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Cyclical Patterns of Employment, Utilization and Profitability

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Cyclical patterns of employment, utilization and profitability

by

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Abstract

The interaction between income distribution, accumulation, employment and the utilization of capital is central to macroeconomic models in the 'heterodox' tradition. This paper examines the stylized pattern of these variables using US data for the period after 1948. We look at the trends and cycles in individual time series and examine the bivariate cycical patterns among the variables.

JEL classification: E12, E32, O41

Key words: growth, business cycles, aggregate demand, instability, income distribution, utilization rate, investment function, pricing.

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1 Introduction

The 'heterodox' tradition in macroeconomics contains a wide range of models. Kaleckian models treat the utilization rate as an accommodating variable, both in the short and the long run. Goodwin's celebrated formalization of Marx, by contrast, take the utilization rate as fixed and looks at the interaction between employment and distribution. Distribution is also central to Kaldorian and Robinsonian theories which, like Goodwin, endogenize the profit share and take the utilization rate as structurally determined in the long run but, like the Kaleckians, view short-run variations in utilization as an intrinsic part of the cycle. The differences in these and other areas are important, and this diversity of views on core issues is no cause for celebration.

Real-world economies differ widely, of course, and appropriate models will reflect these differences. One would not want to use the same model to analyze advanced, labor-constrained economies and dual economies with large (hidden) unemployment. But an attempt should be made to resolve fundamental disagreements on the dynamics of accumulation, income distribution and utilization rates in an advanced capitalist economy. Theoretical and empirical work is needed to evaluate the theories and help create a coherent and convincing alternative to the existing orthodoxy.

This paper makes no attempt to address the theoretical issues. Instead, we explore US data on some of the variables that most, if not all heterodox macroeconomic theories consider important: employment rates, profit shares, accumulation rates, and capacity utilization.[1] The paper complements and extends recent studies of US cycles by Barbosa-Filho and Taylor (2006) and Mohun and Veneziani (2008). Both of these contributions use the Goodwin model as their theoretical framework; the former focusing exclusively on oscillations in profits and utilization, and the latter on profits and employment.

The paper is in 5 sections. Section 2 discusses some general data issues. Trends and cycles of the variables are presented in section 3, and section 4 examines bivariate cyclical patterns among the variables. A final section summarizes the main findings.

2 Data

Benchmark versions of the heterodox models are typically cast in terms of closed economies without a public sector, and a one-good assumption implies that sectoral differences are taken to be insignificant. In short, the models describe a pure capitalist economy.

Abstract models of this kind can be very useful. They serve to highlight particular issues and can be used to examine the logic of mechanisms that may operate within the more complex reality of real-world economies too. But questions arise if one wants to take the simple models to the data. It is hard to evaluate the models since their predictions can be negated by other influences – explosive cycles for instance may be tamed by the

[1] Theoretical issues are discussed in a companion paper, Skott and Zipperer (2010). See also Skott (2010).

influence of public policy – and it may not even be obvious which data should be used as the empirical counterparts to the theoretical variables.

Our approach in this paper is to look at sectors that, according to the theories themselves, should conform to the behavioral assumptions. In practice, this criterion suggests a focus on profit shares, accumulation and capacity utilization for the corporate business sector. Employment, however, is different. The state of the labor market – the size of the reserve army of labor – is important because it affects the balance of power between workers and capital, and the relevant measure is the average economy-wide employment rate.

Other questions concern the precise definition of the variables. How for instance should one treat taxes in the calculation of profit shares? The answers to many questions of this kind depend on the precise purpose of the analysis. There may be no uniquely correct answers and even if there is, data limitations restrict what can be done in practice. Given these problems, the best one can do may be to be clear about the definition of the chosen indicators and to test, when possible, the sensitivity of the observed patterns to changes in the choice of indicators.

We are interested in cyclical fluctuations as well as long-term trends, and high-frequency data therefore are desirable. US employment and utilization data are available monthly, but corporate-sector profit data are published on a quarterly basis and unless noted, all data below are quarterly averages. Data are seasonally adjusted by the reporting agency, and we assume that these adjustments adequately correct for seasonal effects. The sample begins in the first quarter of 1948, the earliest available US employment rates, and ends in the final quarter of 2008, the last full year of available data at the time of writing.[2]

In addition to actual data observations, we smooth the data to construct a short-term and a long-run trend. The smoothing procedure employs the Hodrick-Prescott (1997) filter with smoothing parameters 6.25 and 129,600 for short and long-run trends respectively. While the parameter choice is largely arbitrary – any 'small' and 'large' numbers would be suitable for our descriptive analysis – these specific short- and long-run parameters are recommended by Ravn and Uhlig (2002) for business cycle analysis of annual and monthly data, respectively. Our smaller-than-usual smoothing parameter for the short-run trend is intended to filter out extreme peaks only, leaving considerable quarter-to-quarter variation. Our higher-than-usual smoothing parameter for the long-run trend reflects our effort to describe a long-term variation over decades. Because the actual 1948q1 and 2008q4 observations may bias the constructed endpoints of the long-term trend, we restrict the long-term trend to 1953-2001. That is, after creating the filtered series, we drop the years 1948-1952 and 2002-2008 from the constructed long-term trend, beginning and ending the long-term trend close to the 1953q2 and 2001q1 NBER business cycle peaks.

[2] All US data in this paper were collected in September 2009. The US national accounts data used include the 'final' 2008q4 figures for profits and output, as well as the BEA's July 2009 comprehensive revision. OECD data were collected in December 2009.

3 Trends and cycles

3.1 Profit shares

To measure the profit share π, we use the surplus and compensation subcategories of quarterly value added, net of depreciation, in the Bureau of Economic Analysis (BEA) National Income and Product Accounts (NIPA).[3] The largest private sector in the NIPA tables for which quarterly compensation and operating surplus delineations are available is domestic corporate business. As a share of the total business sector, corporate business net value added rose during 1948-2008, from 57 percent in 1948q1 to 64 percent in 2008q4; as a share of total GDP it remained roughly constant at about 50 percent.[4] Although to some extent dictated by data availability, the use of corporate sector data can also, as noted above, be justified by a cleaner application of the theories to corporate than to noncorporate business.

Net value added (gross value added net of depreciation) is fully decomposed into taxes on production, labor compensation, and net operating surplus. In the BEA national accounts, net operating surplus includes taxes on corporate income (which are different than production taxes). How one treats taxes can therefore in principle produce different proxies for the profit share. For example, three candidate series are

$$\pi = \frac{\text{net surplus + production taxes}}{\text{net surplus + production taxes + compensation}}$$

$$\pi^* = \frac{\text{net surplus}}{\text{net surplus + compensation}}$$

$$\pi' = \frac{\text{net surplus - corporate income taxes}}{\text{net surplus - corporate income taxes + compensation}}$$

Over 1948-2008, the means for π, π^*, and π' are, respectively, 0.29, 0.21, and 0.15. The decision to omit or include production taxes yields series with virtually identical variation: the correlation coefficient between π and π^* is 0.98. In contrast, the treatment of corporate income taxes yields series with different long-term variation (but similar short-term fluctuations). Figure 1 shows the actual quarterly evolution of π and π', as well as their short- and long-run Hodrick-Prescott filtered trends.

Focusing on the profit share inclusive of all taxes, profits accounted for one-third of output at their peak in the early 1950s. A substantial redistribution towards labor income followed, and the profit share temporarily fell below one-quarter around the onset of the 1980 recession before swinging upwards again in the 1980s and 1990s. Using the profit share π' exclusive of all taxes, the long redistribution toward labor after the 1950s fails to occur. The long-term series for π' remained around 14% until around the 1980s, after which the share of profits began to increase substantially. These long-term movements

[3] See http://www.bea.gov/national/nipaweb/index.asp

[4] See BEA NIPA Tables 1.3.5 and 1.14.

capture most of the difference between the two series. Although the correlation coefficient between actual quarterly observations for π and π' is 0.42, deviations of each series from its long-term trend correlate at 0.92.

In simple models profit maximizing markups over cost are unaffected by a change in the tax rate on profits, and for many purposes it will be reasonable to include taxes with profits.[5] In section 4 unless otherwise noted we therefore take the profit share π to be the sum of the surplus and taxes, divided by value added.[6]

FIGURE 1 - US quarterly profit shares π and π'; actual, and short-term and long-term trends

A potentially large problem with the above definition of the profit share concerns its treatment of executive pay, which NIPA tables include as compensation. Executive compensation has increased dramatically and arguably a large part of this increase should be included with profits. Our measure of the profit share fails to do this and may give a misleading picture of the trend in profitability, especially for the period after the 1980s. Krueger (1999) attempts to account for this issue by modifying the NIPA data using a compensation series derived from the Bureau of Labor Statistics Employment Cost Index (ECI) – whose data "exclude jobs in which employees have a significant role in setting their own wages" – which grew more slowly over 1988-1995 than labor's share of income in the NIPA. [7]. After using the ECI data to modify the NIPA-based profit share, Krueger finds that instead of growing only 0.6 percentage points over 1988-1995, the modified profit share grew somewhere between 1.9 and 4.6 percentage points, depending on the nature of the adjustment. A similar adjustment to our data would steepen the most recent long-term rise in the profit share, although it is unclear, *a priori*, what impact this adjustment would have on the cyclical component of the profit share around its trend.

3.2 Utilization rates

We use the Federal Reserve capacity utilization series for manufacturing. The Federal Reserve also publishes a capacity utilization series for the total industrial sector but this series only exists since 1967.[8] The manufacturing series may be more reliable and the movements in the total industrial series closely match those for the manufacturing series. The average over 1967-2008 of the former is 81.3% compared to 80.1% for the latter, and the correlation coefficient between the two series is 0.99. The Federal Reserve manufacturing series is monthly and seasonally adjusted, and we take quarterly averages for the 1948-2008 period. Over the period, utilization fluctuates strongly with extreme values above 90

[5]The invariance of the optimal markup is subject to qualifiations. Consumer loyalty or other intertemporal elements in demand can make it optimal for a firm to vary its markup in response to fluctuations in the tax rate.

[6]See lines 4, 7, and 8 of NIPA Table 1.14.

[7]The ECI data begin in 1975: http://www.bls.gov/news.release/eci.tn.htm

[8]See Shapiro (1989) for a review of how the Federal Reserve calculates capacity and utilization.

percent and below 70 percent (Figure 2). In January 1986 the Federal Reserve switched from SIC to NAICS industry classification, possibly introducing a discontinuity that may affect statistical analysis. We ignore this complication.

FIGURE 2 - US quarterly manufacturing utilization rate u; actual, and short-term and long-term trends

3.3 Accumulation and capital capacity

To approximate changes in the capital stock, there are two candidate data series for the US: Bureau of Economic Analysis (BEA) net fixed assets[9], and the Federal Reserve (Fed) industrial capacity index.[10] Both series are available for the manufacturing sector.

The capacity index measures the "greatest level of output each plant ... can maintain within the framework of a realistic work schedule."[11] The capacity series is published monthly. To calculate quarterly capacity changes $\hat{K}$ from the monthly published data, we calculate the percent difference between index values three months apart: fourth quarter $\hat{K}$ is the percent difference between December and September values; first quarter $\hat{K}$ is calculated from March's index value and the previous year's December value. The average quarterly growth rate of manufacturing capacity was about 0.9 percent between 1948-2008. The growth rate generally fell over the period, with large peaks in the mid-to-late 1960s and mid-to-late 1990s. The same 1986 SIC to NAICS industrial classification change mentioned above for the utilization series may also affect the capacity series, a complication we ignore.

FIGURE 3 - Quarterly Fed-based $\hat{K}$; actual, and short-term and long-term trends

While the Fed series is monthly, the BEA data are annual. This is a serious disadvantage for the analysis of cyclical patterns and there may also be other reasons to prefer the Fed data. Heterodox models usually assume a fixed coefficient production function and a constant rate of depreciation. If these assumptions are satisfied, indicators of production capacity (the Fed data) and capital stock (BEA) will coincide, if correctly measured. If the assumptions are relaxed, however, the two indicators can deviate, and the economic argument behind the standard investment functions concerns the desired increase in capacity. For some purposes, at least, the Fed data therefore may be preferable on theoretical grounds (as well as because of their high frequency).

The BEA series is based on the end-of-year capital stock, and we calculate its annual changes in year n as the percent difference between values in years n and $n-1$. To determine annual changes using the Fed series, we calculate the rate of change in year n as

[9] See the manufacturing industry entry in BEA Table 4.2 of non-residential fixed assets: http://www.bea.gov/national/FA2004/

[10] See http://www.federalreserve.gov/releases/G17/caputl.htm.

[11] Corrado and Mattey (1997) describe how the Federal Reserve capacity series is constructed. See also Shapiro (1989).

the percent difference between December values in years n and $n-1$. Figure 4 shows actual annual rates of change for the Fed and BEA series, as well as their smoothed, long-term trends. For the long-term trends of these annual data, we use a smoothing parameter of 1000, which results in long-term annual rates of change similar to the long-term annual rates of change from quarterly data.[12]

Over 1948-2008, the annual Fed-based rate of capacity changes average about 3.5%, whereas the annual BEA accumulation rates average 2.7%. The two annual series generally move together, with a correlation coefficient of 0.74, indicating some support for using fixed-coefficient production functions. Significant differences between the series occur in 1949-1950 and 1958-1960, when the Fed series exceed the BEA series by about 2-3 percentage points, and in 1996-1999, when the gap is about 3-5 percentage points. In 1974, the BEA series is more than 2 percentage points larger than the Fed series. Since 1982, the Fed-based measure has exceeded that for the BEA, a trend consistent with increasing reliance on computer-based technology. For example, the the large relative run-up in the Fed-series in the 1990s may be viewed in terms of firms realizing productivity gains from computer equipment. The BEA series may show small increases in the capital stock because prices for computers, relative to other machinery, fell dramatically over that period.

FIGURE 4 - Annual Fed-based and BEA-based $\hat{K}$; actual and long-term trend

3.4 Employment rates

We measure the employment rate e as one minus the seasonally adjusted unemployment rate from the Bureau of Labor Statistics (BLS) Current Population Survey (CPS).[13] This economy-wide definition of the employment rate hides all regional, sectoral and skill-specific differences in labor market conditions. The implied BLS measure of movements in the total labor force is in line with common simplifying assumptions of a constant growth rate in the labor force, but the definition avoids complications from historical shifts in the US employment-to-population ratio that may have been endogenous (for example due to female labor market entry).

As shown in Figure 5, the employment rate peaked at more than 97 percent in the early 1950s and dropped to less than 90 percent during 1982-1983. Over 1948-2008, however, it rarely escaped the 92-96 percent range. In a comparison of US-Census-based and BLS Current Population Survey-based employment rates, Schmitt and Baker (2006) noted that the BLS may increasingly be understating the unemployment rate around the order of several tenths of a percentage point. We ignore this complication, although accounting for it would slightly lower the most recent end of the long-term employment trend.

