

The Macroeconomic Consequences of Big Deflations

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How Much Do Modest Deflations Depress Output?

Pat's graph: no relation between modest π and $y - \bar{y}$

2 interpretations of these data

(1) Modest deflations aren't depressing

(2) They are, but it is hard to see in these data

My approach: Assess impact of the big 1930s deflations

Estimate how much deflation reduced output

Extrapolate results to modest deflations

Consensus - Deflation Caused 1930s Int'l Depression

Bernanke, Eichengreen, Sachs, Bordo, Obstfeld, Rogoff, textbooks...

A key mechanism: imperfectly flexible wages

$P \downarrow$, $(W/P) \uparrow$, $Y \downarrow$

Analysis uses a fully specified model with this mechanism

Draw on work with Cole, and Cole and Leung

π and y during Int'l Depression

If just deflation, should see systematic patterns

Similar deflations = Similar depressions

Biggest deflations = Biggest Depressions

We see the opposite in the data

Countries	1929-32 Output Change	1929-32 Price Change
Australia	-6.6	-24.4
United States	-28.2	-21.2
Germany	-19.2	-20.9
Hungary	-3.8	-20.8
Italy	-2.9	-20.7
Japan	5.4	-19.4
Netherlands	-7.3	-18.2
Canada	-25.4	-16.7
Denmark	4.3	-15.5
Finland	-4.1	-15.4
Switzerland	-3.9	-15.3
Sweden	-4.0	-13.6
Norway	0.5	-11.6
France	-14.6	-10.0
United Kingdom	-5.5	-7.8
Austria	-19.8	-1.5

