Economics Letters 135 (2015) 108–111

Contents lists available at ScienceDirect

Economics Letters

journal homepage: www.elsevier.com/locate/ecolet

Reexamining the cyclical behavior of the relative price of investment

Paul Beaudry [a,b], Alban Moura [c], Franck Portier [c,d,*]

[a] Vancouver School of Economics, University of British Columbia, Canada
[b] NBER, United States
[c] Toulouse School of Economics, France
[d] CEPR, United Kingdom

HIGHLIGHTS

- We study the cyclical behavior of the relative price of investment goods in the US since 1960.
- There is no robust evidence that this relative price is countercyclical.
- Post 1983, the relative price of investment appears predominantly procyclical.
- Looking at disaggregated series, most measures are procyclical.
- This procyclical behavior is also found for the six other countries of the G7.

ARTICLE INFO

Article history:
Received 17 March 2015
Received in revised form
5 May 2015
Accepted 8 May 2015
Available online 15 May 2015

JEL classification:
E3

Keywords:
Relative price of investment
Business cycles
Investment shocks

ABSTRACT

We document the cyclical behavior of the relative price of investment goods for the US economy over the last fifty years. There is no robust evidence that this relative price is countercyclical. For the post-1983 period, it is predominantly procyclical.

1. Introduction

It is common wisdom in the macroeconomic profession that the relative price of investment is countercyclical, reflecting the importance of investment-specific technological shocks in the business cycle. For instance, Fisher (2006) finds, for the period 1955–2000, a negative cyclical correlation of the relative equipment price with output, while that of total investment is "somewhat weaker, but still significantly negative" (p. 428). By considering a longer sample, clarifying the role of the consumption deflator, and documenting changes in cyclical patterns over time, we update these results and reach a different conclusion: there is surprisingly little support for countercyclicality of the relative price of investment in the data.

We summarize our results in Table 1, where we use three definitions of aggregate investment (total private investment, business investment, household investment), two measures of the price of consumption (the numéraire used to compute relative prices), two measures of the business cycle (output and hours worked), and two samples. For all the measures, the relative price of investment is procyclical over the post-1983 period, and almost always significantly so. When considering a longer sample, it is rarely countercyclical and never significantly so. We show that this result is robust to measurement issues (choice of the deflator, adjustment for quality) and that it holds for the other G7 countries.

2. What can we learn from the cyclical behavior of the relative price of investment?

Investment is the most volatile component of output, so identifying the forces driving its fluctuations is key to macroeconomists. The cyclical behavior of its relative price reflects the relative importance of demand and supply shocks in the investment market.

* Correspondence to: 21 Allée de Brienne, 31000 Toulouse, France. Tel.: +33 0 5 61 12 88 40; fax: +33 0 5 61 12 86 37.
E-mail address: franck.portier@TSE-fr.eu (F. Portier).

http://dx.doi.org/10.1016/j.econlet.2015.05.011
0165-1765/

Table 1
Cyclical correlations between relative investment prices and output or hours.

Measure	Deflator	Sample	Total private	Business	Household
Corr. with y	Benchmark	1960–2013	−0.10	−0.18	0.02
	Benchmark	1984–2013	0.12	0.05	0.15*
	Core	1960–2013	0.04	−0.05	0.13
	Core	1984–2013	0.38*	0.35*	0.37*
Corr. with h	Benchmark	1960–2013	0.05	−0.13	0.16
	Benchmark	1984–2013	0.36*	0.27*	0.33*
	Core	1960–2013	0.22	0.07	0.29*
	Core	1984–2013	0.60*	0.57*	0.54*

Note: This table displays correlations of various measures of the relative price of investment with output and hours. The numéraire is the price of personal consumption expenditures on non-durable and services (benchmark) or the same price excluding 'Gasoline and other energy goods' (core). Variables are HP-filtered with smoothing parameter 1600. A star means that the correlation is significant at 5%.

Table 2
Cyclical correlations between relative investment prices and output or hours.