[12] Using the same long-term smoothing parameter we used for quarterly data on the annual data would result in an approximately linear long-term series.

[13] See http://stats.bls.gov/data/.

FIGURE 5 - US quarterly employment rate e; actual, and short-term and long-term trends

3.5 Trends

The considerable short-term variation in the utilization series may overshadow relatively modest long-term movements. Figure 6 graphs the percentage-point difference between the mean and long-run Hodrick-Prescott values for the profit share, utilization rate, employment rate and the annual accumulation rate. The span between maximum and minimum long-run differences from the mean of the employment rate is modest at 2.7 percentage points. The span of deviations from the mean is similar for both profit shares and utilization rates, 4.4 percentage points for the profit share and 5.7 percentage points for utilization. But the mean values are different and the relative long-term variation for the profit share is much larger than for the utilization rate: the span between the maximum and minimum of the proportional deviation from the mean is 2.8 percentage points for the employment rate, 7.0 percentage points for the utilization rate, and 15.6 percentage points for the profit share. Annual Fed-based accumulation rates average about 3.6 percent, and the span of absolute differences from this mean is about 2.0 percentage points (corresponding to a span of proportional differences of 53.1 percentage points).

FIGURE 6 - Difference between the US mean and long-run trend, for utilization, employment, profit shares, and quarterly accumulation rate

4 Bivariate cyclical patterns

4.1 Employment - profitability

Figure 7 contains two time-connected scatterplots of US employment rates and profit shares. Dots in the top panel are actual quarterly observations in the (e, π)-plane. The bottom panel is a slightly smoothed version using the short-run HP trend described above. Each first-quarter observation is dated with its year. Line segments between the quarterly observations merely help to illustrate the time orientation.

FIGURE 7 - US actual and smoothed (e, π)-plane cycles

The clockwise loops follow National Bureau of Economic Research (NBER) business cycles.[14] The cycles are most easily distinguished in the bottom panel containing smoothed data, and this panel also shows the long-run variation discussed in the previous subsection. Until the early 1970s the center of the loops shifted vertically as the profit share fell while

[14] See http://www.nber.org/cycles.html.

employment remained above 93 percent. The leftward shift towards higher unemployment over the 1970s and 1980s occurred while the profit share remained below 30 percent. The 1980s began a shift in e and π to the northeast, towards greater employment rates and higher profit shares.

The salient clockwise cycles in the smoothed data are not an artifact of the filtering process. In the actual quarterly data, the profit share moves procyclically: the correlation between it and the employment rate is 0.51, but the correlation between the lags of the profit share and the current employment rate is stronger (for instance, a two year lag of π has a 0.66 correlation with e). Oscillations in one of these variables therefore necessarily produce clockwise cycles in the (e, π)-plane.

Figure 8 - Deviation of US employment and profit shares from their long term trends in the (e, π)-plane.

To get a clearer picture of the cyclical element, we follow the approach of Mohun and Veneziani (2008, 2009) and examine the deviations of the actual quarterly observations of (e, π) from their long-run trend. This approach may be appropriate in particular if the long-term variation in employment, profit shares, and utilization reflect structural or institutional shifts in the economy (e.g., changes in the bargaining power of workers through a rise or fall in unionization) that are unrelated to the short cycles.

Figure 8 displays the deviations. The separate panels correspond to NBER-dated peak-to-peak business cycles, but we include observations from one year after the second peak to account for (e, π) cycles that 'complete' after the NBER cycle has ended – for example, the cycle in the 1960s. All of the deviation-based cycles are qualitatively well-structured and clockwise-oriented, except for the short cycle starting around the beginning of the 1980q1 recession.

4.2 Employment - utilization and utilization - profitability cycles

Similar clockwise cycles exist in the (e, u)- and (u, π)-planes, as displayed in Figures 9 and 10. The amplitudes of the fluctuations (like the period length) differ across cycles, and there are significant differences in the average amplitude of the variables. The employment rate and profit shares typically vary by less than 6 percentage points over a cycle, whereas utilization varies by up to 15-20 percentage points.

Figure 9 - Deviation of US employment and utilization from their long term trends in the (e, u)-plane.

Figure 10 - Deviation of US utilization and profit shares from their long term trends in the (u, π)-plane.

4.3 Other patterns

Visibly regular cycles are also present when considering output growth $\hat{Y}$. To calculate output growth, we use the quarterly growth rate of real net (of depreciation) value added for the corporate business sector. Since BEA does not publish real output or a deflator for the overall corporate sector, to adjust for inflation, we use the deflator implied by the BEA series on real and nominal output of the nonfinancial business sector.[15] This measure of quarterly real output growth averaged 0.9 percent over 1948-2008, varying widely until the 1960s, after which it mostly remained within the range of -2 to 4 percent. Clockwise rotations appear in $(e, \hat{Y})$-, $(\pi, \hat{Y})$-, and $(u, \hat{Y})$-planes for the slightly- smoothed, short-term trends for these variables (see Figure 11). Cycles, finally, seem to exist with quarterly Fed accumulation rates $\hat{K}$ plotted against employment, profit shares, and utilization, but their orientations are not as consistent (Figure 12).

Figure 11 - Smoothed cycles in the $(e, \hat{Y})$-, $(\pi, \hat{Y})$-, and $(u, \hat{Y})$-planes.

Figure 12 - Smoothed cycles in the $(e, \hat{K})$-, $(\pi, \hat{K})$-, and $(u, \hat{K})$-planes.

4.4 Robustness

The cycles are robust to modifications of the underlying data. For example, cycles exist regardless of choosing either the Fed's manufacturing or the total industry utilization series. Data variations like these result in only trivial differences because of the high correlation between the alternative and original data series. Using either the BEA-based and or Fed-based annual accumulation series produces similarly- oriented cycles. The existence of cycles is not altered by defining the numerator of the profit share – the surplus – to be inclusive or net of taxes on production or corporate profits, as well as including or omitting these taxes in the denominator of the profit share. As noted above, this is likely due to the high correlation between the profit share series.

We also examined the implications of changing the method for constructing utilization data by looking at output deviations from a smoothed output series. Taking the ratio of corporate value added to its Hodrick-Prescott long-run trend yields a utilization series u' that is qualitatively different than the Fed series u. While the two series still track each other, the output-based u' contains different variation: the correlation coefficient for u and u' is 0.63, as opposed to 0.99 between the Fed's two series. While using the output based-series u' may yield different results for a more detailed econometric study, similar cycles emerge in (u, π)- and (u', π)-planes. Figure 13 illustrates these cycles using the short-term, slightly smoothed series.

FIGURE 13 - Smoothed cycles in Fed-based (u, π)- and output-based (u', π)-planes.

[15] See NIPA Table 1.14, lines 19 and 42.

4.5 Other countries

The existence of cycles in profit, employment, and utilization spaces are not peculiar to the US economy. As Harvie (2000), Mohun and Veneziani (2009), and others have observed, European economies can exhibit profit-share/employment rate cycles. Using quarterly OECD data, we confirm the existence of cycles using utilization rates as well. With one exception, we limited our sample to those countries in the OECD.Stat Database[16] with at least two decades of consecutive quarterly surplus, employment, and utilization data: the US, Belgium, Canada, Great Britain, France, Italy, the Netherlands, and Spain. The exception is Japan which was included because of its size and importance, and for which the OECD has employment and utilization series but no quarterly surplus data.[17] Data availability causes the sample period to vary by country, but in general the sample covers the 1980s into the 2000s.

FIGURE 14 - Quarterly e, π, u for OECD countries

Figure 14 shows actual quarterly employment, profit share, and utilization series for the sample countries.[18] Utilization rates largely fluctuate around 80%, with Japan's utilization being much higher in the late 1960s and early 1970s. The highest country average is France's at 84.4%, and the lowest average is Italy's at 75.9%. Profit shares oscillate between one-quarter and one-third for most countries, except for Italy and Spain, where shares average about 42.7% and 44.9%, respectively. There is considerable variation among countries' employment rates. Japan's employment rate was the highest in most of the period but fell below the US and the Netherlands in the mid-to-late 1990s. Spain's employment rate is usually the lowest and the most volatile, at extremes fluctuating more than 4 percentage points from its long-term trend.

Cycles for these countries are generally present but not as cleanly observed as in the US data. This is not surprising. Smaller countries are much more affected by foreign trade, and most of the countries have public sectors that are substantially larger than in the US. Hence, cyclical patterns that arise from the private-sector interaction between accumulation, output and pricing decisions will not have the same regularity in these countries.

Figures 15-20 depict the patterns for two countries, France and Spain. Figure 15 contains deviations of (u, π) from its long-term trend in France. For the sample time

[16] http://stats.oecd.org

[17] For all countries, utilization rates are for the manufacturing sector, except in the cases of Canada and Japan, which report total industrial utilization. All rates are capacity utilization rates (measured 0% to 100%), except in the case of Japan, which reports a utilization index with a base year of 2005. To convert Japan's index to a rate comparable to other countries' rates, we arbitrarily assume that the 2005 capacity utilization rate value for Japan is 80.0%.

[18] There are cross-country correlations between the business cycles and utilization rates sometime track each other across countries and sometimes not – for example, Great Britain's series correlates well with the US but not with France.

period, France's clockwise cycles in (u, π) correspond well to the country's first three business cycles.[19] Arguably there is no well-defined cycle present for the 1998q2-2000q4 peak-to-peak, and a relatively rough clockwise cycle appears for the 2000q4-2008q1 cycle. Similarly, figures 16 and 17 show for France that clockwise cycles usually, but not always, exist in (e, π)- and (e, u)-planes.

FIGURE 15 - Deviation of utilization and profit shares in France from their long term trends in the (u, π)-plane

FIGURE 16 - Deviation of employment and profit shares in France from their long term trends in the (e, π)-plane

Figure 17 - Deviation of employment and utilization in France from their long term trends in the (e, u)-plane

Spain exhibits clear clockwise (u, π) cycles in the 1983q4-1989q2 and 1991q4-1995q1 peak-to-peak business cycles. Less clear are whether there exist (u, π) cycles during the 1979q3-1983q4 and 1991q4-1995q1 business cycles. The 1995q1-1998q2 period exhibits a clear counter-clockwise cycle. Within the 1998q2-2008q1 cycle, there appear to be two cycles, the first counter-clockwise and the second clockwise. Figures 19 and 20 show mixed results for clockwise cycles in the (e, π)- and (e, u)-planes.

FIGURE 18 - Deviation of utilization and profit shares in Spain from their long term trends in the (u, π)-plane

FIGURE 19 - Deviation of employment and profit shares in Spain from their long term trends in the (e, π)-plane

Figure 20 - Deviation of employment and utilization in Spain from their long term trends in the (e, u)-plane

Profit shares are unavailable for Japan, but cycles can be observed in employment and utilization. Figure 21 displays deviations from long-term trends in the (e, u)-plane. Japan's cycles are mostly well-defined and clockwise oriented over most of the eight business cycles during the 1970-2008 sample period. The only exception is the last 2004q2-2008q2 peak-to-peak business cycle, where no (e, u)-cycle seems apparent. Interestingly, while Japan

[19] Business cycle turning points for OECD countries can be found at http://www.oecd.org/document/29/0,3343,en_2649_34349_35725597_1_1_1_1,00.html

is widely recognized to have suffered a liquidity-trap or at least a slump since the 1990s, sufficient volatility in the economy exists to generate (e, u) cycles.[20]

Figure 21 - Deviation of employment and utilization in Japan from their long term trends in the (e, u)-plane

5 Conclusion

The US economy since the second world war may provide the best arena for an evaluation of different approaches within heterodox macro. The US is as close as one gets to a closed economy, the size of the public sector is relatively modest, and unlike Japan and many European economies, the US did not have large amounts of hidden unemployment in backward sectors for a good part of the post-war period. With respect to data, moreover, quarterly series are available for some of the key variables in heterodox models.

This paper describes stylized patterns in the data on employment, profitability, capacity utilization and accumulation. The patterns are quite clear and consistent in the case of the US economy, and many of them exist for other OECD countries too, but are generally not as clean and consistent. For the US we find that

- the US employment rate, the profit share and the utilization rate fluctuate around a mean of about 0.94, 0.81 and 0.28, respectively
- the long-term trends of the variables – as measured by Hodrick-Prescott filter – exhibit modest variation. The percentage point difference between maximum and minimum values of the HP trend is 2.7, 4.4. and 5.7 for employment, the profit share and the utilization rate, respectively. In proportional terms, the variation is largest for the profit share (15.6 percent) followed by utilization (7.0 percent) and employment (2.8 percent).
- short-term fluctuations are significant for all the variables but the amplitudes differ: typically less the 6 percentage points over a cycle for employment and the profit share and up to 15-20 percentage points for utilization. In proportional terms, the amplitude is similar for utilization and the profit share but much smaller for employment.
- there is strong evidence of clockwise short-term cycles in three bivariate spaces: (e, π), (e, u), and (u, π)
- clockwise short-run cycles exist for $(e, \hat{Y}), (\pi, \hat{Y})$ and $(u, \hat{Y})$ too, while the orientations of the cycles in the $(e, \hat{K}), (\pi, \hat{K})$ and $(u, \hat{K})$ spaces are less consistent.

[20] For different views on the reasons behind Japan's liquidity trap, see Krugman (1998) and Nakatani and Skott (2007).

- the short-term cycles are synchronized with the standard NBER dating of business cycles
- the cyclical patterns appear to be quite robust to changes in the precise definition and measurement of the variables.

The empirical analysis needs to go much further than a simple analysis of stylized patterns. But the presence of strong and consistent patterns can provide an input into the development and evaluation of economic theories. It is beyond the scope of this paper to discuss these issues. In a companion paper, Skott and Zipperer (2010a), we take a step in this direction by looking at the consistency of three post Keynesian benchmark models with the empirical evidence.

