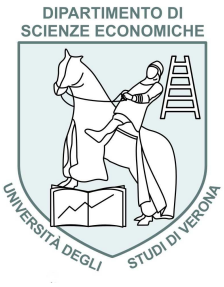


Working Paper Series
Department of Economics
University of Verona

Price-price deviations are highly persistent - extended version

Andrea Vaona

WP Number: 8 March 2012

ISSN: 2036-2919 (paper), 2036-4679 (online)

Price-price deviations are highly persistent - extended version

Andrea Vaona

Department of Economics Sciences, University of Verona

Via dell'artigliere 19

37129 Verona

E-mail: andrea.vaona@univr.it

Kiel Institute for the World Economy

Price-price deviations are highly persistent - extended version

Abstract

The present paper explores the persistence of the deviations between market prices on one side and either production or direct prices on the other - namely their tendency to vanish after being hit by a shock. We consider various countries - Austria, Denmark, Italy, Norway and Japan - across different time periods and different methods of computing direct and production prices. Results can change depending on such methods, but even the weakest results would point to price-price deviations taking 5 years to shrink by one half after a shock. The strongest results, instead, show no tendency of price-price deviations to disappear.

Introduction

Quantitative marxism has been recently animated by a dispute surrounding the correlation and the deviations between sectoral values (or direct prices) and market prices.

This debate has theoretical roots, which have been the subject of a certain number of publications by now (Kliman and McGlone, 1988, 1999; Freeman and Carchedi, 1996, Kliman, 2004; Veneziani, 2004; Mohun, 2004). In essence it is possible to say that scholars in the field tried to understand whether the transformation problem in Marxist economics has any empirical grounding. If market prices are very close to values, then the transformation problem can be thought to be just an intellectual curiosity.

Hereafter, we focus on empirical issues. One stream of literature attempted to estimate the magnitude of the deviations between sectoral market prices and either production prices (that is prices charged under the hypothesis of uniform profit rates) or values (see for instance Ochoa, 1984; Tsoulfidis, 2008; Tsoulfidis and Maniatis, 2002; Tsoulfidis and Rieu, 2006). In general such deviations are not found to be too large, being of the order of 10-30%.

One further stream of literature regressed sectoral prices, measured by gross output, on a constant and sectoral money values. Support was found for the hypotheses that the constant is equal to zero, the regression coefficient is equal to one and the R^2 of the model is around 0.95 (Shaikh, 1984; Petrovic, 1987; Cockshott and Cottrell, 1997a, 1997b; Tsoulfidis and Maniatis, 2002).

According to more recent contributions (Kliman, 2002, 2008, Diaz and Osuna, 2005-6, 2007, 2008), this first wave of literature underplayed the role of quantity in gross output and money values. This would lead to either spurious correlation or indeterminacy of the estimates. In the latter case, measures of the dispersion of market prices with respect to either production or direct prices are affected as well, though they can be used for time series analysis (Diaz and Osuna, 2009).

Though these works mainly focused on statistical issues, Kliman (2004) offers an economic intuition for his specific procedure to take into account the role of sectoral quantities and evidence is there produced rejecting the closeness of market and direct prices.

Tsoulfidis and Paitaridis (2009), instead, contended that results obtained from input-output data are not affected by the critique by Diaz and Osuna (2007, 2009), given that the measurement units of output quantities are not important per se. What is important is that they do not change over the period of observation.

Vaona (2013) takes a different approach to the issue by exploiting not only cross-sectional but also time variation in market and direct prices. By making use of panel integration and cointegration techniques and computing values as in Kliman (2004), he finds hardly any support for the view that market and direct prices are connected.

The present paper approaches the issues above from a different point of view. We want to answer to the question whether market prices have any tendency to fluctuate around either production or direct prices. In other words, we want to understand if shocks to their deviations tend to quickly die away or to persist over time.

It is possible to give a graphical illustration of our research question. In the relevant literature, authors make sometimes reference to a picture where it is possible to see a random oscillation of market prices around either production or direct prices (Tsoulfidis, 2008) - similar to the one occurring between the dashed and the continuous lines in Figure 1. However, are we sure that the dotted and the continuous lines in Figure 1 do not provide a better description of reality? In this case, production (direct) prices would be a centre of gravity for market prices, but the latter can stay far from the former ones for a considerable time. Things could be even worse in case the deviations between the two kinds of prices had a unit root. In that case, market prices would just wander around without any connection with either production or direct prices.

In order to achieve our goal, we import to the literature on price deviations methods and measures used, for instance, to analyse inflation persistence (Altissimo et al. 2006).