Figure 2a: Output vs Prices 1929-30

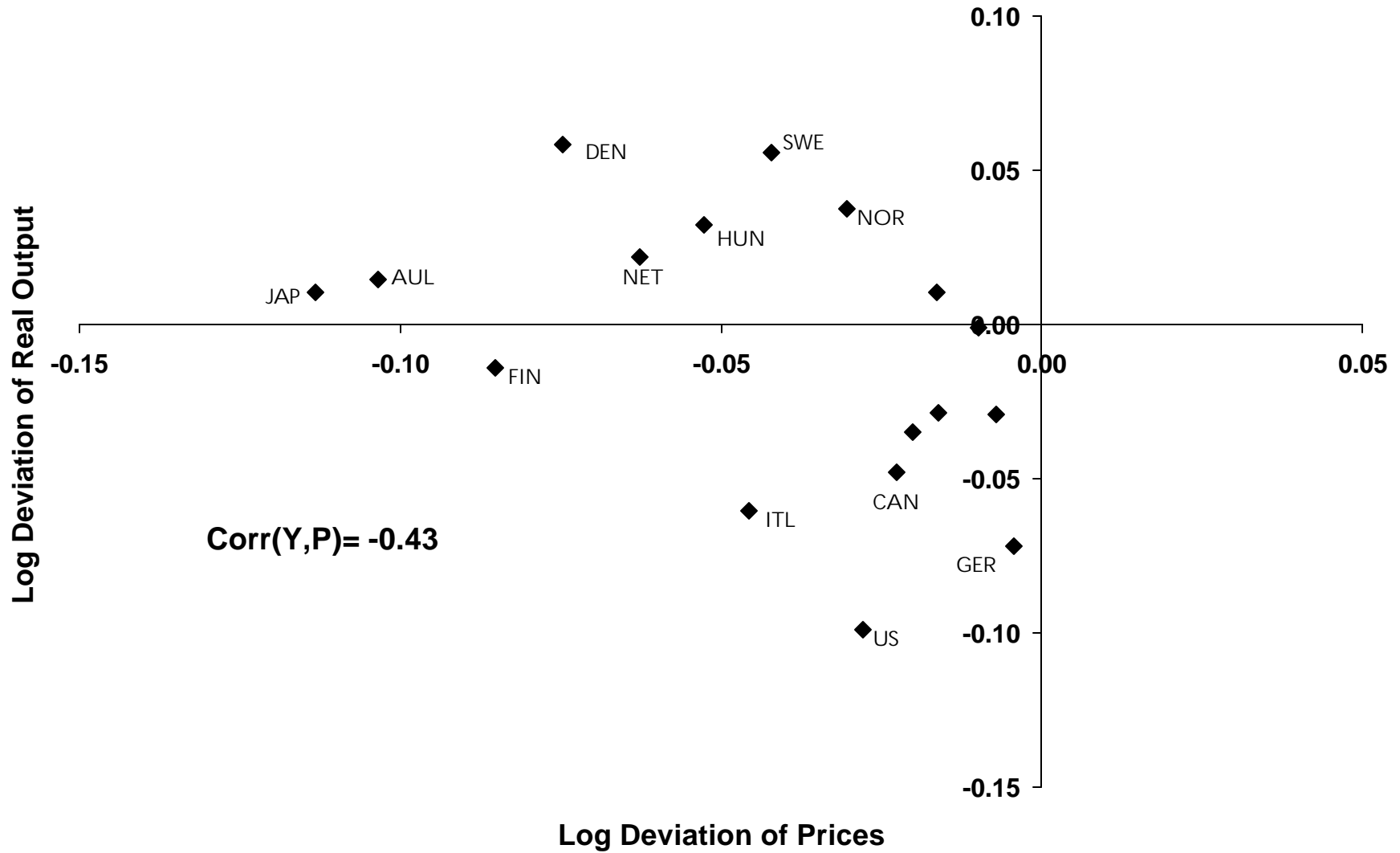


Figure 2b: Real