_{t-1}\pi_t \\ g_{LS,t-1} \end{bmatrix} + \begin{bmatrix} \upsilon_{1t} \\ \upsilon_{2t} \\ \upsilon_{3t} \\ \upsilon_{4t} \\ \upsilon_{5t} \end{bmatrix}$$

In the Granger causality test I can reject the null about the lack of causal relation from the difference in the interest rate to the growth rate of the labor share at the 5% significance level. This result, however, comes at a cost. We cannot reject the null about the lack of causal relation from the interest rate to growth of output and inflation, which suggests that the whole monetary transmission mechanism described in the beginning is rejected in this particular test (see Table 4). Moreover, the impulse response function (Figure 4) indicates that an increase in the interest rate difference is associated with a decrease in the labor share. Although this results is in line with the NK model, it is against the results of the Cantore(2020) paper. One important improvement could be accounting for a potential lag in monetary policy as mentioned before. Such an interpretation would make sense as we can see that the output growth and inflation robustly Granger causes a change in the interest rate which is in line with the Taylor rule. I have also performed the VAR on detrended funds rate and labor share variables. The results also suggest a negative initial response of the labor share to the monetary tightening and suffer from similar drawbacks (see Figure 2a).

III.3. Monetary policy lag in baseline VAR

Out of a great number of monetary policy lag specifications the one with 3-quarter monetary policy lag yields the most interesting results. The structure is the following:

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ -\beta_{21} & 1 & 0 & 0 & 0 \\ -\beta_{31} & -\beta_{32} & 1 & 0 & 0 \\ -\beta_{41} & -\beta_{42} & -\beta_{43} & 1 & 0 \\ -\beta_{51} & -\beta_{52} & -\beta_{53} & -\beta_{54} & 1 \end{bmatrix} \begin{bmatrix} \Delta i_{t-3} \\ g_{Y,t} \\ \pi_t \\ E_t\pi_{t+1} \\ g_{LS,t} \end{bmatrix} = \begin{bmatrix} \gamma_{11} & \gamma_{12} & \gamma_{13} & \gamma_{14} & \gamma_{15} \\ \gamma_{21} & \gamma_{22} & \gamma_{23} & \gamma_{24} & \gamma_{25} \\ \gamma_{31} & \gamma_{32} & \gamma_{33} & \gamma_{34} & \gamma_{35} \\ \gamma_{41} & \gamma_{42} & \gamma_{43} & \gamma_{44} & \gamma_{45} \\ \gamma_{51} & \gamma_{52} & \gamma_{53} & \gamma_{54} & \gamma_{55} \end{bmatrix} \begin{bmatrix} \Delta i_{t-4} \\ g_{Y,t-1} \\ \pi_{t-1} \\ E_{t-1}\pi_t \\ g_{LS,t-1} \end{bmatrix} + \begin{bmatrix} \upsilon_{1,t-3} \\ \upsilon_{2t} \\ \upsilon_{3t} \\ \upsilon_{4t} \\ \upsilon_{5t} \end{bmatrix}$$

In the Granger test I find the key causal relation from the NK monetary transmission mechanism - from interest rate to output to be statistically significant. Moreover, we can reject the null that there is no causal relation from the difference in interest rates to the growth of the labor share. One weak spot is that all other variables fail to cause determine inflation. The p-value for the Chi^2 statistic is not very high and this problem could perhaps be solved by accounting for the exchange rate fluctuations caused by the monetary policy.

In the IRF we find that an increase in the interest rate is associated with the labor share growth being very likely to increase (Figure 5). This finding is line with the Cantore (2020) paper and contradicts the mechanics of the New Keynesian model. One important drawback is that the response of output to the monetary tightening is somewhat counter-intuitive as it causes the growth of output to increase. The positive correlation between output and labor share is prevalent in my results. Even though, I have not yet manage to replicate the results from the Cantore (2020) paper, I have found strong evidence against the monetary transmission mechanism presented in the New Keynesian model.

