



بانک مرکزی جمهوری اسلامی ایران

مجموعه پژوهشهای اقتصادی

شماره ۳۶

بررسی ارتباط متقابل شاخص‌های

CPI و WPI، PPI

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- Wholesale Price Index
 - Consumer Price Index

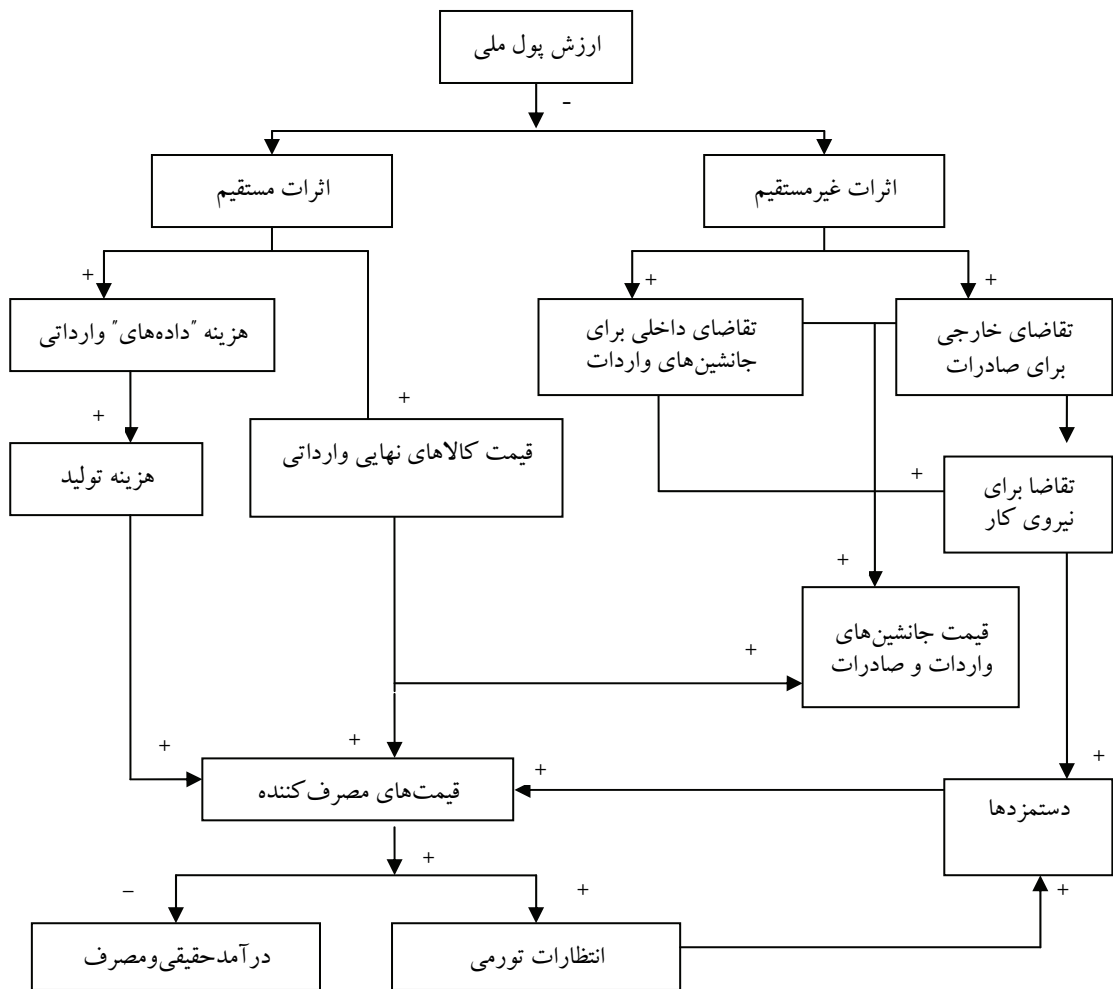
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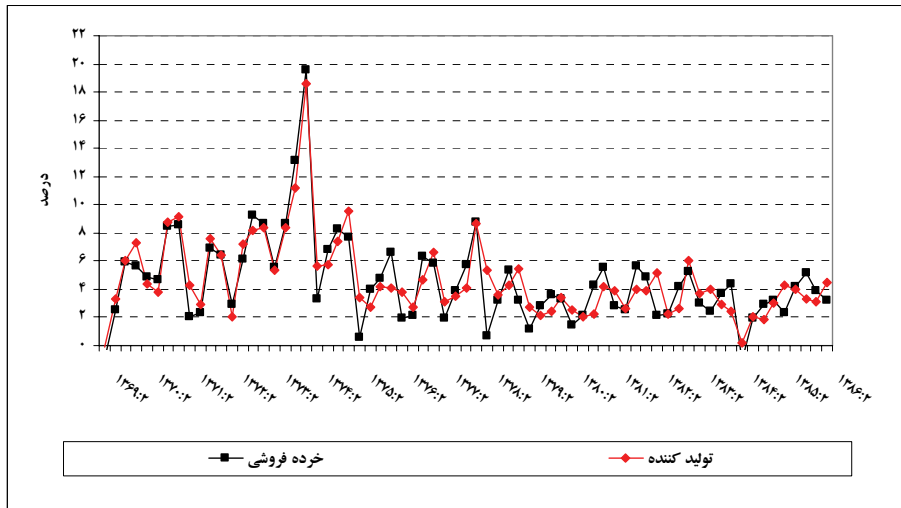
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- Stage of Processing (SOP)
 - Anotai Buddhari
 - Varapat Chensavasdigai
 - Headline Consumer Price Index
 - Core Consumer Price Index