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Figures for Cyclical Patterns paper

February 27, 2010

FIGURE 1 - US quarterly profit shares π and π'; actual, and short-term and long-term trends

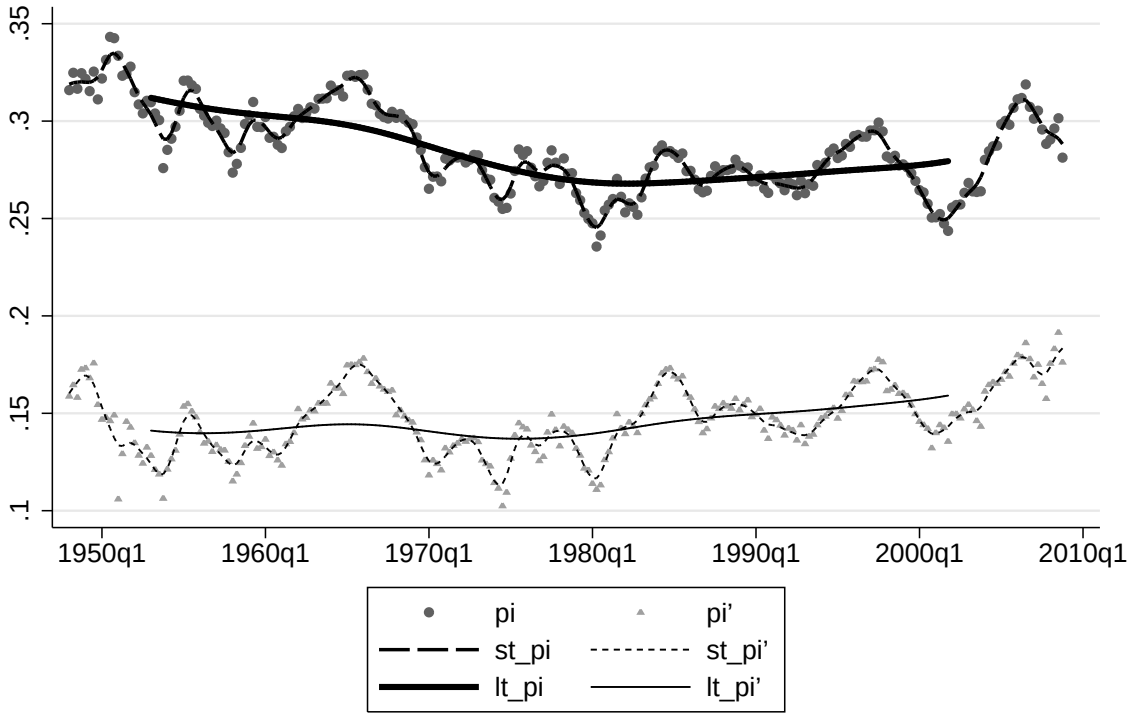


FIGURE 2 - US quarterly manufacturing utilization rate u; actual, and short-term and long-term trends

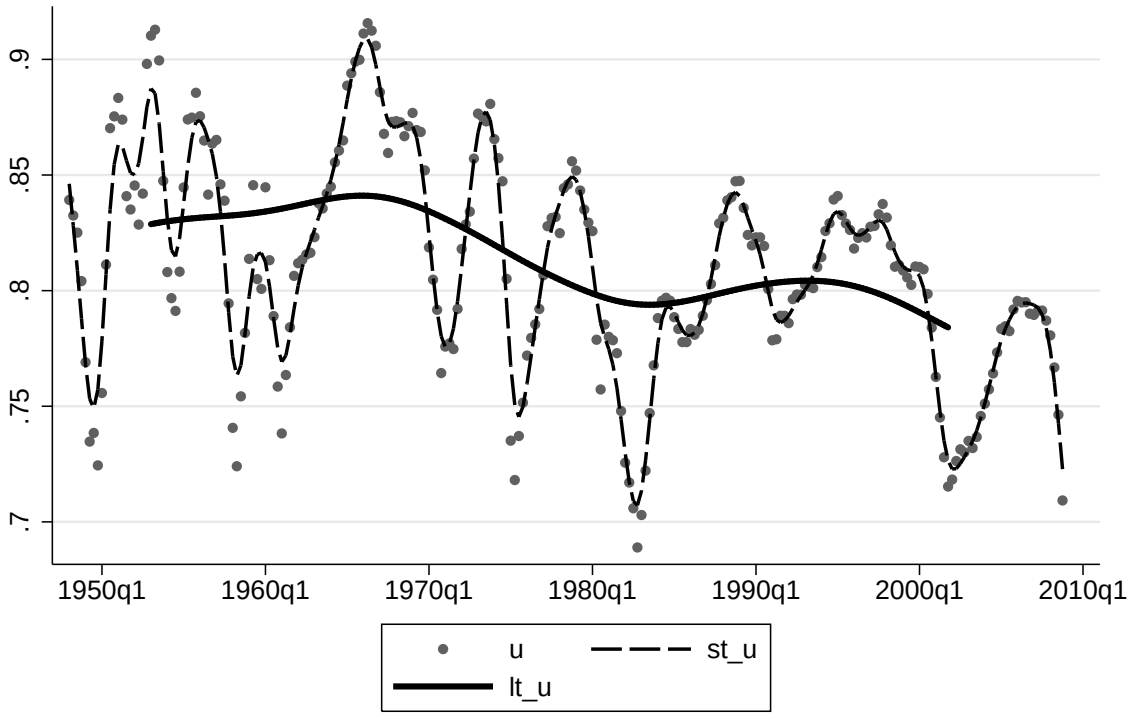


FIGURE 3 - Quarterly Fed-based $\hat{K}$; actual, and short-term and long-term trends

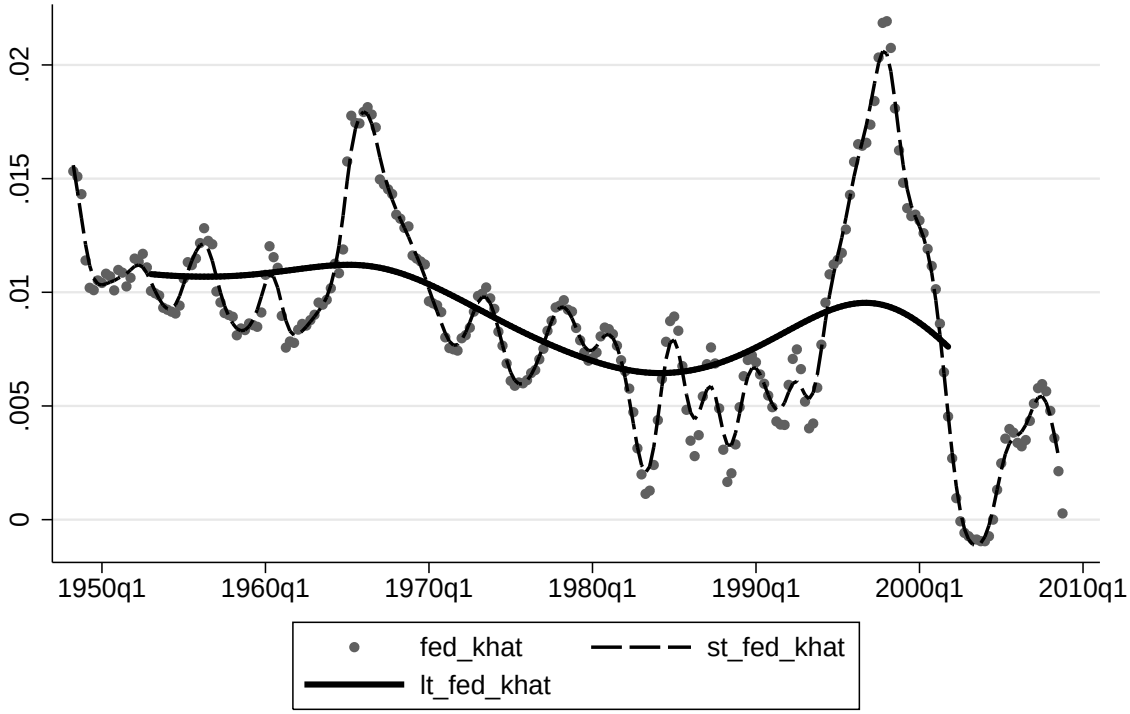


FIGURE 4 - Annual Fed-based and BEA-based $\hat{K}$; actual and long-term trend

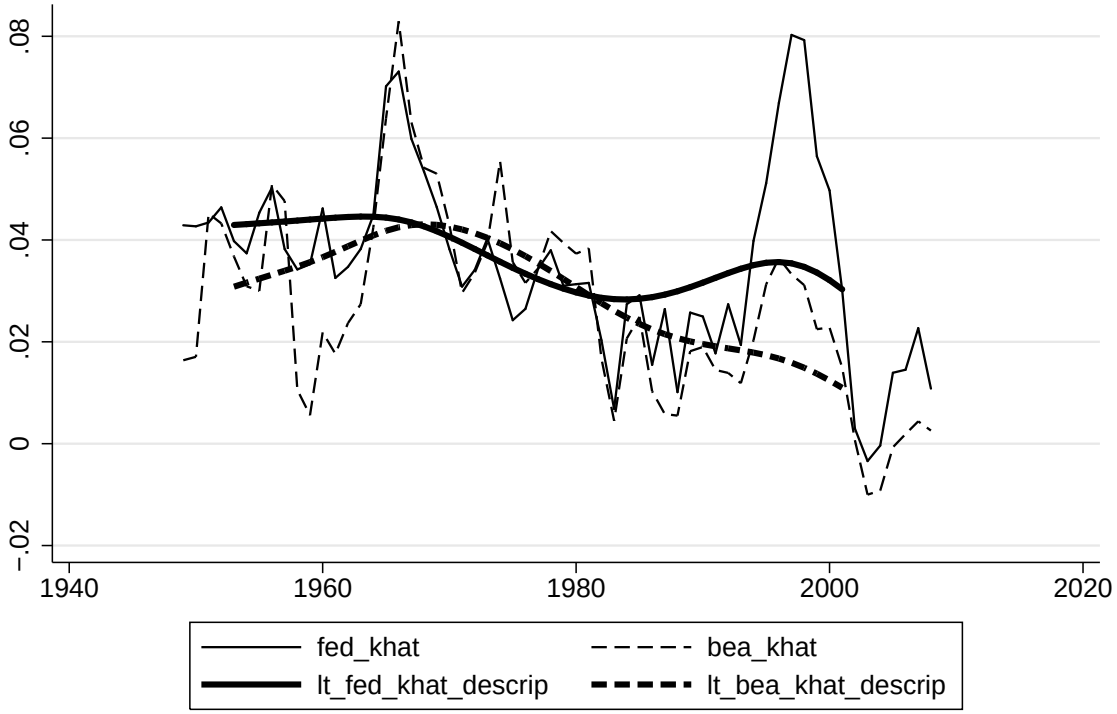


FIGURE 5 - US quarterly employment rate e; actual, and short-term and long-term trends

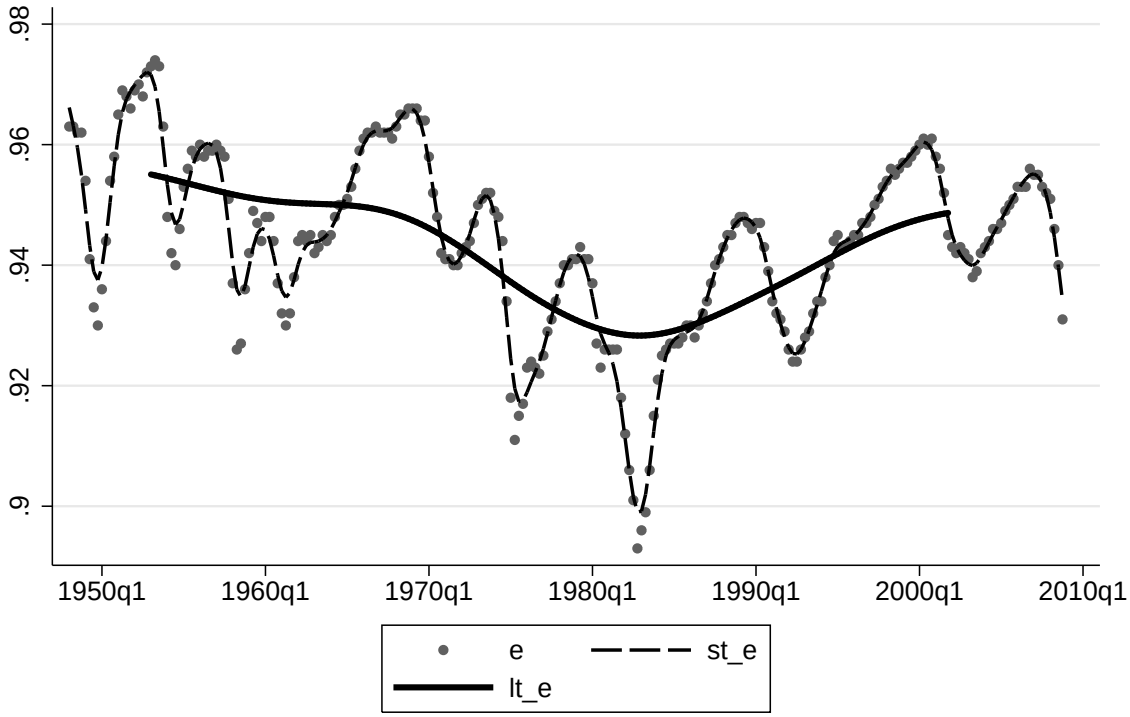


FIGURE 6 - Difference between the US mean and long-run trend, for utilization, employment, profit shares, and quarterly accumulation rate