III.4. Empirical decomposition of the labor share

In this part I use the definition of the labor share:

$$LS_t = \frac{w_t L_t}{w_t L_t + r_t K_t}$$

To test if the growth rate of the labor share is driven by the wage growth, employment growth, the interest rate dynamics or capital dynamics. All 4 variables are directly observable and I use quarterly FRED data in the VAR analysis. I again impose a lower triangular shock matrix. I test if all eigenvalues are within the unit circle and if the results of the Cholesky decomposition are sensitive to variable ordering.

I report the results for the following structural form:

$$
\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ -\beta_{21} & 1 & 0 & 0 & 0 \\ -\beta_{31} & -\beta_{32} & 1 & 0 & 0 \\ -\beta_{41} & -\beta_{42} & -\beta_{43} & 1 & 0 \\ -\beta_{51} & -\beta_{52} & -\beta_{53} & -\beta_{54} & 1 \end{bmatrix}
\begin{bmatrix} g_{employment,t} \\ \Delta i_t \\ g_{investment,t} \\ g_{wages,t} \\ g_{LS,t} \end{bmatrix}
=
\begin{bmatrix} \gamma_{11} & \gamma_{12} & \gamma_{13} & \gamma_{14} & \gamma_{15} \\ \gamma_{21} & \gamma_{22} & \gamma_{23} & \gamma_{24} & \gamma_{25} \\ \gamma_{31} & \gamma_{32} & \gamma_{33} & \gamma_{34} & \gamma_{35} \\ \gamma_{41} & \gamma_{42} & \gamma_{43} & \gamma_{44} & \gamma_{45} \\ \gamma_{51} & \gamma_{52} & \gamma_{53} & \gamma_{54} & \gamma_{55} \end{bmatrix}
\begin{bmatrix} g_{employment,t-1} \\ \Delta i_{t-1} \\ g_{investment,t-1} \\ g_{wages,t-1} \\ g_{LS,t-1} \end{bmatrix}
+
\begin{bmatrix} \upsilon_{1t} \\ \upsilon_{2t} \\ \upsilon_{3t} \\ \upsilon_{4t} \\ \upsilon_{5t} \end{bmatrix}
$$

All eigenvalues lie withing the unit circle and the results for the growth of the labor share are not sensitive to variable ordering. The results of the Granger causality test suggest that the ordering is correct. Furthermore, we find that we can quite confidently reject the null about the lack of the causal relation from the interest rate to the labor share (results in Table 6). The results from the impulse response function suggest that it is more likely that the labor share decrease as a result of the monetary tightening (see Figure 4a) which would seem to confirm the mechanics of the NK model. The problem with this approach is that we do not account for any external factors affecting the income distribution and factor allocation in the economy.

As for the decomposition of the labor share the impulse response function (see Figure 4b) suggest that investment dynamics is the most important component affecting the short run dynamics of the labor share with a relatively narrow confidence interval. An investment growth shock slows down the short-run labor share dynamics. The sign of impact of the interest rate shock is the same but its strength is lower.

III.5. VAR with monetary shock surprise instruments

To be delivered...

In this section I want to use Canova MATLAB VAR package - https://github.com/naffe15/BVAR and monetary shock instruments such as FED minutes announcements to replicate more precisely the results of the Cantore (2020) paper.

IV. The Model.

IV. 1. The desired features of the model

- An increase in the nominal interest rate causes the reduction in output and inflation but increases the labor share in the short-run.
- Target price stickiness in the calibration should be higher than the wage rigidity.
- To account for the three-way interaction between technological change, inflation and labor share. $\implies$ the empirical hypothesis: optimal interest rates and technological change are strongly negatively correlated, technological change and labor share are strongly negatively correlated. My model will allow me to impose economic structure, where $A \to LS$ and $A \to i$.

<u>Proposition:</u>
Augment the intermediate goods problem with the capital-augmenting technology in the CES production function. First, I will assume that capital is fixed and the interest rate determined by the central bank. Then I will relax this assumption and include capital adjustment costs (I would like to follow the Woodford paper here [7]).