PPI CPI

(SMM)

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- Lag/Lead
 - Steve Amber
 - Ali Dib
 - Nooman Rebei
 - Generalized Method of Moments
 - Simulated Method of Moments
 - Jonathan Mccarthy

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- Bhatta Charya
 - Thomakas
 - Todd E. Clark

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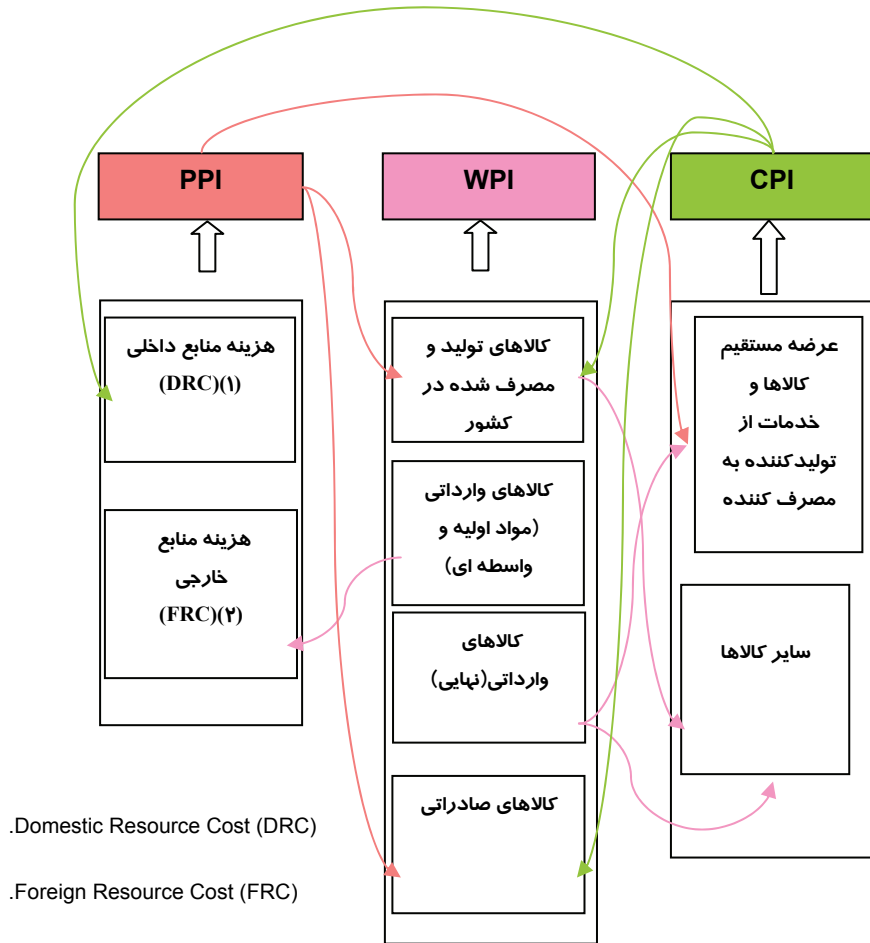
(IMP)

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$$X_t = \sum_{i=1}^n A_i X_{t-i} + U_t :$$

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$$X_t = (DLCPI, DLPPPI, DLWPI)$$

$$U_t \quad X_t = (DLCPI, DLPPPI, DLPC, DLIMP, DLXP)$$

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(HQ) (SC) (AIC) (FPE)
FPE LR

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I()	- /	- /	DLPPI
I()	- /	- /	DLWPI
I()	- /	- /	DLPC
I()	- /	- /	DLIMP
I()	- /	- /	DLXP

- Spurious Regression

- Augmented Dickey- Fuller (ADF)