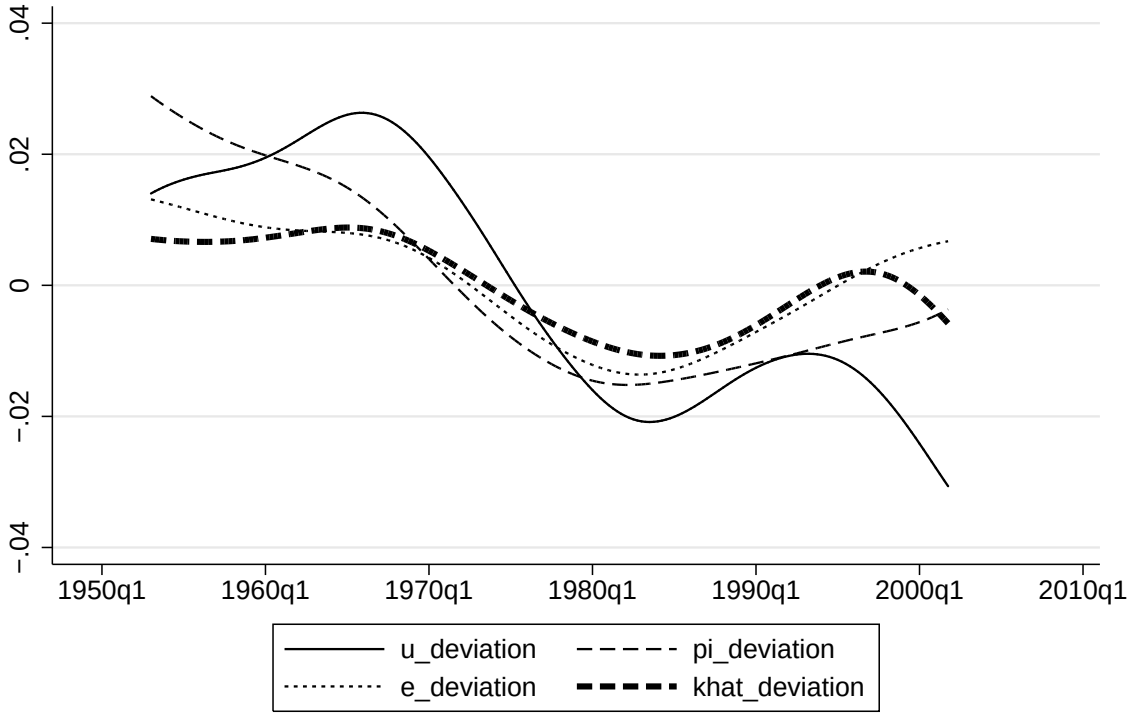


FIGURE 7 - US actual and smoothed (e, π)-plane cycles

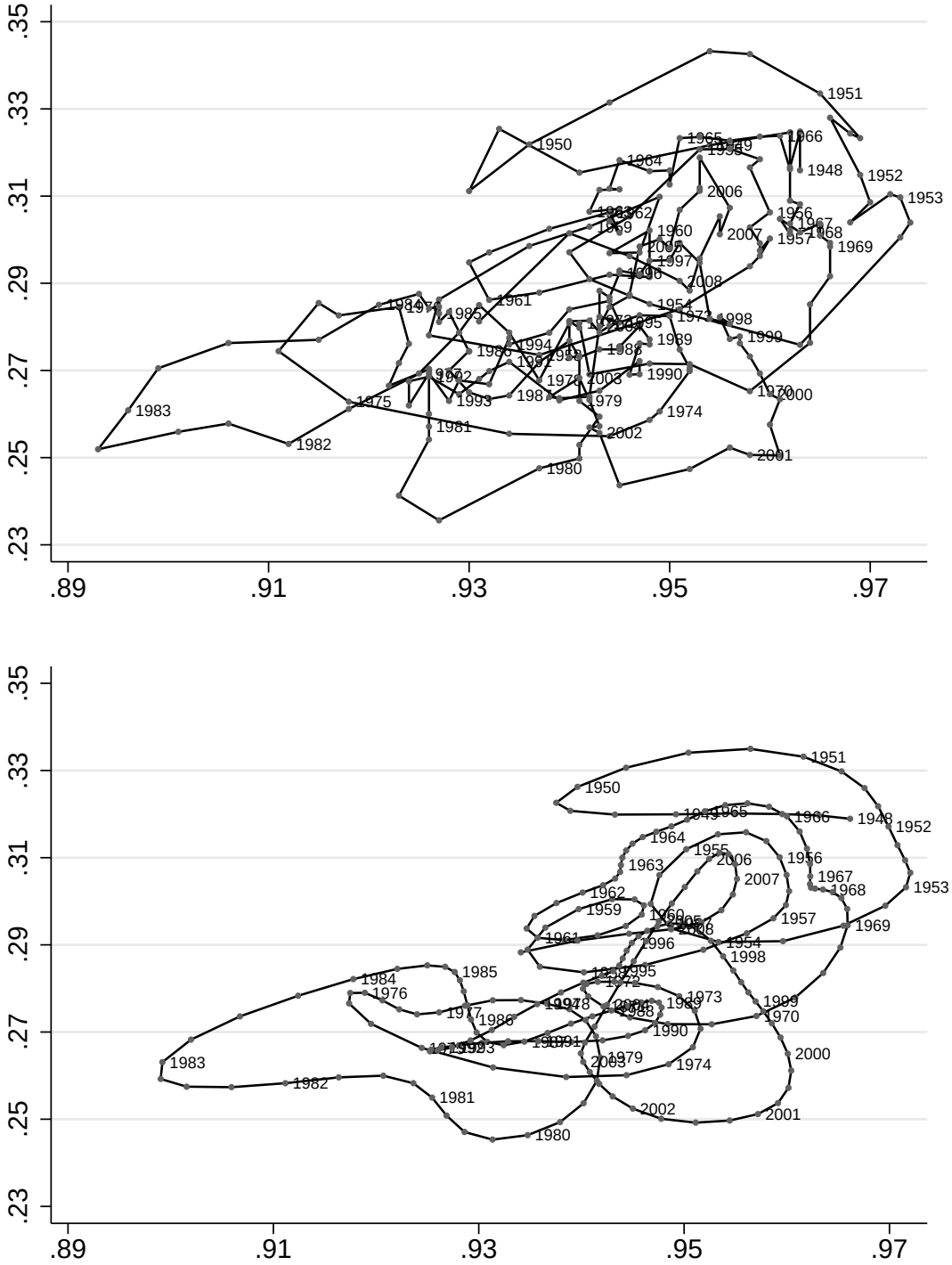
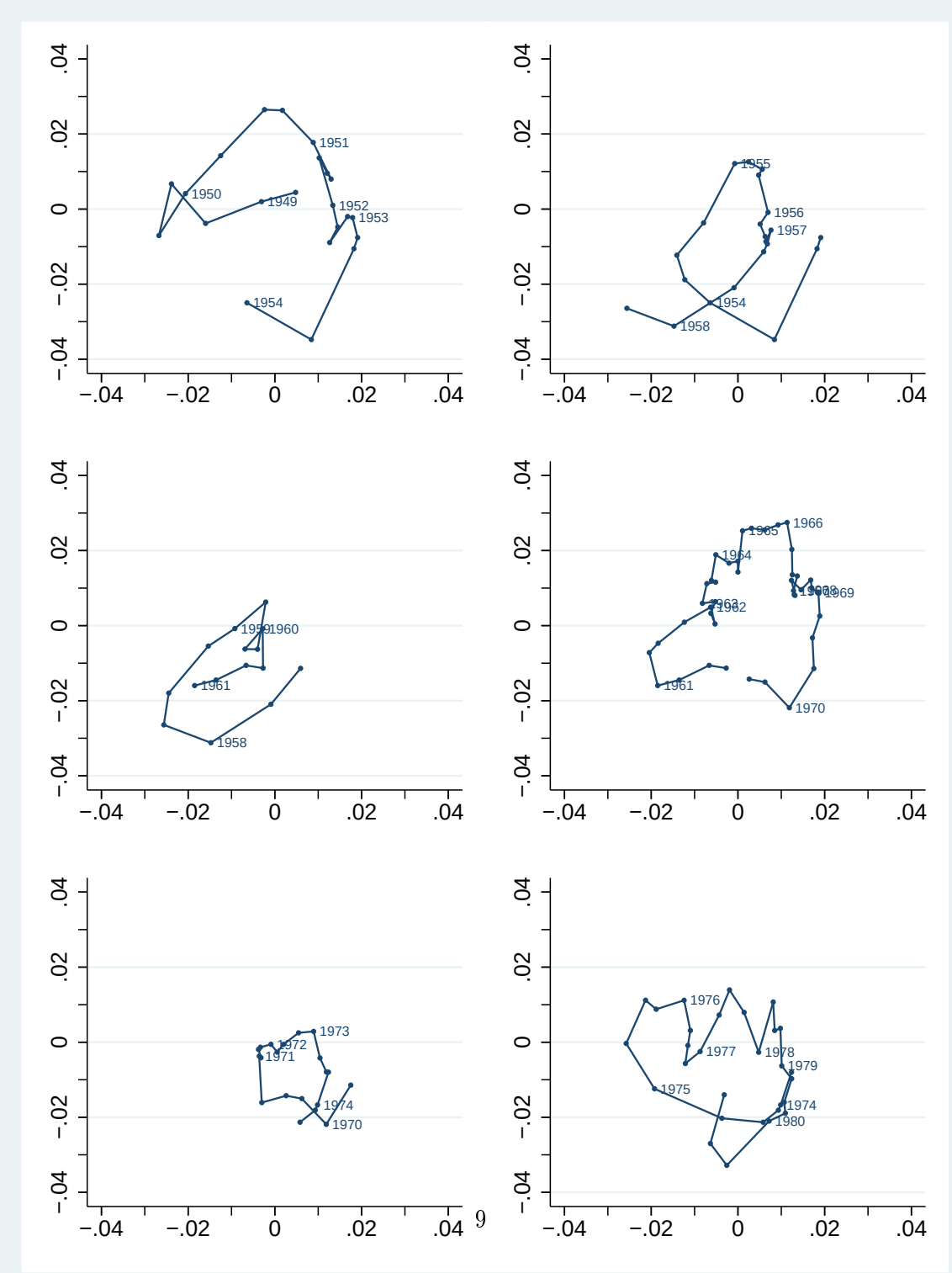


Figure 8 - Deviation of US employment and profit shares from their long term trends in the (e, π)-plane.



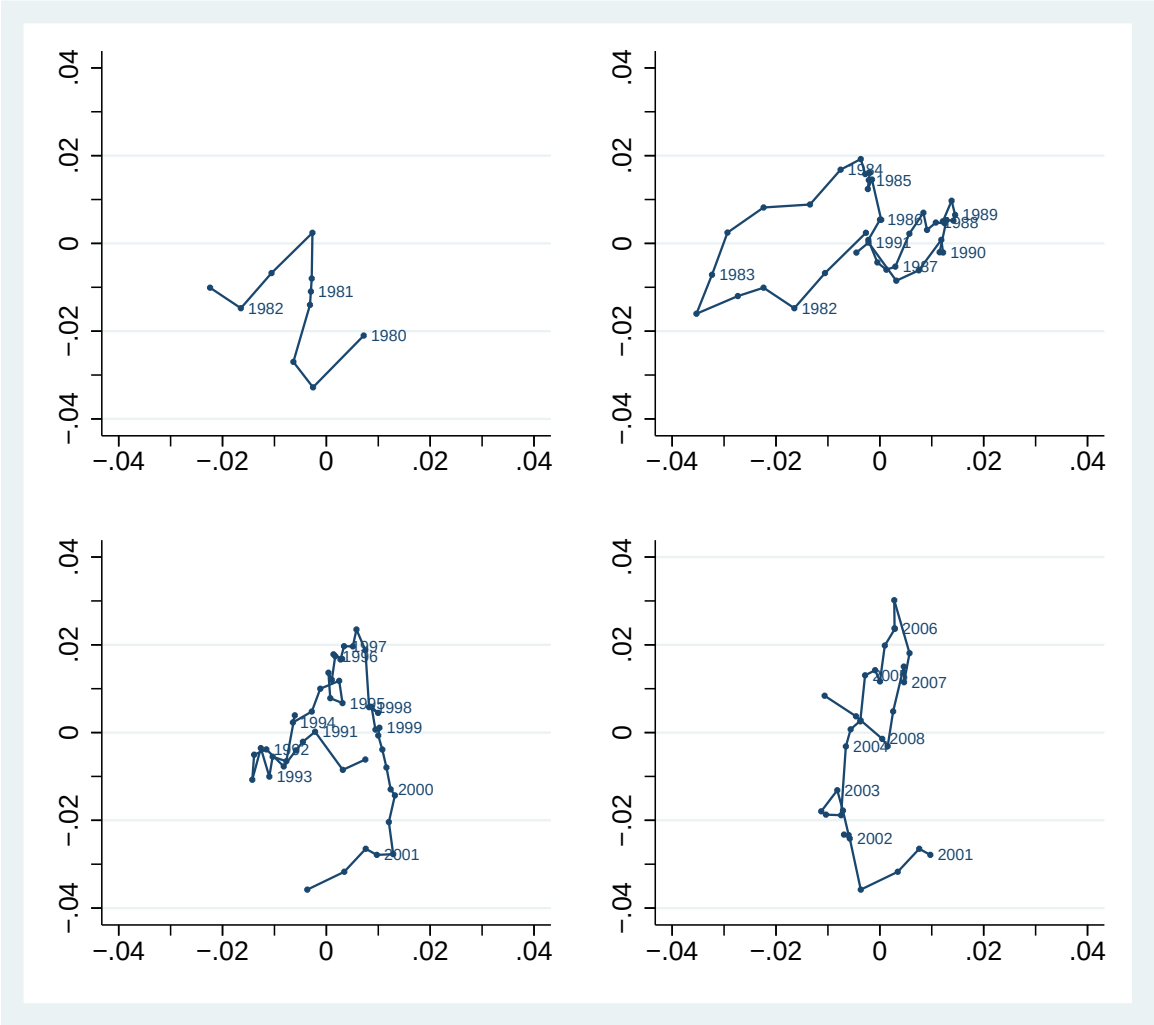

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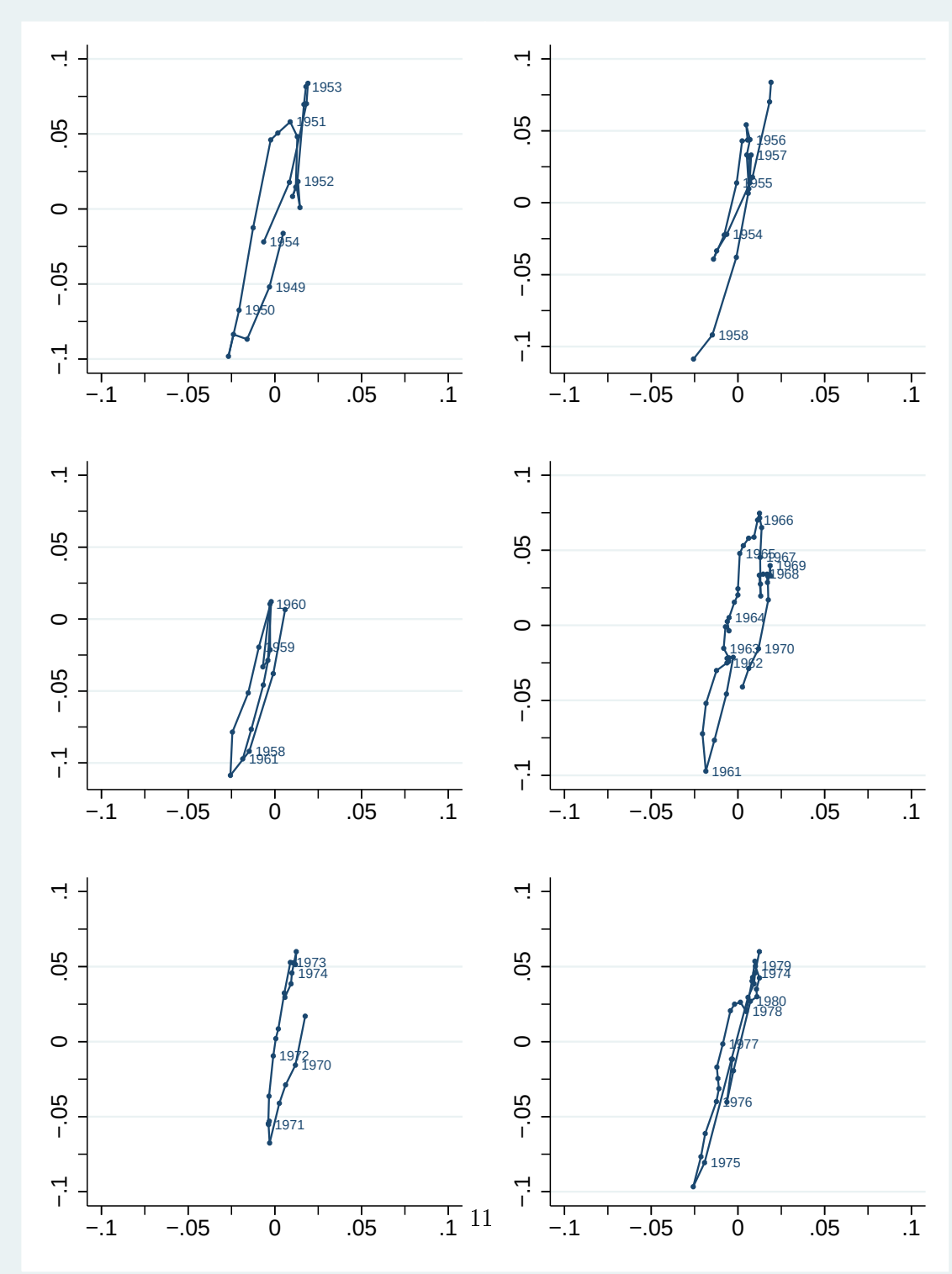
Figure 9 - Deviation of US employment and utilization from their long term trends in the (e, u)-plane.