The intermediate goods firms' problem is now the following:

$$\max_{P_t(i),Y_t(i),L_t(i)} P_t(i)Y_t(i) - W_tL_t(i) - R_tK_t(i) \quad \text{subject to:}$$

$$Y_t(i) = (\frac{P_t(i)}{P_t})^{-\phi}Y_t \quad \text{The demand in inputs}$$

$$Y_t(i) = \left[A_tK_t(i)^{\frac{\sigma-1}{\sigma}} + L_t(i)^{\frac{\sigma-1}{\sigma}}\right]^{\frac{\sigma}{\sigma-1}} \quad \text{Production function with common productivity}$$

$$K_t(i) = K_t \quad \text{Capital as a fraction of aggregate capital normalized to 1 (all firms ex-ante identical)}$$

Final note:
I still need more time to solve the model but the general idea is that shocks which cause the central bank to raise interest rate increase the labor share ($A_t \downarrow \implies LS_t \uparrow$)
I expect this to be the subject of my Master thesis. I do realize that my command of the empirical tools necessary to perform this task needs to improve but this could be the added benefit of choosing this subject.

V. Appendix

III.1. The data and the stationarity issues

Table 1: ADF stationarity testing table

	(1)	(2)	(3)	(4)	(5)	(6)
	dgLS	dlnY	dinfl	die	dffr	ddffr
L.gLS	-1.324***					
	(-17.30)					
L.lnY		0.256***				
		(6.14)				
L3.lnY		-0.296***				
		(-6.05)				
L9.lnY		0.0349				
		(1.93)				
L.i			-1.019***			
			(-14.80)			
L4.i			0.462***			
			(7.29)			
L.ie				-0.155***		
				(-5.85)		
L.ffr					0.536***	
					(6.71)	
L2.ffr					-0.665***	
					(-4.94)	
L7.ffr					-0.187*	
					(-2.22)	
L8.ffr					0.346***	
					(4.43)	
L9.ffr					-0.120*	
					(-2.43)	
L.dffr						-0.433***
						(-5.50)
L8.dffr						0.105*
						(2.07)
_cons	-0.000808	0.0533***	0.120***	0.467***	0.0661	-0.0313
	(-1.08)	(3.68)	(4.23)	(4.94)	(1.21)	(-0.78)
N	159	152	157	160	152	152

t statistics in parentheses

Table 2: ADF stationarity testing table (2)

	(1)	(2)	(3)	(4)
	dwages	dwgrowth	dwemployment	digrowth
L.wages	0.329***			
	(7.22)			
L3.wages	-0.285***			
	(-4.44)			
L8.wages	-0.216*			
	(-2.22)			
L9.wages	0.167*			
	(2.09)			
dateq	0.000669			
	(1.58)			
L.wage_growth		-0.627***		
		(-8.26)		
L2.wage_growth		0.348***		
		(4.43)		
L7.wage_growth		0.157*		
		(2.17)		
L8.wage_growth		-0.173*		
		(-2.61)		
L.employment_growth			-0.0555	
			(-1.40)	
L5.employment_growth			-0.234**	
			(-3.02)	
L6.employment_growth			0.132	
			(1.80)	
L.investment_growth				-0.704***
				(-9.45)
_cons	-0.0121	0.00218***	0.000517*	0.00660*
	(-0.84)	(4.35)	(2.31)	(2.43)
N	152	152	154	159