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Lag	LogL	LR	FPE	AIC	SC	HQ
.	007,2702	NA	2,88e-11	-10,70840	-10,70720	-10,71808
1	031,3918	40,22784	1,79e-11	-17,23099	-10,82720*	-17,07102*
2	042,8916	20,48409	1,76e-11	-17,30911	-10,70073	-17,03004
3	047,1924	0,070171	2,00e-11	-17,13101	-10,11904	-10,73234
4	064,2149	28,72337*	1,02e-11	-17,41297	-10,09740	-10,89470
0	074,0480	14,74963	1,00e-11*	-17,43900*	-14,81984	-10,80113

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 0% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

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Lag	LogL	LR	FPE	AIC	SC	HQ
0	748,0040	NA	0,77e-17	-23,21889	-23,00023	-23,10240
1	784,8939	66,86206	3,92e-17	-23,09044	-22,07846*	-23,19177
2	818,8632	06,26160	3,01e-17	-23,87073	-22,01044	-23,13983
3	838,8028	29,98439	3,60e-17	-23,71410	-21,01000	-22,60103
4	868,0477	39,23060	3,44e-17	-23,84024	-20,30332	-22,44990
5	930,3200	73,94830*	1,21e-17*	-20,01000*	-20,72477	-23,28244*

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 0% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

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	DLCPI	DLPPI	DLWPI
DLCPI(-1) t-statistics	0,770900 [2,744666]	0,707009 [2,01703]	0,703290 [1,87087]
DLCPI(-2) t-statistics	-0,214087 [-0,80718]	0,179781 [0,74070]	0,033781 [0,09977]
DLCPI(-3) t-statistics	0,490787 [1,77870]	0,349771 [1,40422]	0,470044 [1,29982]
DLCPI(-4) t-statistics	0,000327 [1,90078]	0,384103 [1,78417]	0,707020 [1,78770]
DLCPI(-5) t-statistics	-0,071879 [-0,23879]	-0,122737 [-0,00200]	0,048937 [0,14777]
DLPPI(-1) t-statistics	-0,100131 [-0,39034]	-0,331717 [-0,98027]	0,071007 [0,14279]
DLPPI(-2) t-statistics	-0,024013 [-0,07477]	-0,473202 [-1,40717]	-0,327332 [-0,77470]
DLPPI(-3) t-statistics	-0,777070 [-1,89717]	-0,038497 [-1,00249]	-0,722000 [-1,39747]
DLPPI(-4) t-statistics	0,249884 [0,73943]	0,300109 [1,04419]	-0,267389 [-0,03040]
DLPPI(-5) t-statistics	-0,819200 [-2,21748]	-0,390770 [-1,24774]	-0,837138 [-1,77012]
DLWPI(-1) t-statistics	-0,134027 [-0,06030]	0,070917 [0,29900]	0,027470 [0,08739]
DLWPI(-2) t-statistics	0,187707 [0,80410]	0,229084 [1,22182]	0,190307 [0,79901]
DLWPI(-3) t-statistics	0,178098 [0,77970]	0,140017 [0,73997]	0,192039 [0,70907]
DLWPI(-4) t-statistics	-0,077872 [-0,34704]	-0,188707 [-0,98172]	0,170000 [0,00884]
DLWPI(-5) t-statistics	0,394803 [1,77408]	0,270003 [1,43241]	0,374120 [1,30827]
C Standard errors t-statistics	0,027178 (0,01279) [2,04034]	0,020090 (0,01098) [1,87721]	0,017718 (0,01730) [1,08370]
R-squared	0,080910	0,719744	0,007808
Adj. R-squared	0,449940	0,00783	0,419788