Output vs. Prices 1929-31

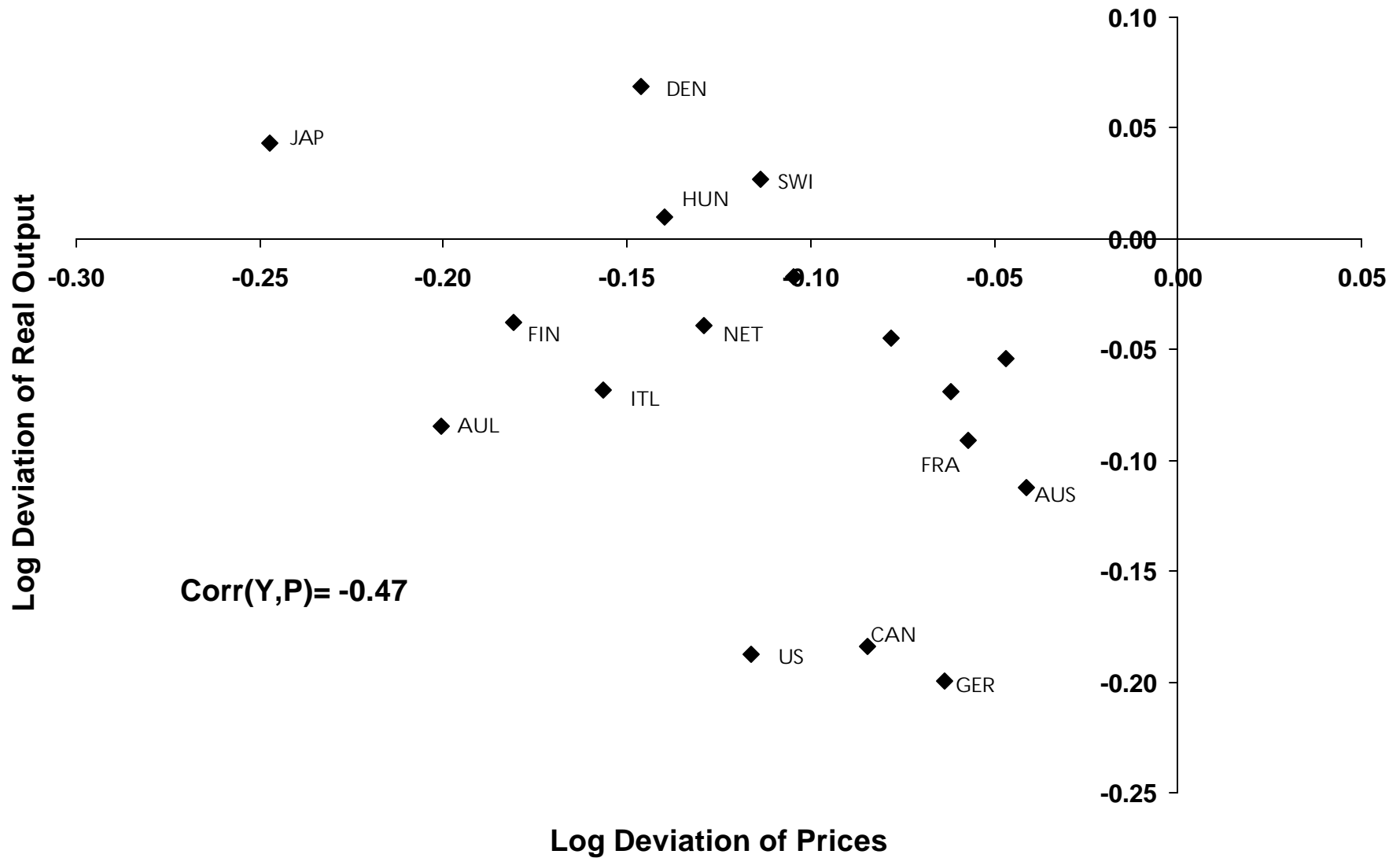


Figure 2c: Real Output vs. Prices 1929-32