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

III.2. Baseline VAR analysis

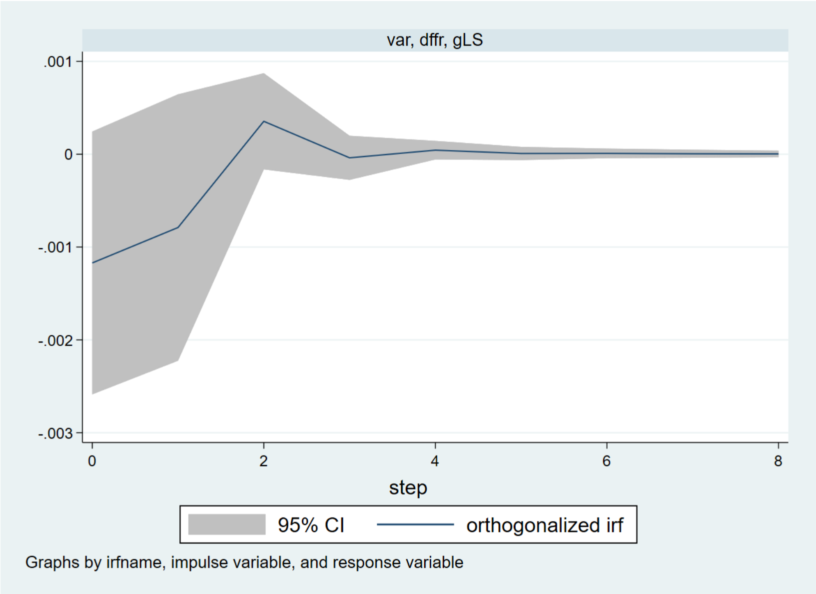
Table 3: Granger causation FFR - LS

Correlations and the Granger test				
Equation	Excluded	chi2	df Prob >chi2 |	
dffr	gLS	.01322	1	0.908
dffr	ALL	.01322	1	0.908
gLS	dffr	2.282	1	0.131
gLS	ALL	2.282	1	0.131
N	159			

t statistics in parentheses

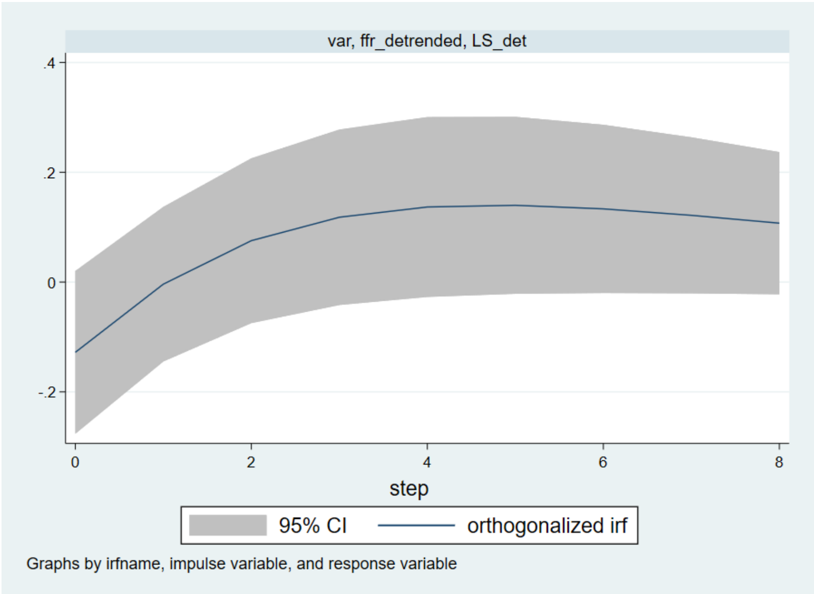
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 1: Impulse Response Function of the labor share growth to a negative monetary shock



(a) IRF of dFFR on gLS

Figure 2: Impulse Response Function of the detrended labor share to a negative monetary shock on detrended FFR



(a) IRF of FFR$_{d}etrendedonLS_{d}etrended$

Table 4: Granger causation FFR - gLS

Correlations and the Granger test				
Equation	Excluded	chi2	df	Prob >chi2
dffr	gY	9.8005	1	0.002
dffr	i	5.0937	1	0.024
dffr	ie	5.5093	1	0.019
dffr	gLS	.952	1	0.329
dffr	ALL	13.708	4	0.008
gY	dffr	1.9375	1	0.164
gY	i	.62566	1	0.429
gY	ie	2.0522	1	0.152
gY	gLS	12.214	1	0.000
gY	ALL	16.88	4	0.002
i	dffr	.84071	1	0.359
i	gY	1.7454	1	0.186
i	ie	14.739	1	0.000
i	gLS	3.2471	1	0.072
i	ALL	19.321	4	0.001
ie	dffr	.31875	1	0.572
ie	gY	2.286	1	0.131
ie	i	16.994	1	0.000
ie	gLS	.6783	1	0.410
ie	ALL	22.015	4	0.000
gLS	dffr	4.5076	1	0.034
gLS	gY	3.6761	1	0.055
gLS	i	.32494	1	0.569
gLS	ie	.80326	1	0.370
gLS	ALL	6.176	4	0.186