Robalo Marques (2004) offers a review of the four most used measures of persistence. Consider an autoregressive model for a given variable, the sum of the autoregressive coefficients (that we denote with ρ) is one of such measures. Two further measures are the cumulative impulse response

function (CIRF), defined as $\frac{1}{1-\rho}$, and the largest root of the autoregressive model (which, however, ignores the information contained in other roots). Finally, a popular measure is the "half-life", which, for an AR1 model with no constant, is equal to $-\frac{ln2}{ln\rho}$. Given that the largest root provides only partial information about the persistence of the variable under study, we ignore it. Being the other measures all connected, we start with the sum of the autoregressive coefficients and we will move to the CIRF and the half-life only if necessary.

The rest of this paper is structured as follows. The next section illustrates our data, definitions and methods. Then we move to illustrate our results and the last section concludes, discussing research and policy implications.

Data, variable definitions and methods

We consider three ways of computing money values and we have different data sources.

First we deal with the approach by Kliman (2004). In this case our data source is the STAN OECD database[1] and we consider the following variables: consumption of fixed capital (CFCC), intermediate inputs in current prices (INTI), gross output in current prices (PROD), value added in current prices (VALU), the number of employees (EMPE), the number of self-employed (SELF), and labour costs (LABR).

We consider the following countries and time periods: Austria from 1976 to 2009, Denmark from 1970 to 2007, Italy from 1980 to 2008 and Norway from 1970 to 2007. The precise list of sectors and the level of aggregation varies from country to country depending on data availability. More details are given in the Appendix A. After Diaz and Osuna (2005-6), among others, we restrict our attention to the private sector, though, in keeping with the literature, we do not distinguish between productive and unproductive activities.

Our aggregate price measure is PROD. The steps taken to compute money values after Kliman (2004) are summarized in Table 1 and those following Diaz and Osuna (2005-6) in Table 2. In the

[1] http://stats.oecd.org/Index.aspx?DatasetCode=STAN08BIS&lang=en

latter case, we consider only data for Denmark and Italy for availability reasons. The Diaz and Osuna (2005-6) approach also requires data on the gross operating surplus and mixed income (GOPS), the gross capital stock and on total hours worked. Data on the first variable are available from the STAN OECD database, on the second variable from national statistical offices[2] and on the third one from the Groeningen Growth Development Center database (www.ggdc.net).

Note that the calculation of the monetary expression of labor time (MELT) is iterative. As illustrated in Tsoulfidis and Paitaridis (2009), the procedure was initialized setting the first year MELT equal to the sum of sectoral values added over the sum of sectoral working hours. We drop the first five years to minimize the dependence of our data from the first observation. As a consequence we consider the years from 1985 to 2007 for Italy and from 1975 to 2007 for Denmark. NOPS and GOPS were corrected for the presence of the self-employed following, among others, Vaona (2011). The approach by Diaz and Osuna (2005-6) makes also it possible to compute the percentage deviations of market prices from production prices. Note that in this computation approach, the MELT used to compute non-labor costs measured in work hours is evaluated at the prices of the previous year. In presence of a trend in inflation, this might induce a bias in the data. In order to verify whether this might affect our results, we inflated MELT- by using annual inflation rates, computed from the deflator of aggregate production (PRDP in the STAN OECD database). Results are available in Appendix D.

Our last approach is computing market price-value and market price-production price deviations using input-output tables instead of national accounts data. Actually to do so, we consider the Japanese data already available in Tsoulfidis (2008, Table 3) for the years 1970, 1975, 1980, 1985 and 1990.

One final note is that when considering data computed à la Kliman (2004), we consider relative price-value deviations and the numeraire sectors were Agriculture, hunting, forestry and fishing for Austria; Agriculture, hunting and related service activities for Denmark and Norway; and

[2] For Italy: http://www3.istat.it/salastampa/comunicati/non_calendario/20100701_00/. For Denmark: www.statbank.dk.

Agriculture, hunting and forestry for Italy. In other cases, we consider absolute deviations. We consider both possibilities because relative price-value deviations were discussed in the literature (see Diaz and Osuna, 2007, p. 392). However, we also performed our tests considering absolute deviations in Appendix C.

Our methods change with the features of the datasets considered. When dealing with long time series of twenty years or more, we rely on panel unit root tests. Instead, in the case of short penels, like those deriving from input-output data, we adopt the dynamic panel data estimators by Blundell and Bond (1998) and Roodman (2005) on one side and by Bruno (2005a, b) on the other. Such tests and estimators can be found in standard econometric packages and they are described in Baltagi (2005) for instance.