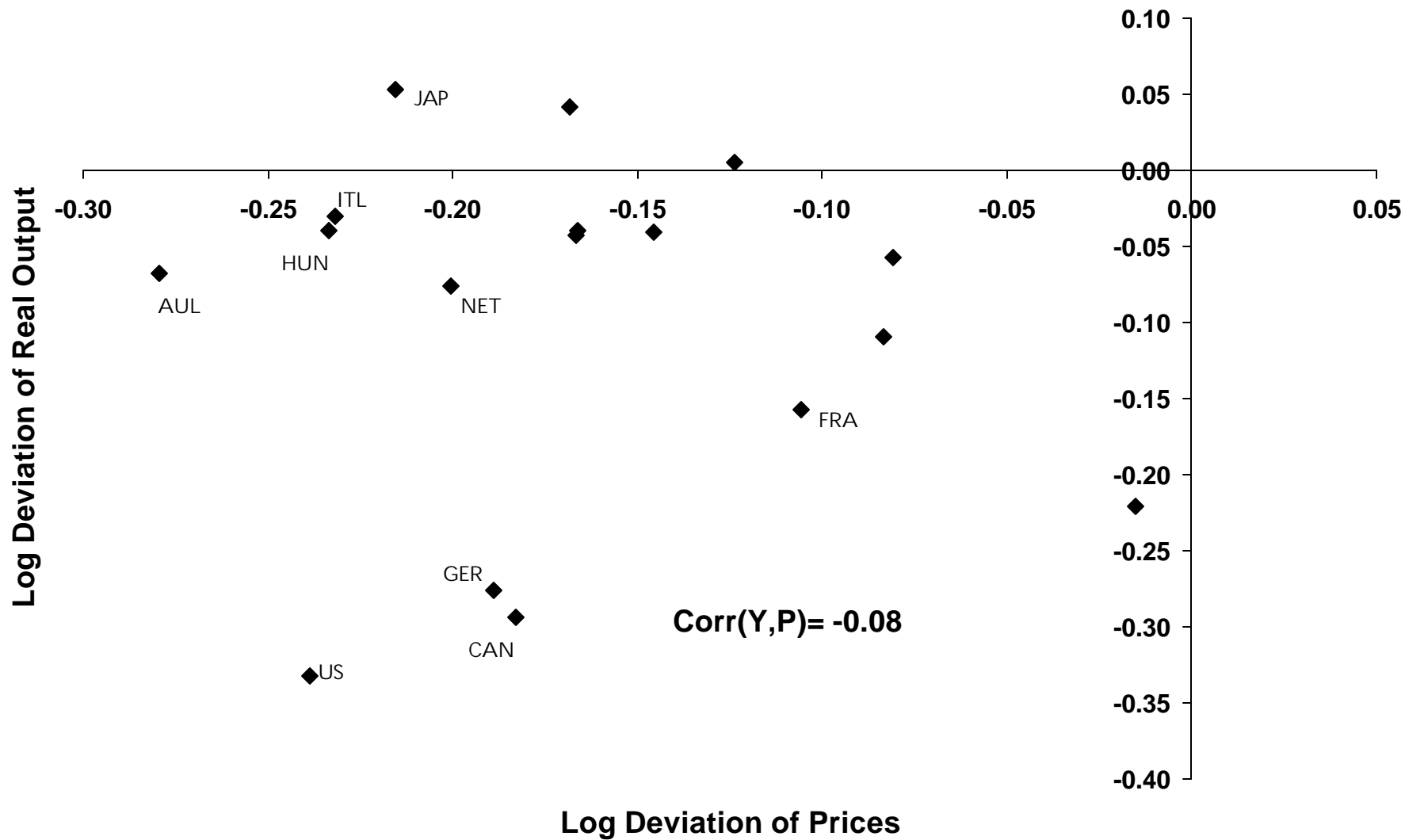
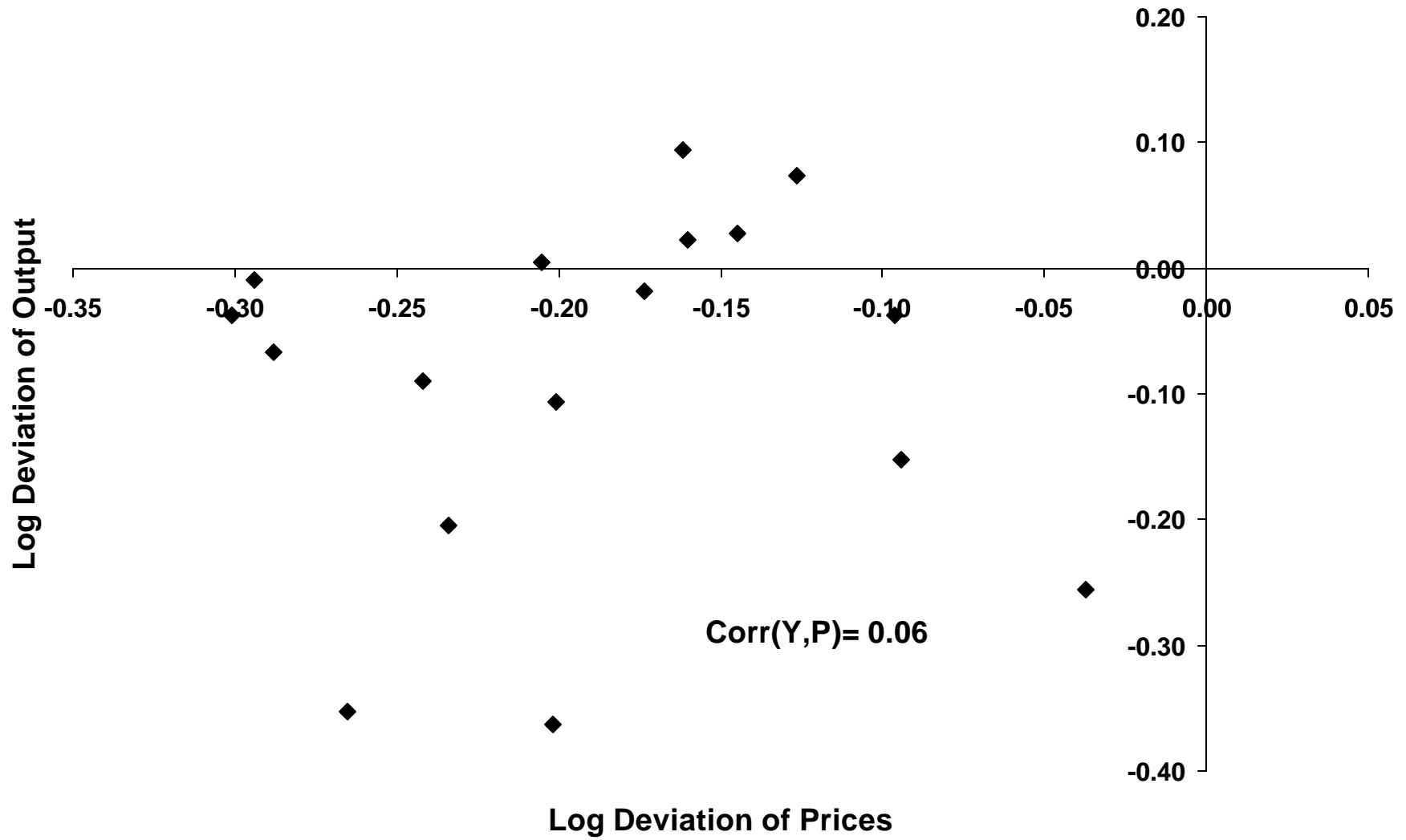