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

III.3. Monetary policy lag in baseline VAR

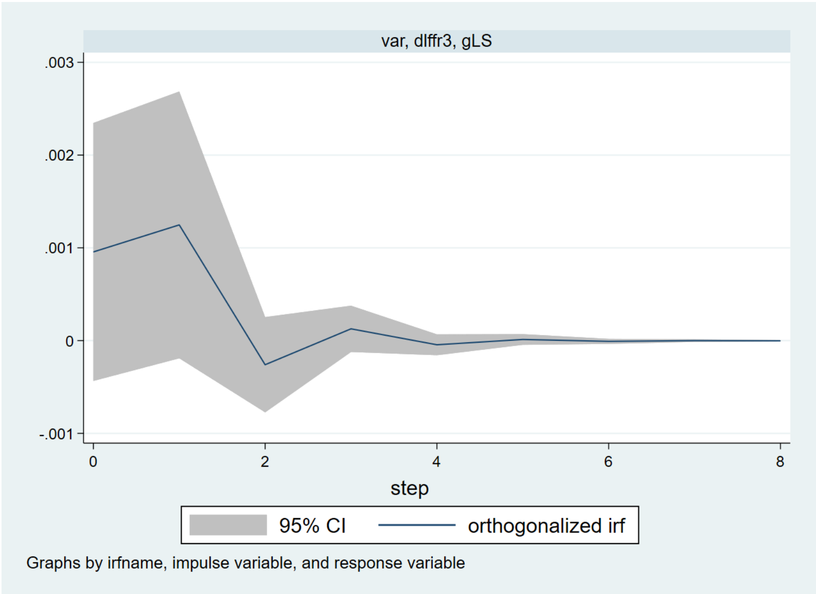
Table 5: Granger causation dlFFR3 - gLS

Correlations and the Granger test				
Equation	Excluded	chi2	df	Prob >chi2
dlffr3	gY	.32146	1	0.571
dlffr3	i	.31712	1	0.573
dlffr3	ie	4.6001	1	0.032
dlffr3	gLS	2.2558	1	0.133
dlffr3	ALL	9.5878	4	0.048
gY	dlffr3	5.3408	1	0.021
gY	i	3.1241	1	0.077
gY	ie	18.935	1	0.000
gY	gLS	15.135	1	0.000
gY	ALL	39.014	4	0.000
i	dlffr3	.06069	1	0.805
i	gY	2.5537	1	0.110
i	ie	4.8249	1	0.028
i	gLS	3.2552	1	0.071
i	ALL	8.0777	4	0.089
ie	dlffr3	.01713	1	0.896
ie	gY	3.0834	1	0.079
ie	i	23.912	1	0.000
ie	gLS	.45794	1	0.499
ie	ALL	32.735	4	0.000
gLS	dlffr3	4.3191	1	0.038
gLS	gY	4.4821	1	0.034
gLS	i	1.9566	1	0.162
gLS	ie	4.2558	1	0.039
gLS	ALL	11.469	4	0.022