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	DLCPI	DLPPI	DLPC	DLIMP	DLXP
DLCPI(-1) t-statistics	0,017880 [1,779888]	0,392408 [1,49393]	0,283802 [0,72077]	0,433720 [1,088976]	-0,470309 [-0,023223]
DLCPI(-2) t-statistics	-0,171937 [-0,71398]	0,231722 [0,914444]	0,010920 [0,02876]	0,483222 [1,20840]	0,208080 [0,30103]
DLCPI(-3) t-statistics	0,720744 [2,00308]	0,297380 [1,17470]	0,438204 [1,14477]	-0,262317 [-0,77760]	1,294731 [1,49777]
DLCPI(-4) t-statistics	0,078437 [0,27910]	0,319940 [1,20887]	0,278084 [0,73113]	0,997973 [2,09017]	0,71347 [0,07129]
DLCPI(-5) t-statistics	-0,009080 [-1,87907]	-0,493800 [-2,01331]	-0,001937 [-1,00084]	-0,710724 [-1,74208]	-1,001019 [-1,87773]
DLPPI(-1) t-statistics	0,124394 [0,33007]	-0,081012 [-0,24171]	0,074210 [1,12238]	0,083802 [0,17497]	-0,021088 [-0,01902]
DLPPI(-2) t-statistics	0,087941 [0,24177]	-0,492488 [-1,49732]	-0,370812 [-0,74134]	-0,871171 [-1,72091]	-1,037049 [-1,37980]
DLPPI(-3) t-statistics	-0,474499 [-1,17270]	-0,214731 [-0,09420]	-0,171232 [-0,29772]	-0,274704 [-0,0129]	-1,02181 [-0,88407]
DLPPI(-4) t-statistics	0,007202 [1,31914]	0,337879 [0,97337]	-0,044771 [-0,08701]	-0,878700 [-1,70079]	1,739942 [1,48000]
DLPPI(-5) t-statistics	-0,900920 [-2,02000]	-0,373812 [-1,07827]	-1,048812 [-2,00414]	-0,330107 [-0,73948]	0,717381 [0,72131]
DLPC(-1) t-statistics	-0,037737 [-0,14411]	0,224170 [0,97222]	0,237810 [0,78793]	0,304112 [0,87999]	0,900270 [1,10321]
DLPC(-2) t-statistics	0,020470 [0,09009]	-0,07498 [-0,12900]	-0,124870 [-0,4043]	0,237974 [0,77410]	0,384904 [0,00301]
DLPC(-3) t-statistics	-0,088719 [-0,37877]	0,249232 [1,14729]	0,313074 [0,97197]	1,093039 [3,31711]	0,032073 [0,72278]
DLPC(-4) t-statistics	0,198472 [0,87477]	-0,177328 [-0,81044]	0,208473 [0,84001]	-0,100800 [-0,32414]	-0,001274 [-0,79338]
DLPC(-5) t-statistics	0,704812 [3,13799]	0,738887 [3,14482]	0,838794 [2,70390]	1,178212 [3,79313]	1,118877 [1,72771]
DLIMP(-1) t-statistics	-0,137874 [-0,97470]	-0,087077 [-0,78947]	-0,240802 [-1,29099]	0,002222 [0,03707]	-0,032248 [-1,23773]
DLIMP(-2) t-statistics	-0,032410 [-0,23171]	0,78800 [0,04307]	0,34904 [0,18394]	0,072809 [0,27940]	0,184923 [0,43103]
DLIMP(-3) t-statistics	0,183040 [0,00874]	-0,004742 [-0,00874]	-0,090877 [-0,090877]	-0,441379 [-0,441379]	0,110289 [0,110289]

t-statistics	[1,30871]	[-0,44839]	[-0,02472]	[-2,38910]	[0,26731]
DLIMP(-ε)	-0,199942	-0,039478	0,083742	0,104670	-0,394078
t-statistics	[-1,48718]	[-0,32460]	[0,40878]	[0,83903]	[-0,90716]
DLIMP(-σ)	0,077318	-0,07033	-0,043960	-0,249037	-0,492437
t-statistics	[0,71826]	[-0,78032]	[-0,29773]	[-1,76800]	[-1,47680]
DLXP(-1)	0,001010	-0,000888	-0,041384	0,020490	0,109107
t-statistics	[0,02794]	[-0,12048]	[-0,06479]	[0,34410]	[0,97186]
DLXP(-2)	0,130949	0,121090	0,176890	0,160804	0,410008
t-statistics	[2,07348]	[2,03432]	[2,46933]	[2,22071]	[2,06876]
DLXP(-3)	-0,138203	-0,074166	-0,127960	-0,091308	0,037602
t-statistics	[-2,72706]	[-1,34802]	[-1,79300]	[-1,26602]	[0,22712]
DLXP(-ε)	-0,019304	0,021107	0,040464	-0,003817	-0,279790
t-statistics	[-0,37174]	[0,44821]	[0,74397]	[-0,05447]	[-1,70490]
DLXP(-σ)	-0,043233	-0,073604	-0,076896	0,000087	-0,169647
t-statistics	[-0,78811]	[-1,28289]	[-0,89928]	[0,00781]	[-1,00887]
C	0,019740	0,014041	0,010206	-0,009007	0,003300
t-statistics	[1,74829]	[1,34883]	[0,94394]	[-0,08171]	[0,09193]
R-squared	0,700109	0,702991	0,722488	0,803607	0,449306
Adj. R-squared	0,093996	0,090480	0,039910	0,774484	0,087008