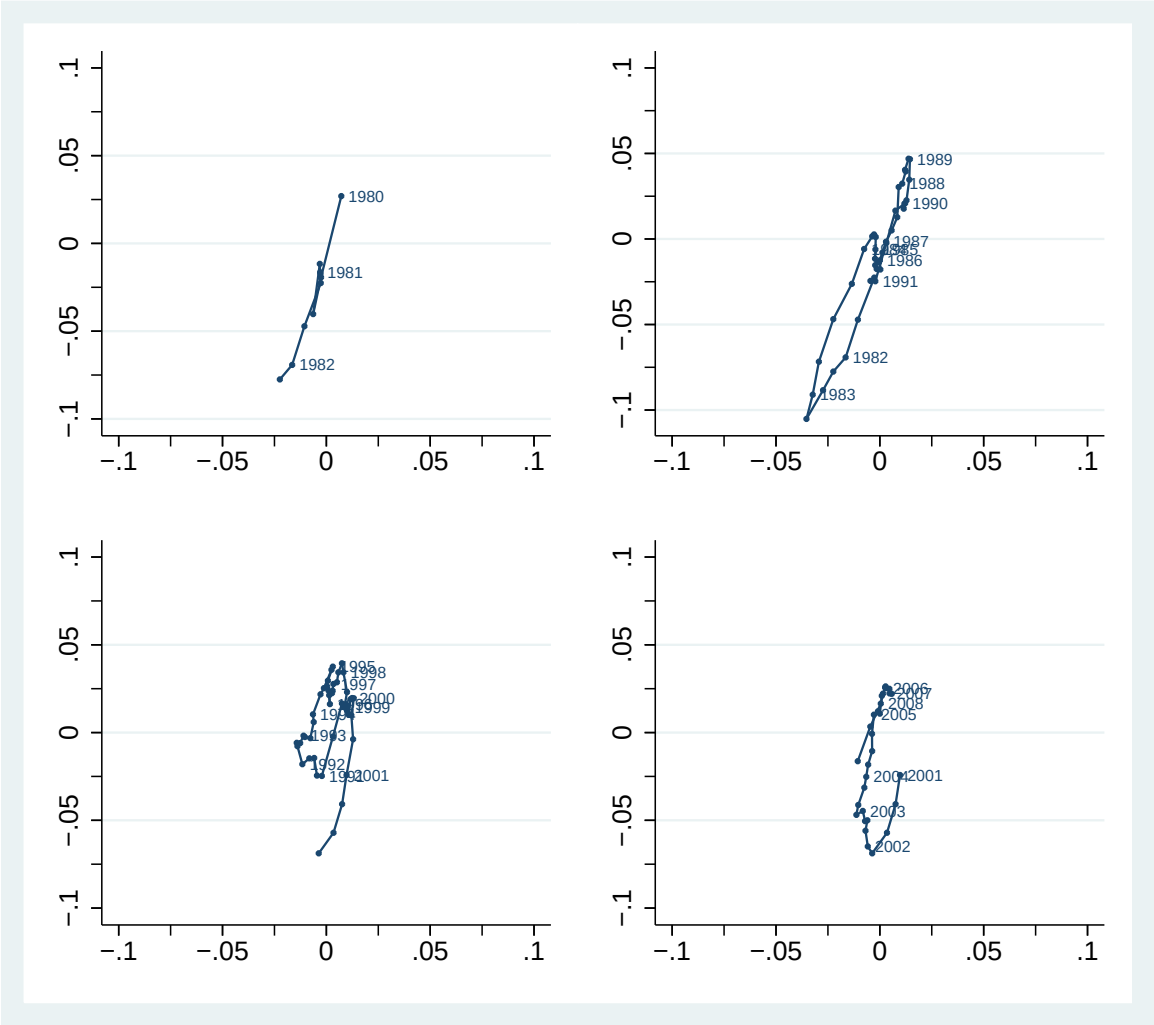

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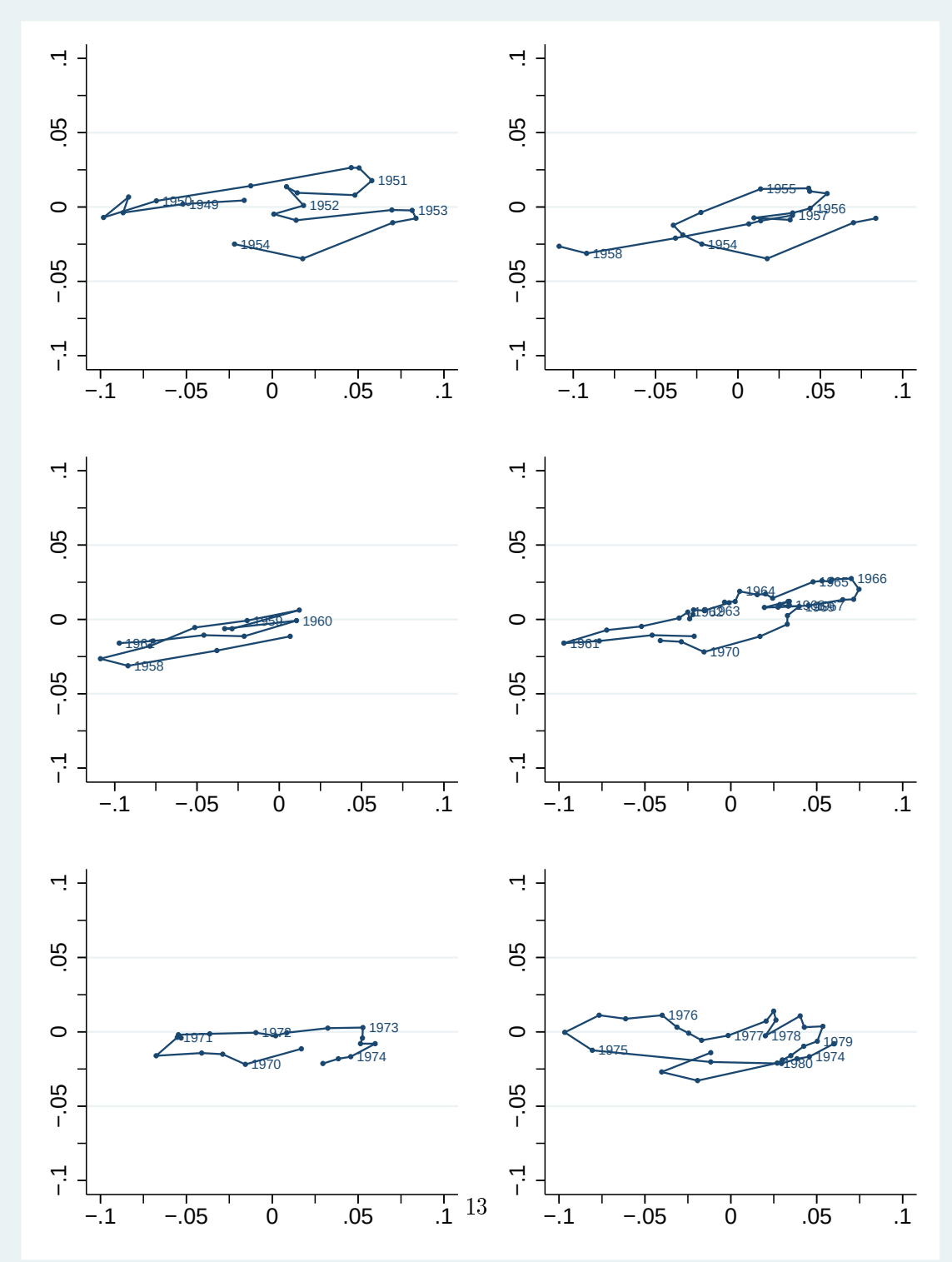
Figure 10 - Deviation of US utilization and profit shares from their long term trends in the (u, π)-plane.



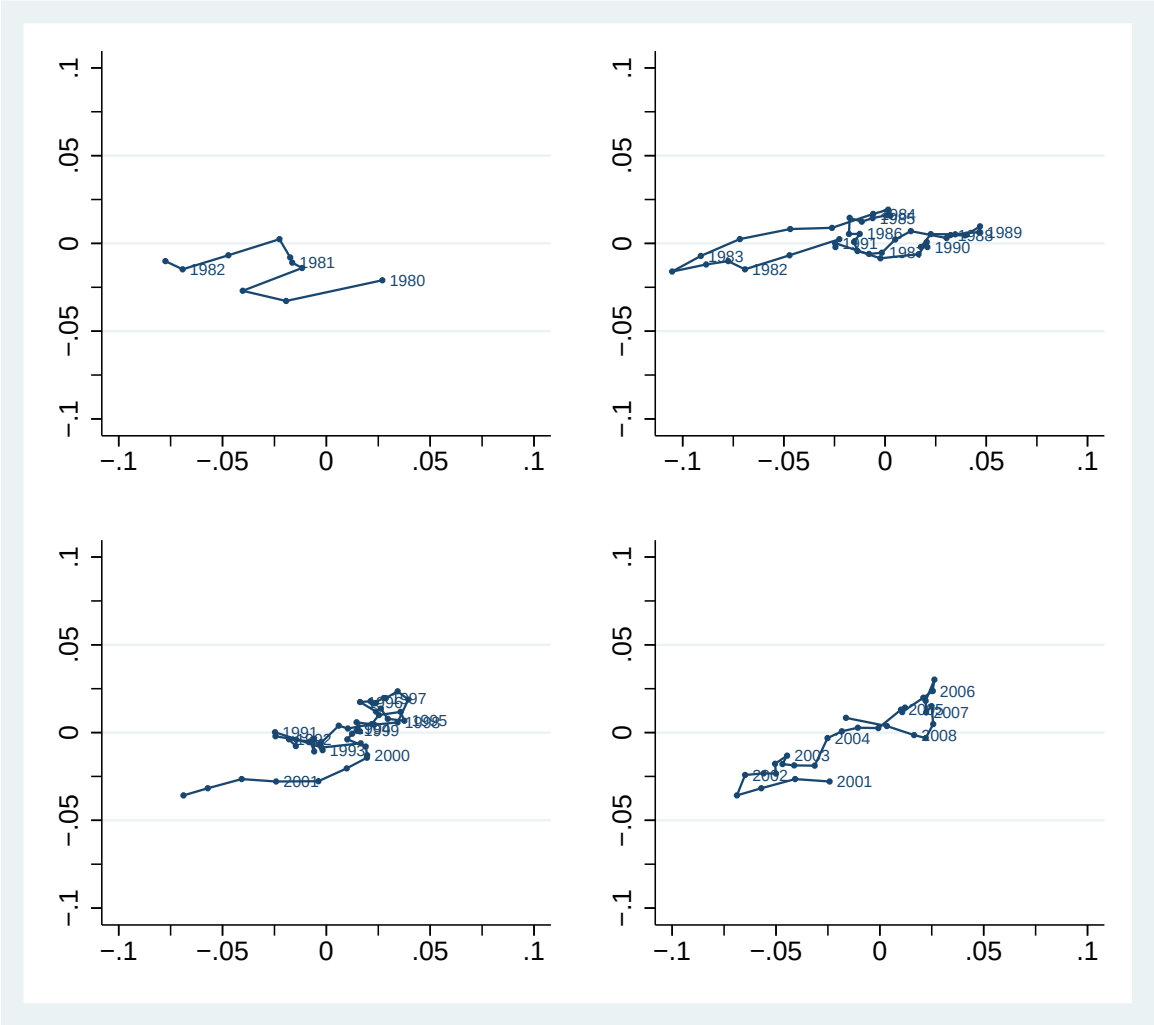


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Figure 11 - Smoothed cycles in the $(e, \hat{Y})$-, $(\pi, \hat{Y})$-, and $(u, \hat{Y})$-planes.

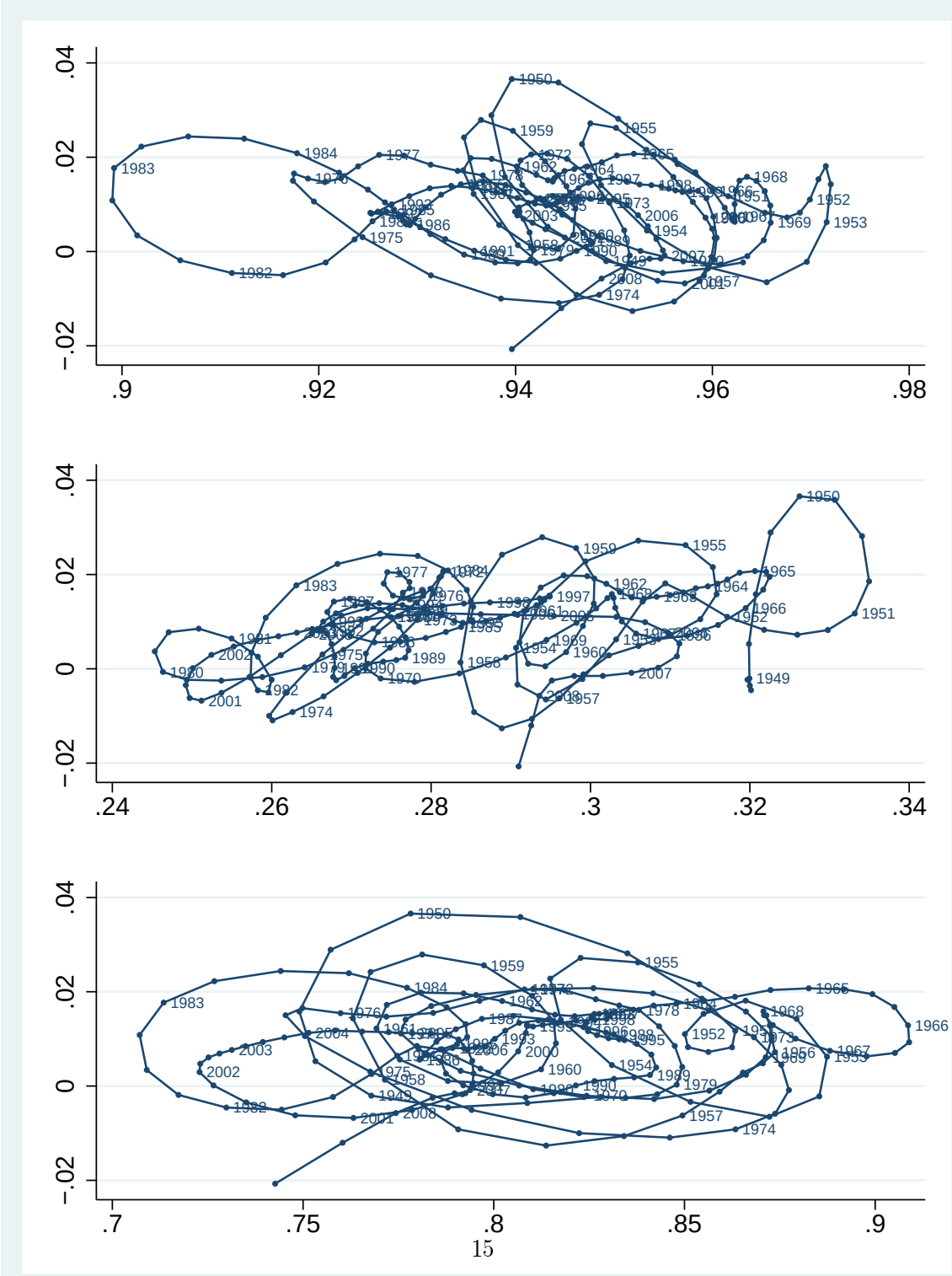


Figure 12 - Smoothed cycles in the $(e, \hat{K})$-, $(\pi, \hat{K})$-, and $(u, \hat{K})$-planes.