Figure 2d: Real Output vs. Prices 1929-33



Need An Additional Shock

Add productivity shock, because:

Output and Labor Productivity in 1933 (1929 = 100)

Country	Y	Y/L
Australia	99	104
U.K.	96	98
U.S.	69	84
Canada	64	75

And add prod shock because need labor demand shifter

Positive correlation between real wages and output

Figure 1a: Real Output vs. Wages 1929-30

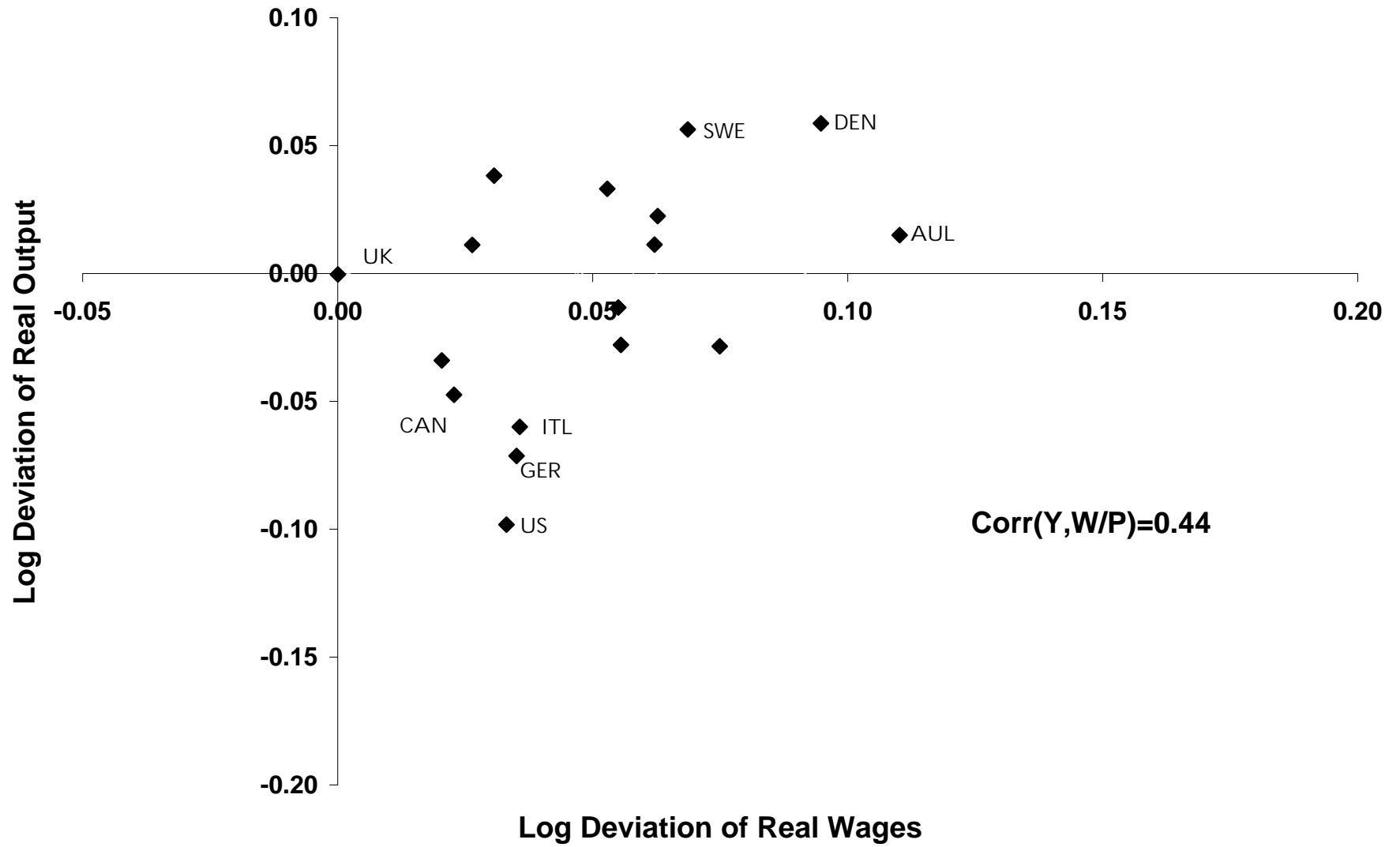