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Variance Decomposition of DLCPI:				
Period	S.E.	DLCPI	DLPPI	DLWPI
1	.,.21923	27,7.799	71,79238	1,499631
2	.,.24.22	32,20431	77,49719	1,249494
3	.,.241.4	32,9782	77,39922	1,0.2973
4	.,.24748	33,9227	77,99704	3,979198
5	.,.28021	31,09209	70,34922	3,08187
6	.,.29399	32,77003	72,11.03	0,114442
7	.,.2971.0	32,31991	71,49790	7,182127
8	.,.29820	31,97784	7.,7174.	7,410707
9	.,.3.827	31,94217	71,11040	7,942387
10	.,.31227	31,72099	09,07327	8,7.0708
11	.,.31017	31,20371	09,49910	9,247139
12	.,.31071	31,18471	09,44330	9,37194.
13	.,.31798	31,03.79	09,77944	9,299877
14	.,.31997	3.,71321	09,178.9	1.,11871
15	.,.32234	3.,40303	09,30888	1.,18709
16	.,.32280	3.,0.98	09,32.17	1.,17880
17	.,.3237.	3.,30809	09,32308	1.,31783
18	.,.32474	3.,18017	09,19237	1.,72247
19	.,.327.1	3.,.8824	09,34347	1.,07829
20	.,.32779	3.,13.7.	09,17971	1.,78979

Variance Decomposition of DLPPI:				
Period	S.E.	DLCPI	DLPPI	DLWPI
1	.,.188.9	.,.00000	1.,.0000	.,.00000
2	.,.21712	11,73797	87,87721	1,380824
3	.,.22041	10,04101	81,78721	2,77128.
4	.,.22792	17,33037	8.,.7178	3,7.2848
5	.,.20.90	17,8.84.	79,12377	3,79930
6	.,.27720	2.,32317	73,77244	7,0.44.2
7	.,.271.2	2.,41717	71,178.1	8,4.0821
8	.,.2727.	2.,3.84	7.,3747.	9,334403
9	.,.27787	2.,388.3	7.,71.77	9,0.13.8
10	.,.2832.	2.,89821	78,31737	1.,78042
11	.,.287.9	2.,71440	77,18481	12,2.074
12	.,.28710	2.,0.304	77,11440	12,382.1
13	.,.28794	2.,42177	77,17300	12,4.478
14	.,.28942	2.,428.4	77,48801	13,08347
15	.,.291.0	2.,2.40	77,20337	13,04719
16	.,.29219	2.,24777	77,3.883	13,44301
17	.,.29278	2.,21732	77,133.	13,70.79
18	.,.293.1	2.,19.2.	70,99749	13,81331
19	.,.2938.	2.,.94.0	77,0.9.0	13,8979.
20	.,.29477	2.,191.1	70,90991	13,849.8

Variance Decomposition of DLWPI:

Period	S.E.	DLCPI	DLPPI	DLWPI
1	0,028017	0,000000	78,39209	21,70791
2	0,031780	4,720379	78,19943	17,17019
3	0,032607	7,407123	70,03791	17,00097
4	0,033393	9,704830	72,40401	17,99117
5	0,034373	13,71237	79,48848	17,99117
6	0,037900	17,07947	77,03380	17,88779
7	0,038278	17,00927	70,49949	17,99124
8	0,038737	17,43417	74,27492	19,30091
9	0,039322	17,27192	73,09780	19,14028
10	0,039700	17,70000	72,01370	19,78070
11	0,039903	17,48727	72,17091	20,34182
12	0,040092	17,38127	71,99024	20,72849
13	0,040173	17,44020	71,97747	20,07828
14	0,040247	17,42947	71,70904	20,81098
15	0,040370	17,34320	71,83098	20,82077
16	0,040008	17,40188	71,87003	20,72810
17	0,040074	17,38932	71,84174	20,77890
18	0,040701	17,37723	71,84140	20,79132
19	0,040732	17,37404	71,93777	20,78870
20	0,040810	17,47383	71,88019	20,70097

Cholesky Ordering: DLPPI DLWPI DLCPI

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Variance Decomposition of DLCPI:

Period	S.E.	DLCPI	DLPPi	DLPC	DLIMP	DLXP
1	0.18834	22,0208	73,97790	2,710907	0.00339	0.83222
2	0.20807	23,37420	72,70932	2,207280	0.90130	0.879073
3	0.22411	20,22079	74,31478	2,07300	1,380881	11,99924
4	0.23444	23,0508	70,41187	2,924091	1,040737	12,07034
5	0.27277	22,44239	70,24470	2,218007	1,177781	8,928072
6	0.29109	19,71320	71,99139	8,041401	1,397230	8,307730
7	0.29070	19,44970	70,43037	8,310893	1,013712	10,28043
8	0.30278	18,84479	07,70204	8,411707	1,484923	13,00749
9	0.31422	18,40334	08,00202	7,911070	1,410008	14,22207
10	0.32703	17,81173	04,33023	12,78204	1,348769	13,72731
11	0.32974	17,97727	04,42731	12,09701	1,331174	13,77777
12	0.33248	17,80108	04,28037	12,08071	1,709034	13,71831
13	0.33407	17,08010	04,47070	12,72130	1,740043	13,47731
14	0.34202	17,20202	02,14013	10,89742	1,830943	12,92449
15	0.34710	17,29143	02,72489	10,03733	1,800174	12,74719
16	0.34730	17,17770	02,99030	10,47182	1,801211	12,00992
17	0.34840	17,08002	03,10214	10,40724	1,827990	12,47871
18	0.35097	17,04420	02,41977	17,39487	1,837183	12,30404
19	0.30470	17,90742	02,97994	17,00710	1,800297	12,20019
20	0.30727	17,81034	02,88784	17,41747	1,787011	12,09934