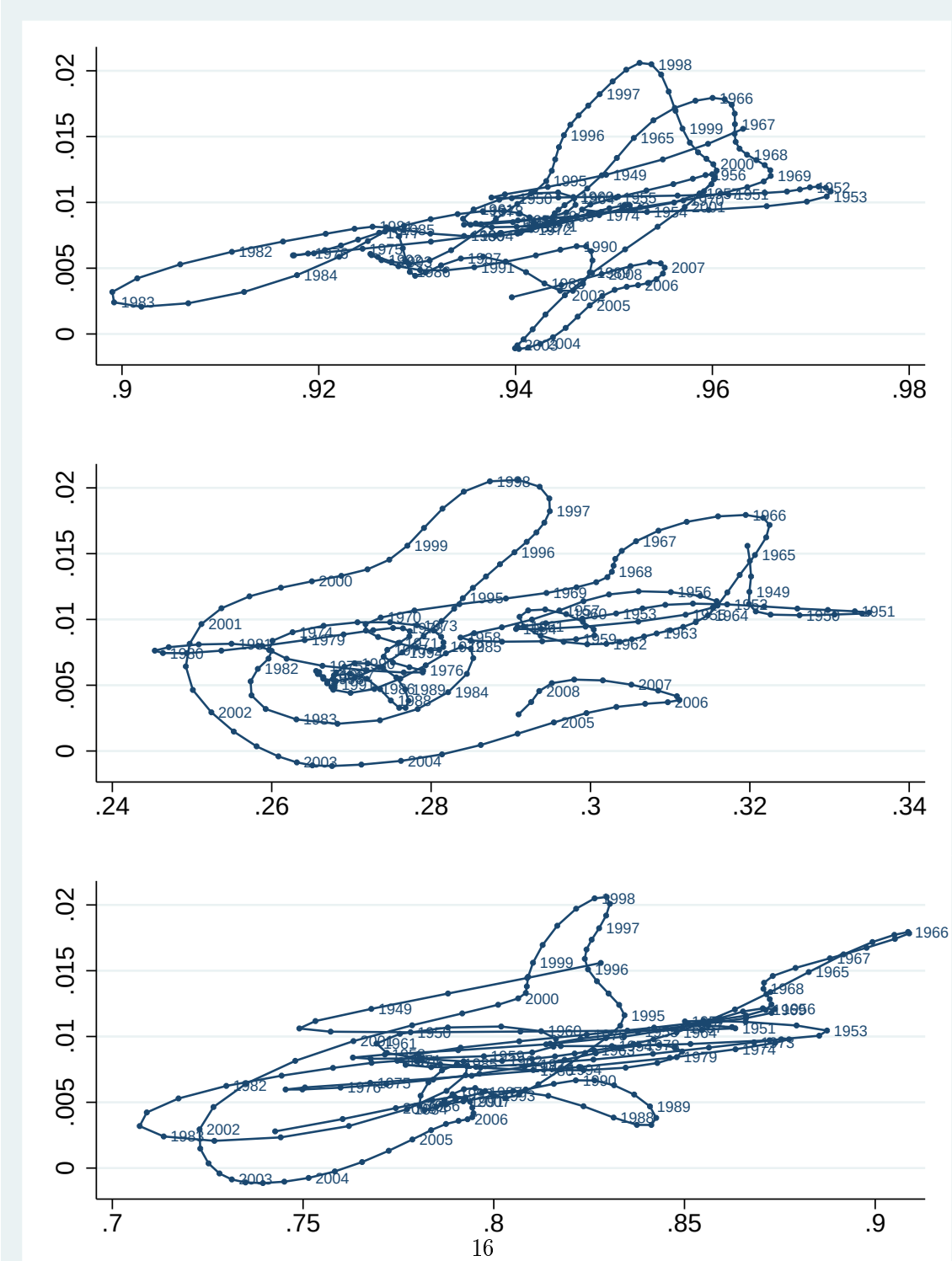


FIGURE 13 - Smoothed cycles in Fed-based (u, π)- and output-based (u', π)-planes.

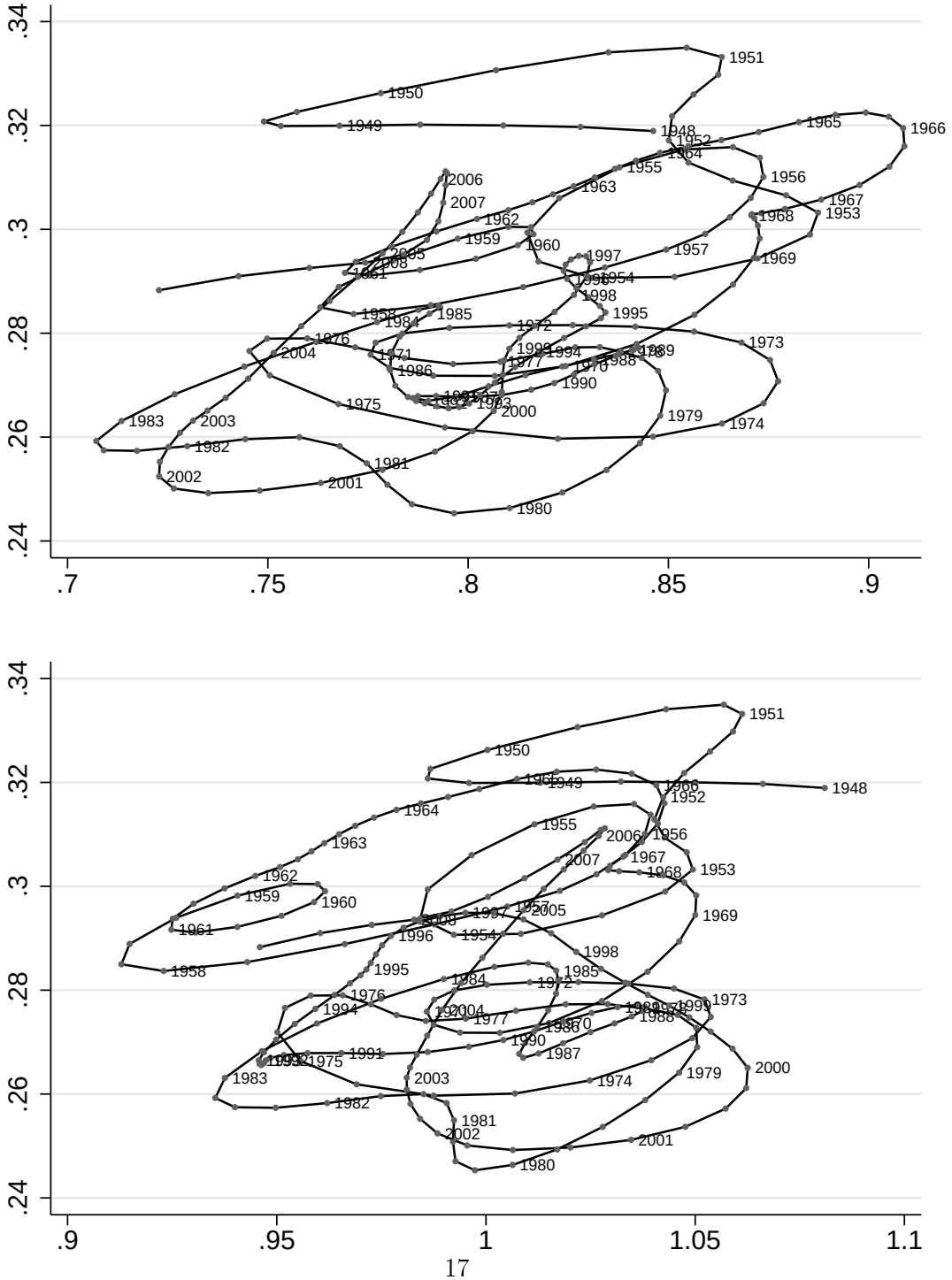


FIGURE 14 - Quarterly e, π, u for OECD countries

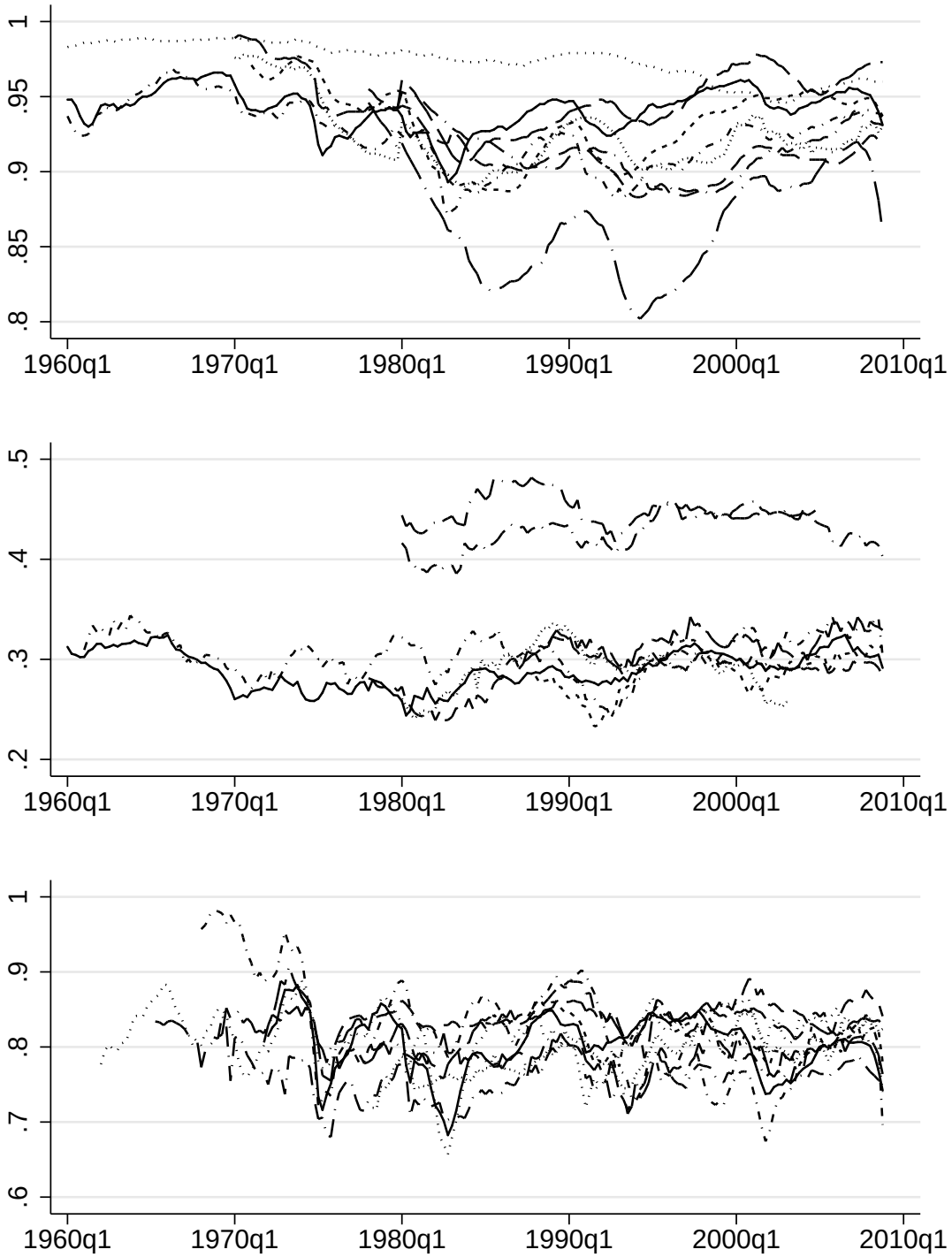


FIGURE 15 - Deviation of utilization and profit shares in France from their long term trends in the (u, π)-plane