Deflator	Sample	TPI	BI	HI	EI	SI	IPR	RI	DG
Correlation with output									
Benchmark	1960–2013	−0.10	−0.18	0.02	−0.31*	0.10	0.06	0.50*	−0.03
	1960–1983	−0.24*	−0.31*	−0.07	−0.31*	−0.16	−0.01	0.55*	−0.01
	1984–2013	0.12	0.05	0.15	−0.31*	0.39*	0.14	0.52*	−0.05
Core	1960–2013	0.04	−0.05	0.13	−0.23	0.17	0.25*	0.54*	0.12
	1960–1983	−0.16	−0.28*	−0.01	−0.31*	−0.11	0.10	0.53*	0.04
	1984–2013	0.38*	0.35*	0.37*	−0.06	0.49*	0.42*	0.63*	0.23*
Correlation with hours									
Benchmark	1960–2013	0.05	−0.13	0.16	−0.38*	0.32*	0.08	0.59*	−0.11
	1960–1983	−0.25*	−0.47*	−0.02	−0.51*	−0.13	−0.17	0.61*	−0.23*
	1984–2013	0.36*	0.27*	0.33*	−0.21*	0.63*	0.25*	0.60*	0.03
Core	1960–2013	0.22	0.07	0.29*	−0.26*	0.40*	0.33*	0.65*	0.09
	1960–1983	−0.13	−0.40*	0.07	−0.49*	−0.05	0.01	0.62*	−0.15
	1984–2013	0.60*	0.57*	0.54*	0.05	0.72*	0.51*	0.69*	0.30*

Note: TPI: Total private investment, BI: Business investment, HI: Household investment, EI: Equipment, SI: Structures, IPR: Intellectual property rights, RI: Residential, DG: Durables. TPI = BI + HI, BI = EI + SI + IPR, HI = RI + DG. A star indicates that the correlation is significant at the 5% level.

A long-lasting view, dating back at least to Keynes, emphasizes the role of investment demand by forward-looking entrepreneurs. Modern incarnation of this theory includes the literature on news shocks about the future profitability of investment goods, for example Beaudry and Portier (2004, 2013) and Beaudry et al. (2011). Such models based on demand-driven fluctuations predict a procyclical relative price of investment (see also Murphy et al., 1989). A more recent branch of the literature, pioneered by Greenwood et al. (1988) and extended by Fisher (2006) and Justiniano et al. (2010), puts forward supply shocks arising from technological shocks in the investment sector as important drivers of the cycle. As those shocks affect the efficiency of investment production, they are associated with countercyclical movements in the relative price of investment. Since labor productivity has become less procyclical,[1] such shocks also appear as a powerful way to generate investment booms in DSGE models: for instance, the investment-specific technology shock is one of the three main drivers of output fluctuations in Smets and Wouters (2007).

3. Results

We use the Hodrick–Prescott filter with a smoothing parameter 1600 to isolate the business-cycle components of the series.[2] We consider two indicators of the business cycle: the cyclical components of real per-capita GDP and per-capita hours worked in the private non-farm business sector. We include hours worked because they provide an alternative index of the business cycle that is not as affected by productivity shocks as output is.

3.1. Benchmark analysis for the USA

We start with our benchmark analysis of US data. Table 2 displays the contemporaneous correlations between the relative prices of investment and our two measures of the cycle, over both the full sample and two subsamples.

The picture that emerges is clearly not one of strong countercyclicality. Among disaggregated investment measures, only equipment relative price is significantly negatively correlated with output. Over the full sample 1960–2013, its correlation is −0.31 with output and −0.23 with hours worked. Otherwise, the relative prices of structures and durables are roughly acyclical, with respective (non significant) contemporaneous correlations with output of 0.10 and −0.03. The relative price of structures is significantly procyclical when the business cycle is measured by hours worked, with an instantaneous correlation of 0.32. The relative price of residential investment is strongly procyclical, with an instantaneous correlation of 0.50 with GDP and 0.59 with hours. Turning to aggregate series, business investment is slightly countercyclical (not significantly so), while household investment is acyclical. As a whole, we find small and non significant correlations between the relative price of total private investment and output (−0.10) and hours worked (0.05) along the cycle over the full sample.

[1] See Galí and van Rens (2014).

[2] Our findings are robust to using instead a bandpass filter (6–32 quarters) to isolate cyclical components of the data.