Variance Decomposition of DLPPi:

Period	S.E.	DLCPI	DLPPi	DLPC	DLIMP	DLXP
1	0.17037	0.00000	100.0000	0.00000	0.00000	0.00000
2	0.19047	3,217104	94,07123	2,282444	0.49289	0.29933
3	0.21173	7,000704	81,14789	2,110072	0.427137	10,20414
4	0.21797	7,333883	79,07000	2,410179	1,471144	10,20970
5	0.24911	9,047098	79,27902	2,031970	1,198900	7,942772
6	0.27112	8,171400	74,70741	8,492943	1,200727	7,482478
7	0.27771	7,839230	73,78288	8,043299	1,400702	8,483884
8	0.28029	7,727073	72,43743	8,034378	1,442808	9,808778
9	0.28918	7,724480	70,07714	8,184827	1,701387	12,42217
10	0.30277	7,122780	70,31344	13,70182	1,779009	12,23290
11	0.30020	7,313140	74,20744	14,10877	1,701910	12,77880
12	0.30773	7,212012	74,32807	13,93170	1,800713	12,77221
13	0.30830	7,278447	74,14333	13,90842	1,910477	12,71934
14	0.31419	7,01482	71,93820	17,08421	2,078783	12,30727
15	0.31777	7,177897	71,73090	17,87727	2,00437	12,27000
16	0.31892	7,181270	72,00703	17,77183	2,023884	12,11748
17	0.31913	7,200977	71,90708	17,70329	2,029070	12,10070
18	0.32074	7,209791	71,34390	17,41908	2,039908	11,98772
19	0.32280	7,270300	71,34200	17,37802	2,022722	12,00707
20	0.32477	7,307307	71,20804	17,44797	2,017330	11,92030

Variance Decomposition of DLPC:

Period	S.E.	DLCPI	DLPII	DLPC	DLIMP	DLXP
1	.,.20041	.,.....	77,2.746	22,79204	.,.....	.,.....
2	.,.29696	.,729.08	8.,061.3	16,90217	1,39.00.	.,367198
3	.,.31227	1,710273	72,92291	10,33692	1,0.2130	8,022762
4	.,.31704	2,717199	71,9.823	10,10.42	2,0.82299	8,242801
5	.,.32767	0,76829	73,7.108	13,20148	1,699237	6,27.872
6	.,.38017	4,79188	71,62714	16,0.6614	1,849.22	0,778014
7	.,.38790	4,807424	70,63209	10,92810	2,0.11429	6,07.461
8	.,.39438	4,70.472	69,0.174.	10,71600	1,90.923	8,614606
9	.,.4.878	0,0.0336	67,1.0262	14,834.1	1,816208	1,0.74178
10	.,.42.078	0,68883.	63,66248	18,33192	1,72.417	1,0.09630
11	.,.42490	6,043298	62,82321	18,1.2.0	1,692462	1,0.83898
12	.,.42799	6,497230	62,62273	17,84940	2,0.13929	11,0.166
13	.,.42918	6,466080	62,39260	18,11140	2,0.8707	11,0.206
14	.,.43726	6,621642	60,11.42	20,0400.	2,0.718.9	1,0.60.63
15	.,.44178	7,0.138.3	60,3.0.88	20,14943	2,0.314.4	1,0.0.449
16	.,.44447	6,922133	60,69769	19,9960.	2,0.11860	1,0.37232
17	.,.445063	6,923680	60,601.8	20,0.6146	2,0.17417	1,0.34630
18	.,.44797	7,0.12.32	60,0.21.8	20,69769	2,0.14037	1,0.20466
19	.,.450248	7,0.74076	60,4.371	20,3.433	1,970892	1,0.24149
20	.,.450470	7,0.30.40	60,27967	20,07242	1,967964	1,0.1499.