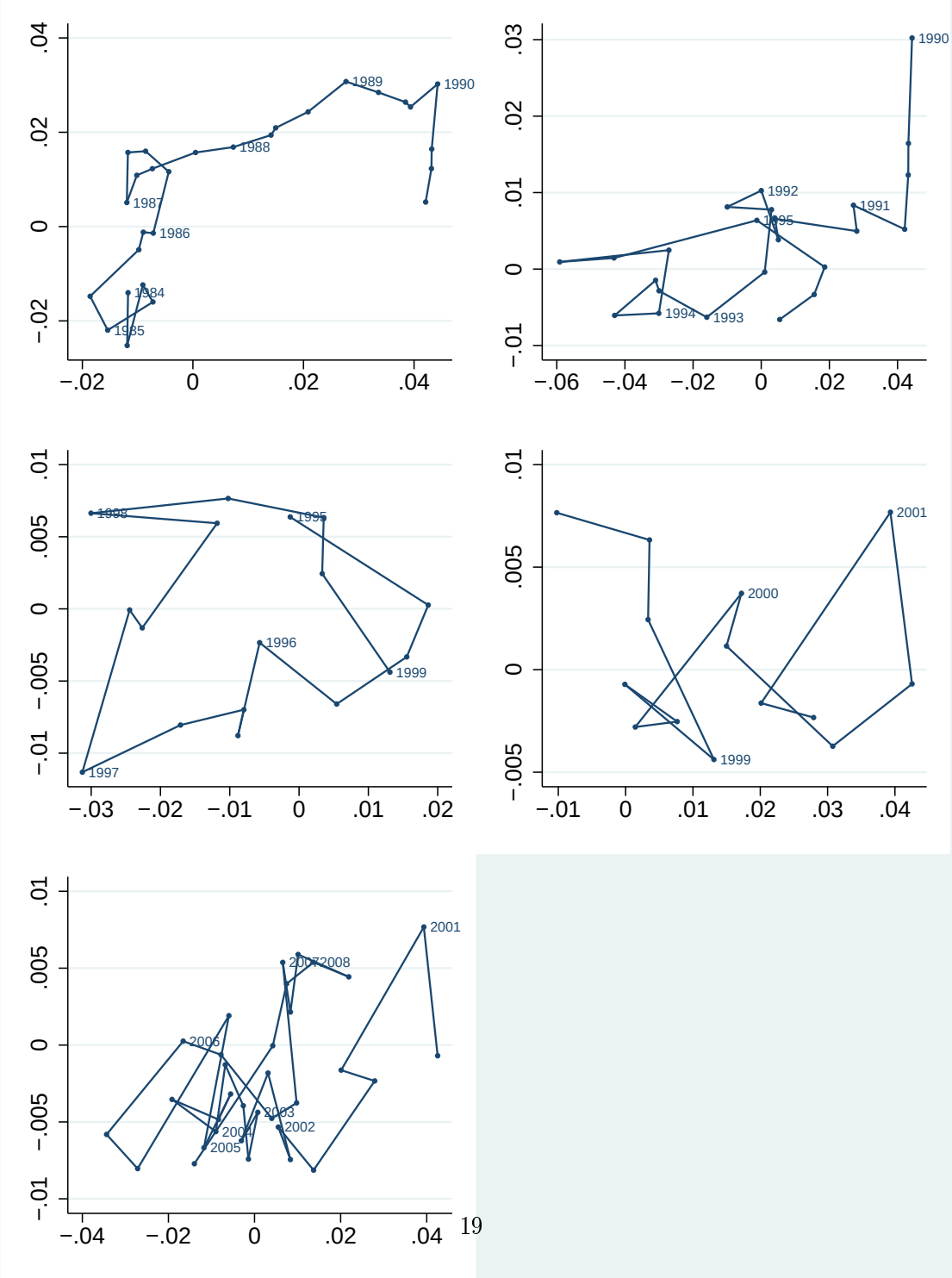


FIGURE 16 - Deviation of employment and profit shares in France from their long term trends in the (e, π)-plane

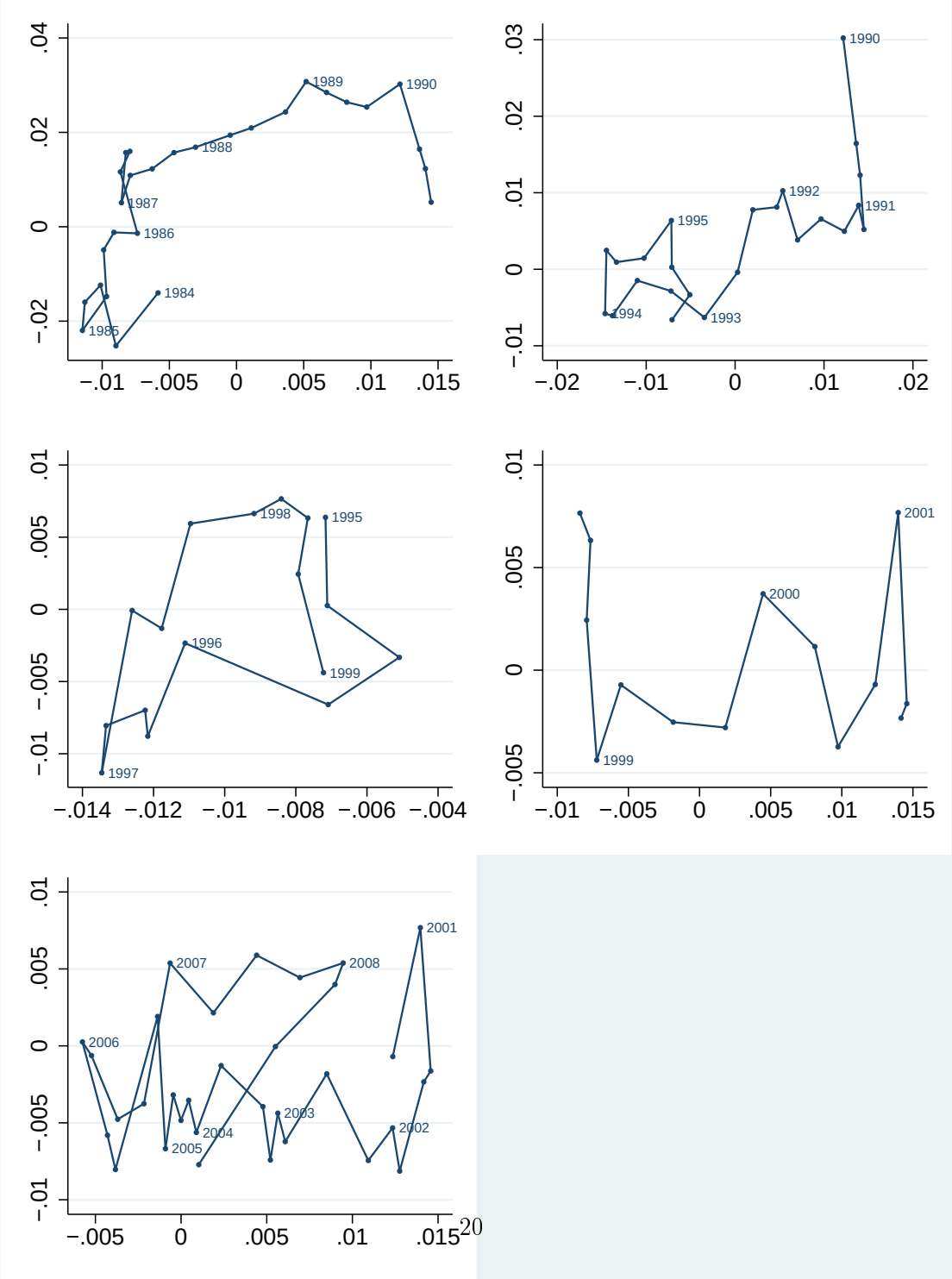


Figure 17 - Deviation of employment and utilization in France from their long term trends in the (e, u)-plane

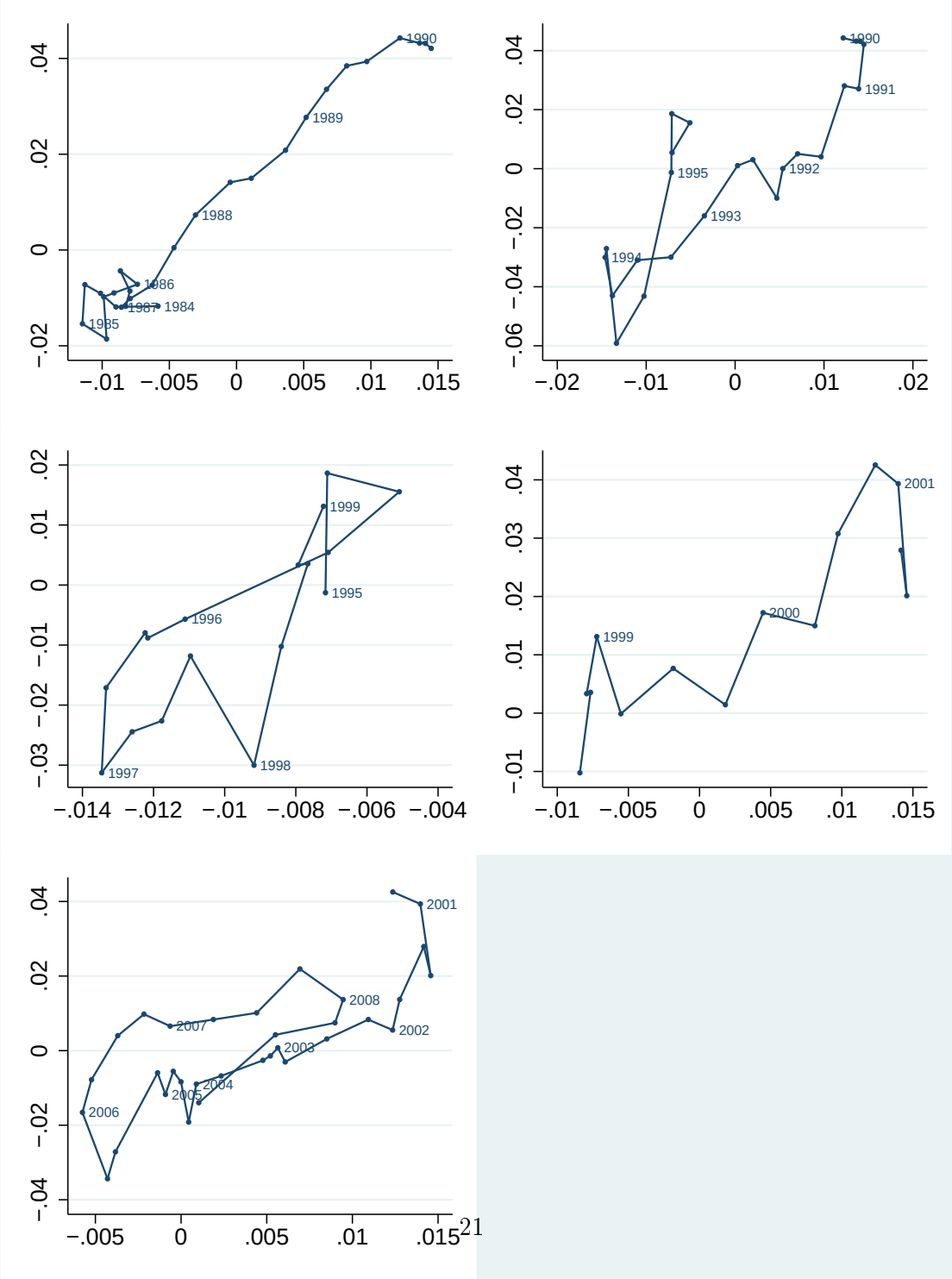


FIGURE 18 - Deviation of utilization and profit shares in Spain from their long term trends in the (u, π)-plane

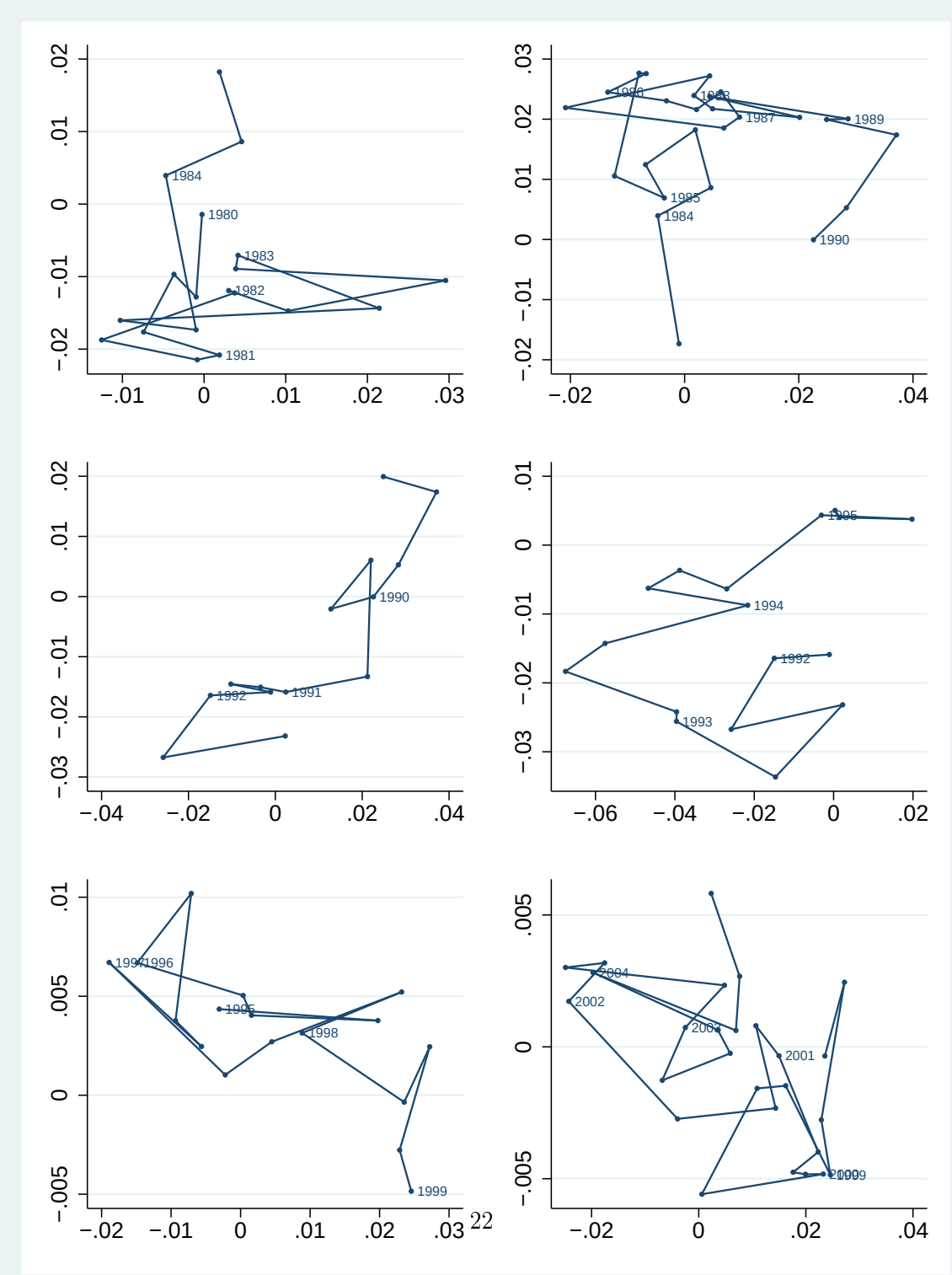


FIGURE 19 - Deviation of employment and profit shares in Spain from their long term trends in the (e, π)-plane