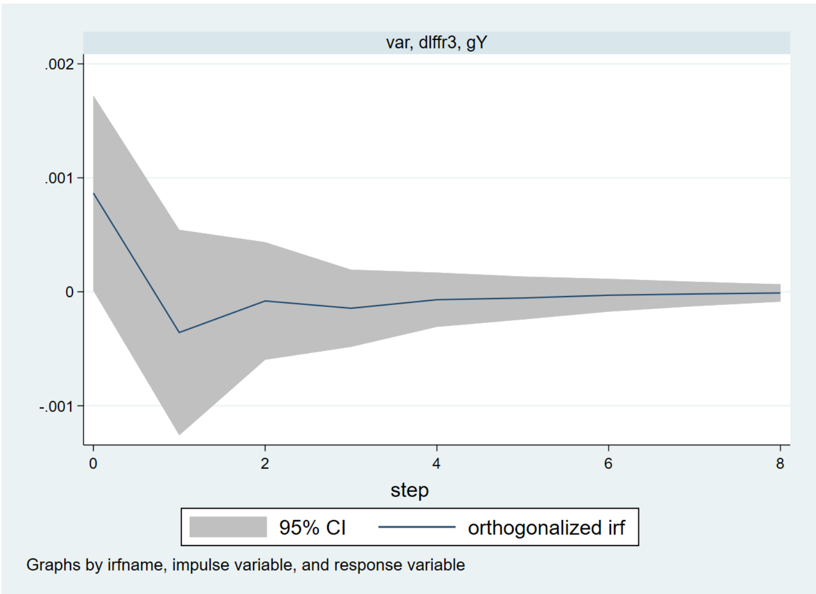
t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 3: Impulse Response Function of the labor share growth to a negative monetary shock with a 3 period lag



(a) IRF of dlFFR3 on gLS



(b) IRF of dFFR on gY

Table 6: Granger results definition of labor share table

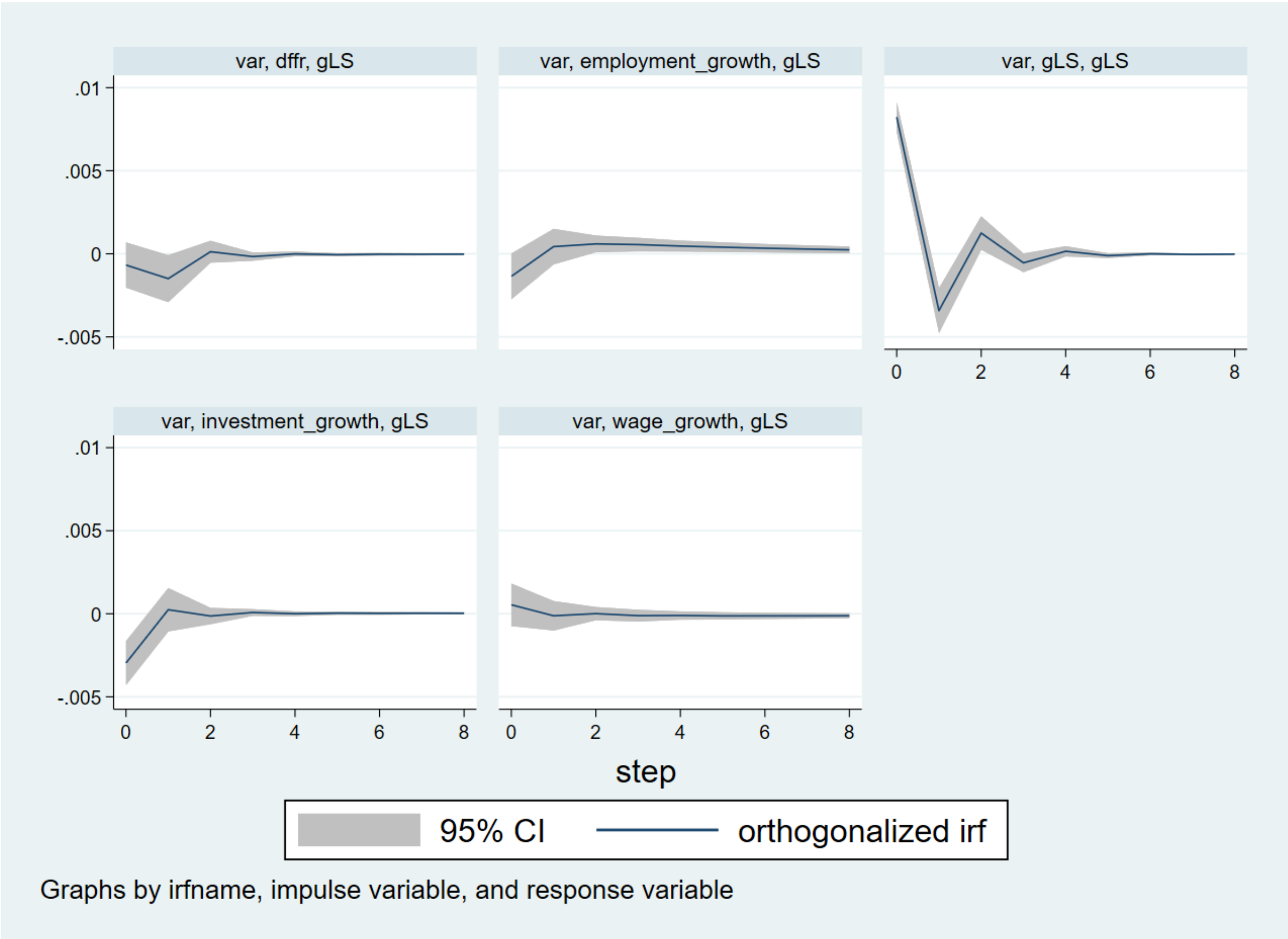
Granger causality Wald tests				
Equation	Excluded	chi2	df	Prob >chi2
employment_growth	dffr	1.1827	1	0.277
employment_growth	investment_growth	.04124	1	0.839
employment_growth	wage_growth	2.5837	1	0.108
employment_growth	gLS	1.4397	1	0.230
employment_growth	ALL	5.487	4	0.241
dffr	employment_growth	5.3006	1	0.021
dffr	investment_growth	.27281	1	0.601
dffr	wage_growth	.32356	1	0.569
dffr	gLS	.15158	1	0.697
dffr	ALL	6.2576	4	0.181
investment_growth	employment_growth	3.0793	1	0.079
investment_growth	dffr	7.2835	1	0.007
investment_growth	wage_growth	.59403	1	0.441
investment_growth	gLS	.81085	1	0.368
investment_growth	ALL	17.113	4	0.002
wage_growth	employment_growth	2.3955	1	0.122
wage_growth	dffr	.40716	1	0.523
wage_growth	investment_growth	8.2526	1	0.004
wage_growth	gLS	1.5013	1	0.220
wage_growth	ALL	15.26	4	0.004
gLS	employment_growth	12.48	1	0.000
gLS	dffr	6.2896	1	0.012
gLS	investment_growth	2.2385	1	0.135
gLS	wage_growth	.08581	1	0.770
gLS	ALL	15.315	4	0.004