Variance Decomposition of DLIMP:

Period	S.E.	DLCPI	DLPII	DLPC	DLIMP	DLXP
1	.,.20826	.,.....	49,02470	18,80.071	31,67409	.,.....
2	.,.31.08	1,006.04	60,20206	10,8160.	21,90.204	.,472803
3	.,.307.2	0,366337	00,0.48.8	14,98698	16,72699	7,871620
4	.,.38732	4,670.01	02,82623	14,9.0769	2,309.8	7,236908
5	.,.41271	9,783762	01,81830	13,89984	18,07346	6,424086
6	.,.44778	8,892686	00,27490	14,36489	10,97146	0,496.16
7	.,.48131	7,744260	08,31.079	12,80947	14,08412	6,0.1367
8	.,.49177	7,44.077	07,176.9	14,20287	14,16848	6,961784
9	.,.49900	7,076878	00,42199	13,92340	13,73391	9,343791
10	.,.0.818	7,374786	04,11430	10,07908	13,44093	9,480303
11	.,.01738	7,7.3190	02,907.9	16,10.4.	13,03.10	1,0.10917
12	.,.02074	7,6.3011	01,966.7	16,82120	12,772.8	1,0.837.9
13	.,.02861	7,689983	01,708.6	17,02.84	12,63383	1,0.89728
14	.,.03.32	7,660481	01,43117	17,31320	12,07991	11,0.1.23
15	.,.03328	7,449211	00,97070	17,68.03	12,4660.	1,0.93400
16	.,.03868	8,097960	01,1470.	17,76929	12,24608	1,0.73867
17	.,.04.079	8,081.41	01,261.3	17,60662	12,1960.	1,0.8051
18	.,.04137	8,11.101	01,21792	17,63702	12,17124	1,0.86367
19	.,.04320	8,24.281	01,11.02	17,67371	12,08970	1,0.88000
20	.,.04040	8,39.03.	01,2094	17,00974	11,99297	1,0.80.82

Variance Decomposition of DLXP:

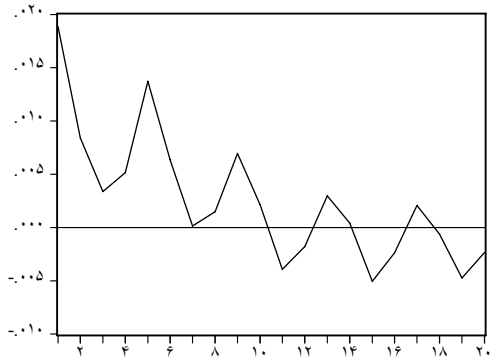
Period	S.E.	DLCPI	DLPII	DLPC	DLIMP	DLXP
1	.,.057677	.,.000000	8,033.32	.,271928	.,.77921	91,12812
2	.,.092966	.,.491009	8,874371	.,724180	1,878931	88,03.96
3	.,.73018	.,.43101.	7,768.07	2,.,77676	1,789207	88,0.4400
4	.,.70832	1,2.231.	9,097716	3,4981.7	1,739176	84,0.737.
5	.,.7902.	1,277107	12,8.227	7,044111	2,777290	76,71117
6	.,.71833	3,110497	14,43121	7,1.968	3,274032	72,0.778.
7	.,.738.0.	3,22999	13,88777	7,734793	3,1.49.7	73,20.03
8	.,.74307	3,379471	13,7419.	7,799470	3,1493.4	72,93987
9	.,.748.7	3,471279	13,71873	7,138904	3,4317.1	72,24943
10	.,.70000	3,092049	13,49027	7,023711	3,8.7976	71,08.01
11	.,.70920	3,008287	13,921.8	7,77.991	3,9.37.7	70,947.4
12	.,.77276	3,7.0187	14,329.3	7,71.137	3,982326	70,37832
13	.,.76496	4,013370	14,31111	7,7.8034	4,00273	70,0.117.
14	.,.77710	4,010802	14,281.8	7,834764	4,07741	79,8.0.76
15	.,.77832	4,01.2.3	14,39970	8,038370	4,079374	79,4723.
16	.,.779.2	4,007.22	14,37044	8,087017	4,120981	79,4.0.4
17	.,.77987	4,030088	14,374.7	8,134947	4,127440	79,32896
18	.,.77.2.	4,037917	14,37237	8,184027	4,124.20	79,28117
19	.,.77.88	4,00.479	14,38201	8,24770.	4,139037	79,18.82
20	.,.77139	4,049870	14,37349	8,310742	4,147.84	79,12391