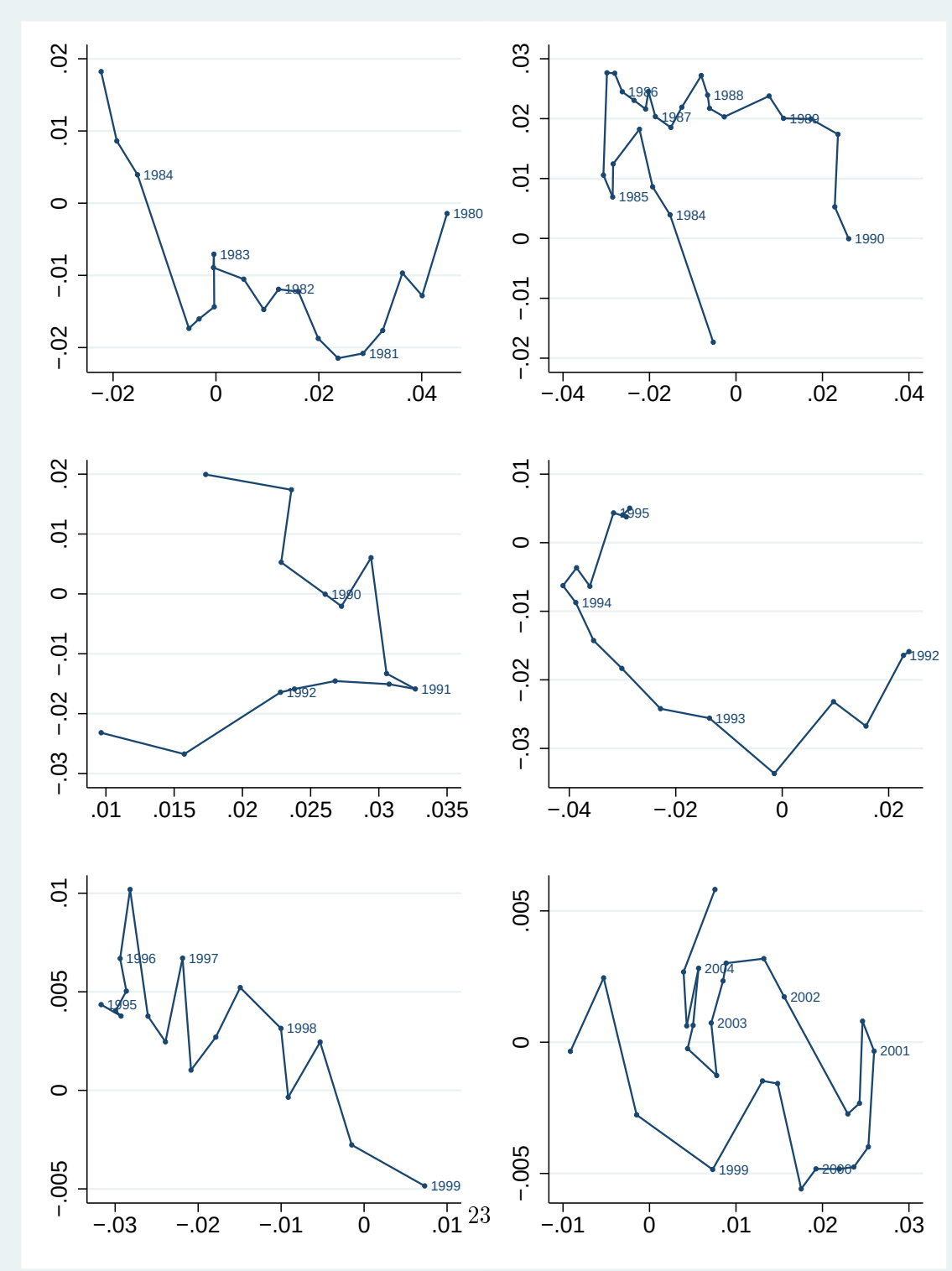


Figure 20 - Deviation of employment and utilization in Spain from their long term trends in the (e, u)-plane

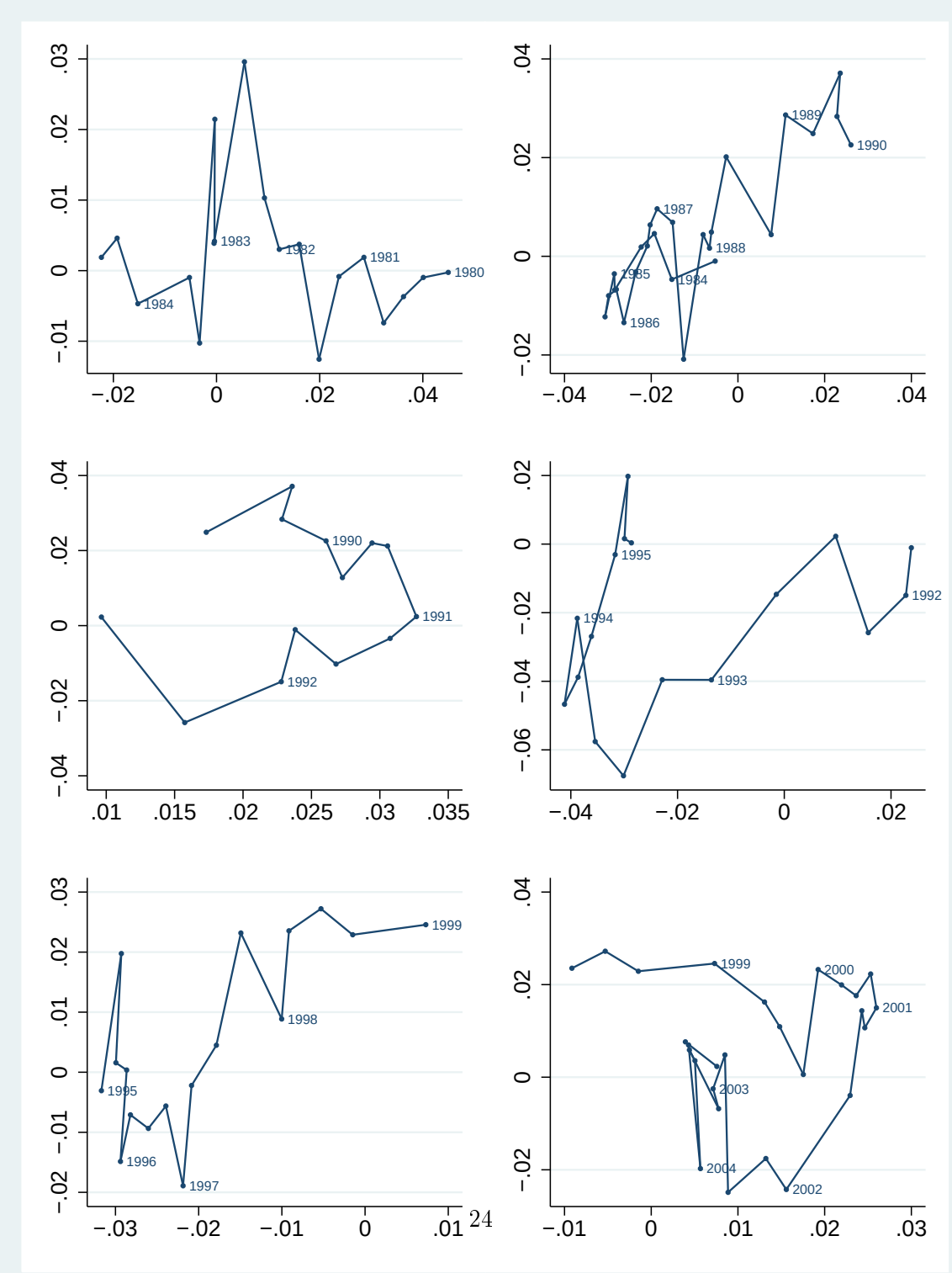
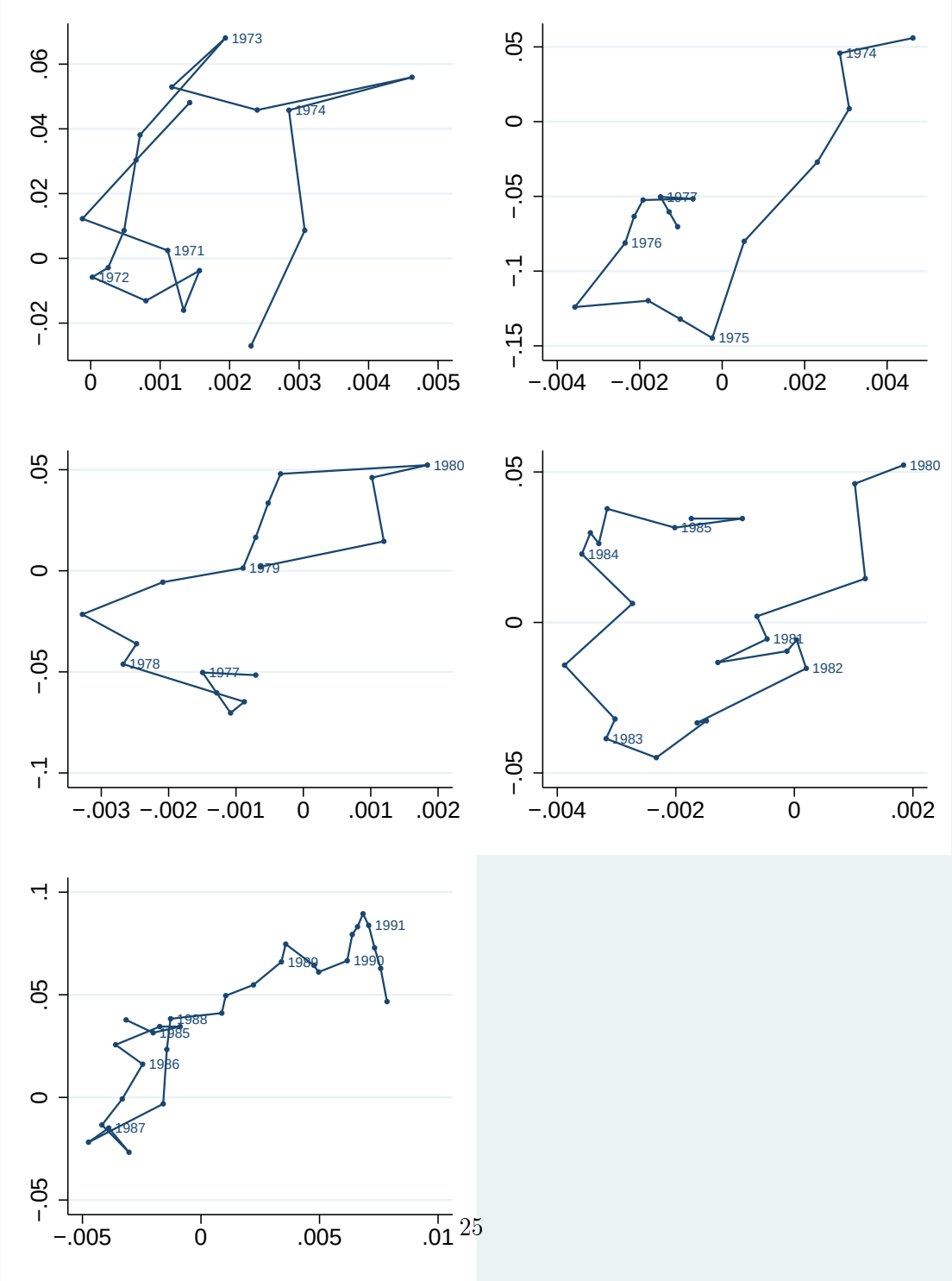
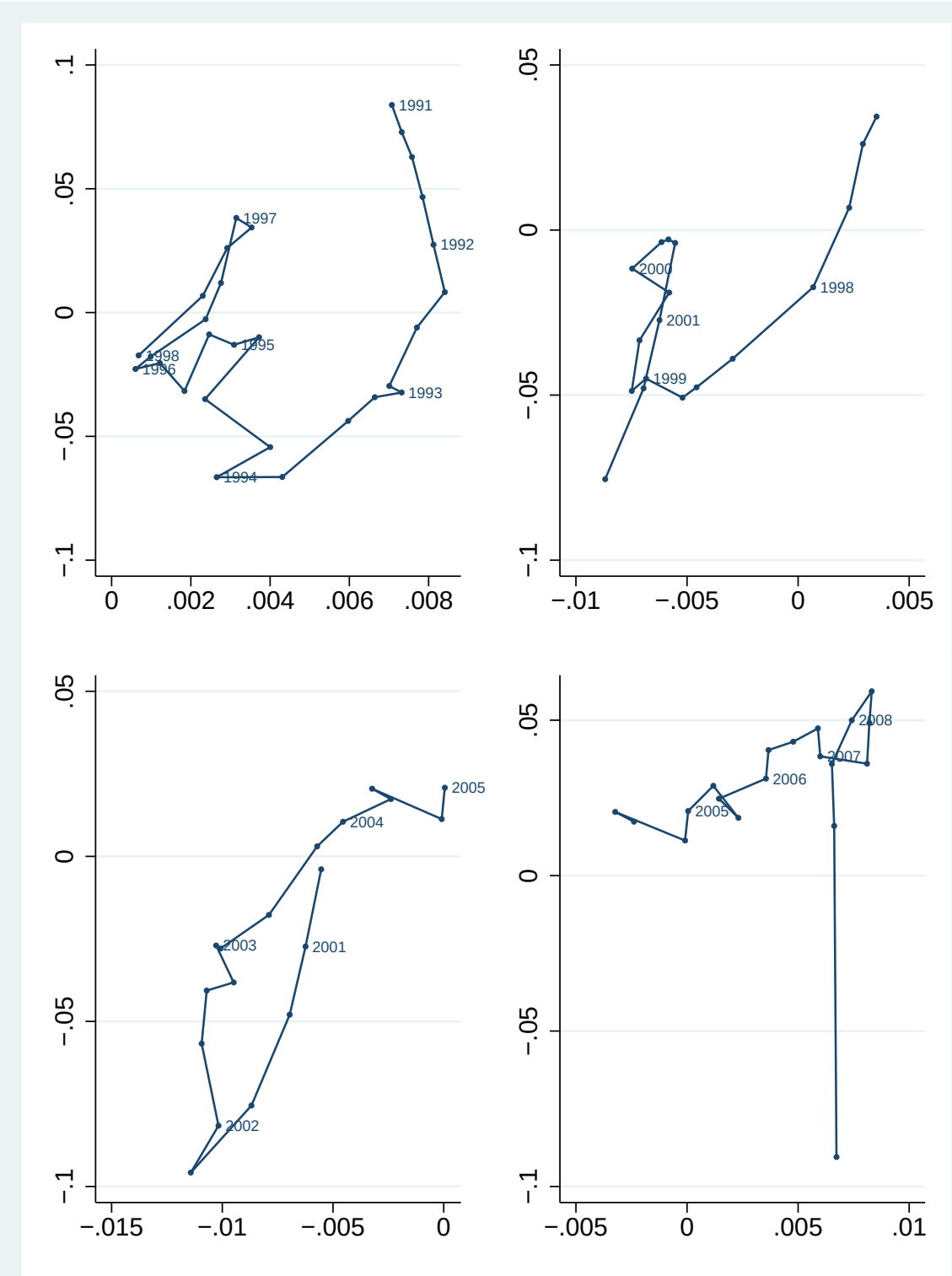


Figure 21 - Deviation of employment and utilization in Japan from their long term trends in the (e, u)-plane

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