t statistics in parentheses

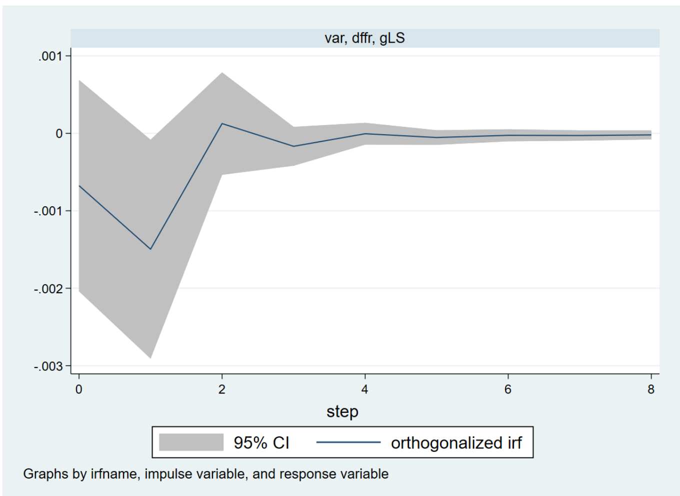
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

III.4. Empirical decomposition of the labor share

Figure 4: Impulse Response Function of the labor share to its various components



(a) Decomposition of the labor share dynamics



(b) IRF of dFFR on gLS in definition specification

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