Figure 1b: Real Output vs Wages 1929-31

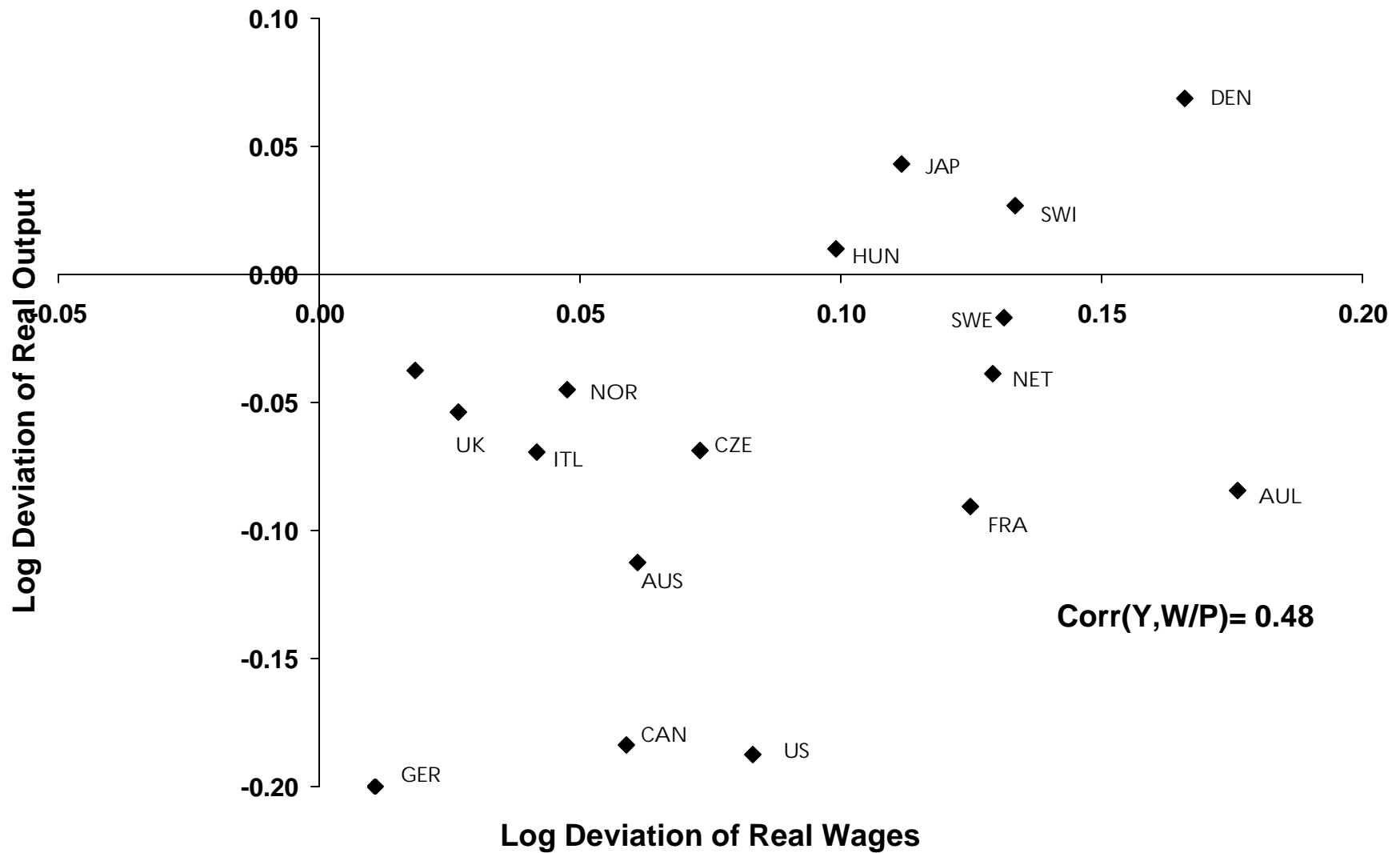


Figure 1c: Output vs Real Wages 1929-32

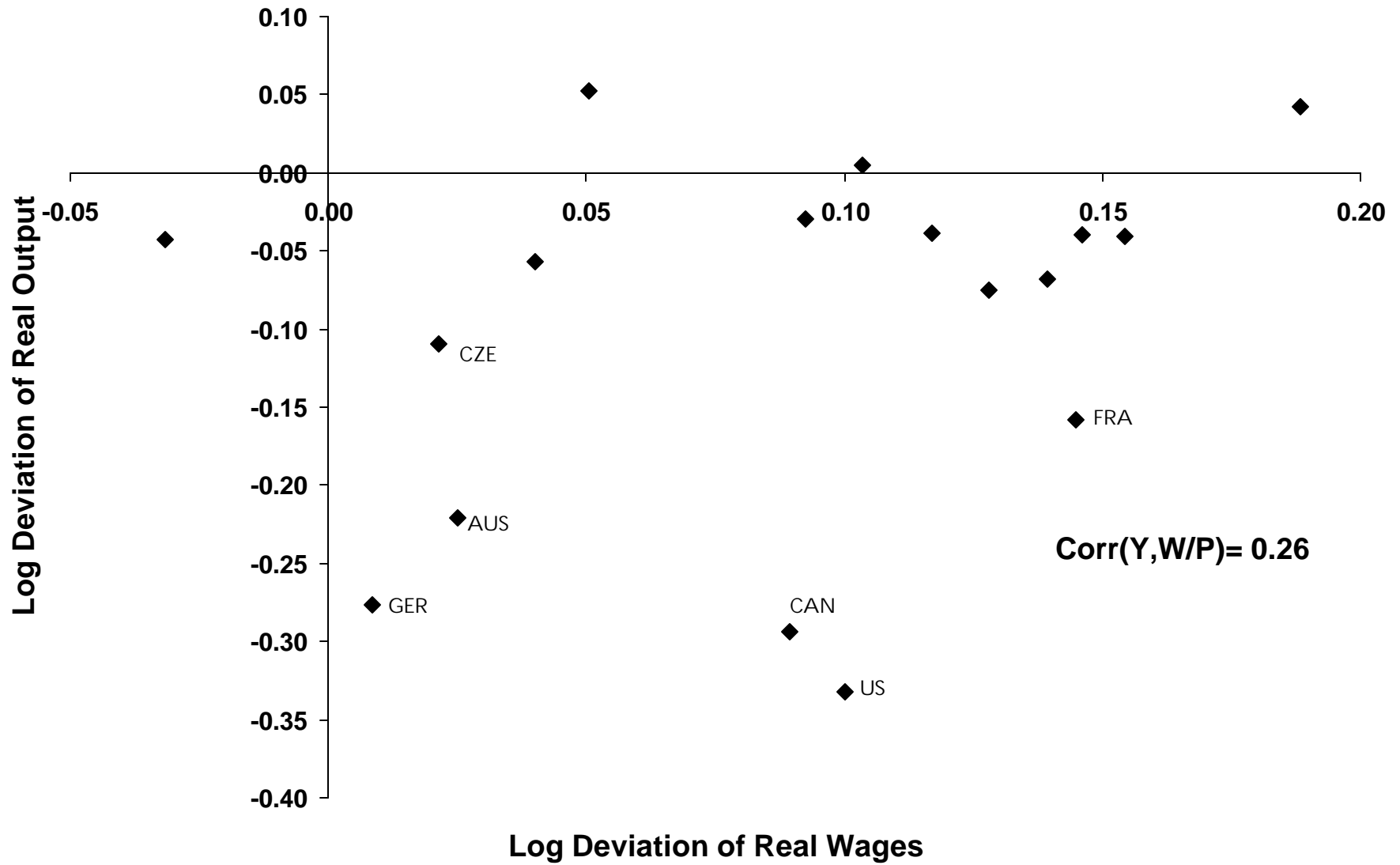
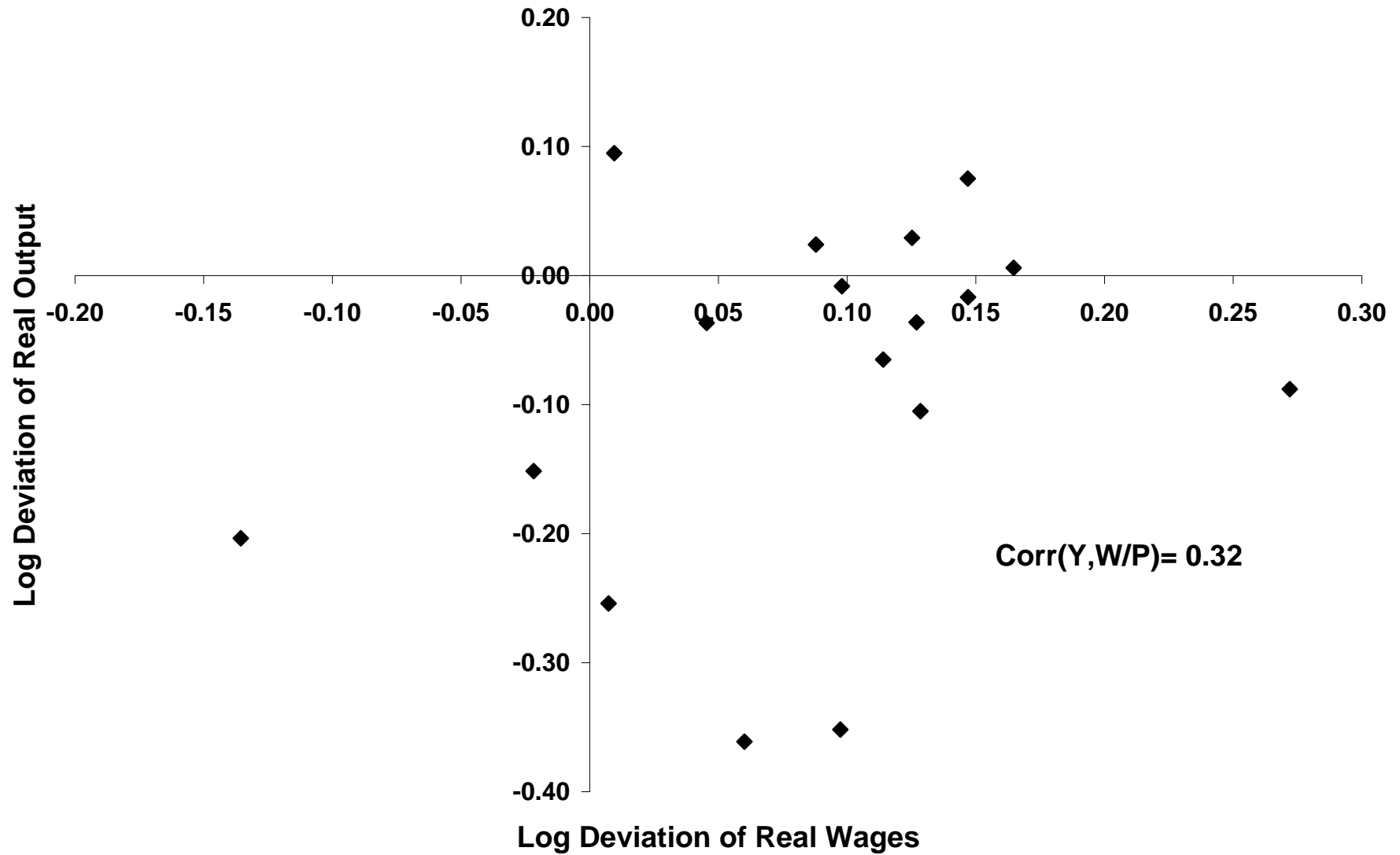