Cholesky Ordering: DLPII DLPC DLIMP DLXP DLCPI

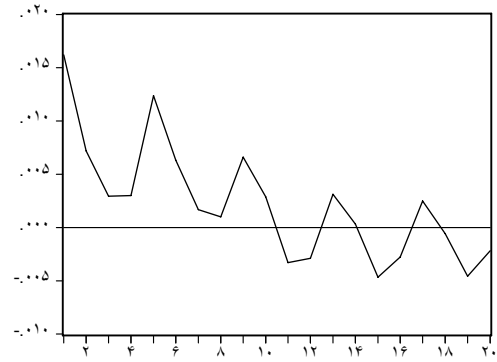
DLPC DLIMP DLCPI DLPP1

DLCPI **:()**

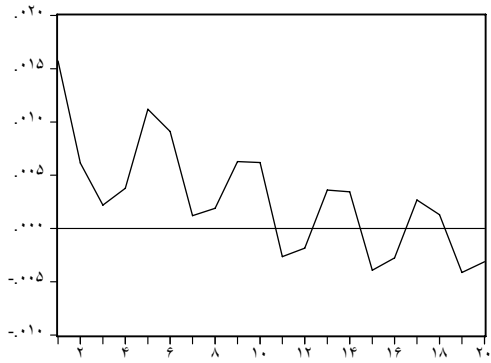
Response of DLCPI to DLCPI



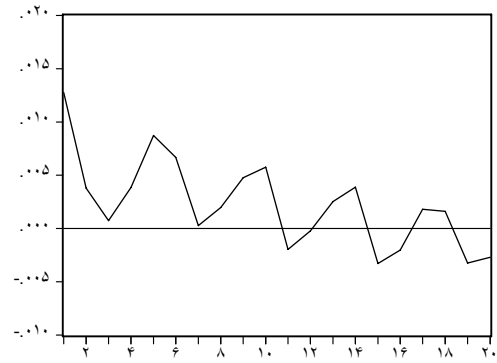
Response of DLCPI to DLPP1



Response of DLCPI to DLPC



Response of DLCPI to DLIMP

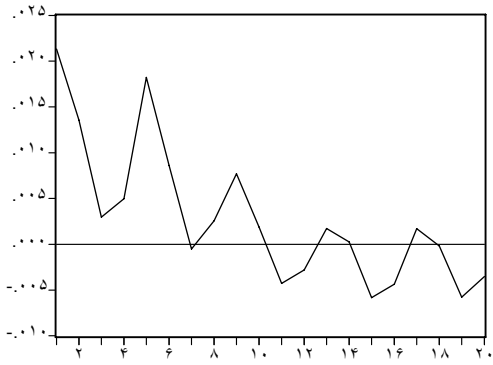


CPI

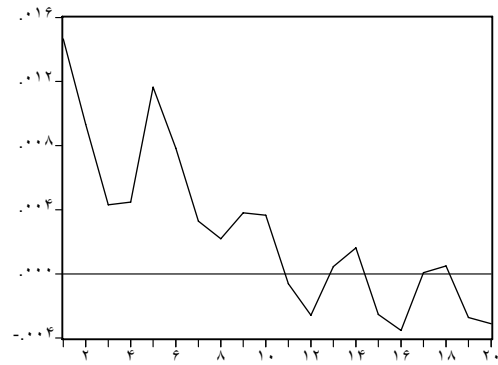
PC XP PPI

:()

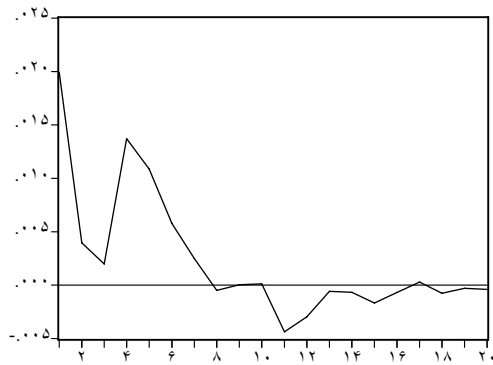
Response of DLPC to DLCPI



Response of DLPPPI to DLCPI



Response of DLXP to DLCPI

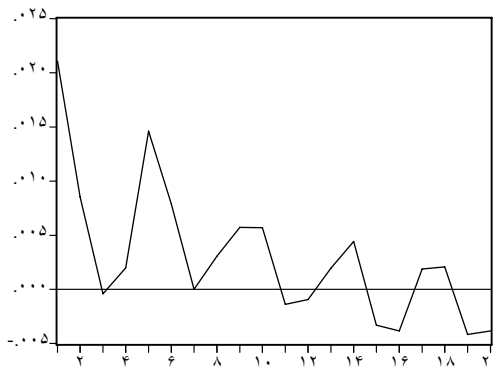


IMP

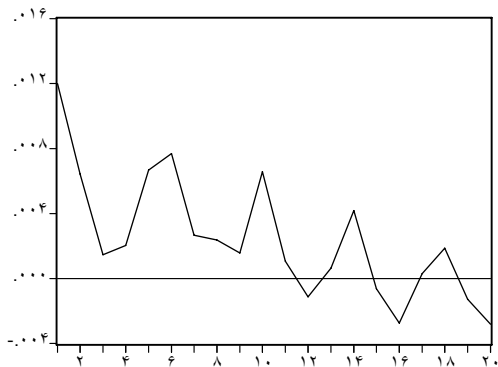
PC PPI

:()

Response of DLPC to DLIMP



Response of DLPPPI to DLIMP



P*

CPI WPI PPI