Figure 1d: Output vs Real Wages 1929-33



Shock Decomposition of Int'l Depression

Central question

How much is productivity, how much is deflation?

Need fully specified model to address this question

Summary of the Model

Stochastic growth model with cash/credit goods

Non-neutrality from imperfect info (Lucas, 1972)

Model has monetary mechanism of consensus view

$M\downarrow$, $P\downarrow$, $(W/P)\uparrow$, $Y\downarrow$

Qualitatively works exactly like sticky wage model

Model has range of nonneutralities

Decomposition Experiment

Construct TFP and money shocks to:

Match Y and P in each country and each year, 1930-33

Calculate % of output change due to TFP and money

Why this approach?

Consensus implies if model accounts for p ,

then it will account for most of y

Orthogonal Shocks

Decomposition requires orthogonal shocks

Benchmark decomposition: TFP orthogonal to deflation

Corrects for deflation-related mis-measurement

and possibly for other deflation-related channels

Productivity is Major Factor

66% of output change due to orthogonal TFP

34% due to money and non-orthogonal TFP

Output Decomposition Percent Due to Productivity and Money

Year	Ortho Productivity	Money
1930	95	5
1931	76	24
1932	47	53
1933	78	22
Ave.	66	34

Results robust to other orthogonalizations

Characteristics of Productivity Shocks

Productivity Shocks and Output (1929 = 100)

Year	Mean(z)	Mean(y)	Corr(z, y)
1930	101	100	.03
1931	99	94	.20
1932	96	90	.74
1933	96	92	.64

Large, negative productivity shocks at trough

Shocks are correlated with output at trough

Model Productivity Similar to Data

Y/L in Model Looks Like Data: 1930
(1929 = 100)

Country	Model	Data
Australia	107	105
UK	101	102
USA	98	96
Canada	100	99

Y/L in Model looks like Data: 1933
(1929 = 100)

Country	Model	Data
Australia	101	104
UK	98	98
USA	85	84
Canada	85	75

Correlation between model TFP and IP/L(mfg)

.80 for TFP, .70 for orthogonal TFP

Money, Productivity, and Output

Money not positively correlated with z first 2 years.

Money not positively correlated with y first 2 years.

Correlation of $\Delta \ln(M0)$ with Productivity and Output

Year	$\hat{z} \perp \pi$	y
1930	-0.20	-0.17
1931	-0.47	-0.46
1932	0.21	0.21

Correlation of $\Delta \ln(M1)$ with Productivity and Output

Year	$\hat{z} \perp \pi$	y
1930	-0.01	0.01
1931	0.14	0.14
1932	0.60	0.59

The 2 Big USA Deflations

Early 1920s: 24% deflation, no depression

Early 1930s: 23% deflation, Great Depression

A big difference in the 2 episodes - Productivity

Productivity during the Big USA Deflations

Early 1920s (1920 = 100)

	Output	Price	Prod
1921	97	81	100
1922	99	76	98
1923	108	79	104

Early 1930s (1929 = 100)

	Output	Price	Prod
1930	87	97	92
1931	78	88	88
1932	65	78	79
1932	62	77	76

Productivity major positive factor in 1920s

Productivity major negative factor in 1930s

Int'l Depression is a Productivity Puzzle

Find a factor that

Looks & acts like productivity shock in growth model

Is orthogonal to deflation and money

Why do we get different answer than literature?

Use a fully articulated model

Include other shocks

Implications for Small Deflations and Policy

Small deflations are small potatoes

Impact of 2% deflation is negligible

Policy message: If it ain't broke, don't fix it...

Because fighting deflation could lead to inflation

Could undo one of the great economic policy successes