Results

In order to illustrate our results we start with some descriptive evidence on some sectors. As in part already noted by Ochoa (1984, p. 148), market price deviations from either values or production prices might not tend to gravitate around zero. On the contrary, it is possible to find sectors for which there appear clear trends. In other words, it would seem that shocks might not have a tendency to die away and, instead, they tend to be incorporated in the analysed time series. As showed by Figures 2 to 6, this pattern would not seem to be specific to a given country or computing approach. However, at the same time it cannot be considered to represent the behaviour of all the sectors in all the countries as in some sectors percentage deviations might just fluctutate around zero and in some other they can have a declining trend. Appendix B gives a graphical representations of price-price deviations in all the sectors of all the country considered using different computation approaches.

We now turn to panel unit root testing (Tables 3 to 6 and 8 to 11). A clear general pattern emerges: for many of the sectors market price deviations from either values or production prices are non-stationary. This means that shocks hitting them do not tend to vanish. This results is robust across

countries, computation methods and using both relative and absolute price deviations, as also testified by Appendices C and D.

We also tried to control for the effect of possible common factors, by cross-sectional demeaning our time series as suggested by Im et al. (1995). Table 7 lists the sectors that one has to exclude from the sample in order to obtain the acceptance of the null of non-stationarity of all the series considered. As it is possible to see, it is enough to exclude a few sectors and all the remaining series turn out to be non-stationary[3].

In principle, it would be enough to have only one non-stationary series to produce disturbing evidence for market prices gravitating around either production prices or values. However, this phenomenon appears to be much more pervasive[4].

For price-price deviations taken from Tsoulfidis (2008) we adopt a two-step Blundell and Bond (1998) estimator with finite sample Windemejir (2005) correction. We start with an AR(1) model and we initially insert time dummies and a constant, which are subsequently drop because insignificant. As instruments, we use, for equations in differences, all the lags in the deviations in levels starting from the second one; for equations in levels, instead, we use the first difference of the first lag of the deviations[5]. In order to keep instruments at a minimum they are collapsed. The coefficient of the first lag of price-value deviations is equal to 0.51, with a p-value of 0.00. Specification tests support the model, given that the Arellano-Bond test for second order serial correlation has a p-value of 0.73, the Hansen test for overidentifying restriction a p-value of 0.14, and the difference-in-Hansen tests of exogeneity of instrument subsets a p-value of 0.45. After Bruno (2005a, 2005b) we also estimate a bias Corrected Least Squares Dummy Variable estimator (LSDVC), with bootstrapped standard errors and a bias correction of order O(1/1322). It is

[3] We also tried with the procedure suggested by Pesaran (2007), which consists in adding lags of the cross-sectional mean to the autoregressive model underlying unit root tests. Results are similar to those discussed for the Im et al. (1995) procedure.

[4] We cannot consider CIRF and the half-life as they are not defined with $\rho=1$.

[5] In brief, this is the Stata command we use: xtabond2 dev L.dev, gmmstyle(L.dev, collapse) twostep robust noc.

initialized with the Blundell and Bond (1998) estimator. It returns a coefficient of 0.44 with a p-value of 0.00.

We repeat the same exercises for market prices-production prices deviations. We follow a similar procedure to that described above, also regarding the choice of the instruments, and an AR(1) model without a constant and time dummies turns out to best suit our data. The coefficient of the first lag of market price-production price deviations is equal to 0.49, with a p-value of 0.00. Specification tests support the model, given that the Arellano-Bond test for second order serial correlation has a p-value of 0.76, the Hansen test for overidentifying restrictions a p-value of 0.24, and the difference-in-Hansen tests of exogeneity of instrument subsets a p-value of 0.55. The LSDVC returns a coefficient of 0.5 with a p-value of 0.00.

Compared to those of panel unit root tests, these results are more in favour of the long run equalization not only of market prices and production prices, but also of market prices and values, as it was not possible to reject the null hypothesis that the constant of the AR(1) model was equal to zero[6] and also the coefficient of the lagged dependent variable was definitely smaller than one. However, even taking its lowest estimate of 0.44 and taking into account that periods here are 5 year intervals, it will take more than 25 years for shocks to die away. To make a comparison, such a persistence, roughly equal to that implied by a half-life of 5 years, is an upper bound of the persistence found in purchasing power parity tests, and it is seldom regarded as low (Rogoff, 1996).

At any rate, the fact that it is not possible to understand whether either direct or production prices are poles of attraction for market prices casts shadow on these results. Such weakness might be due to the short time dimension of the dataset. An interesting future research direction might be to compute datasets from input-output tables for longer time-spans. This would make it possible to run unit root tests for this kind of data too.

[6] For production prices - market prices deviation it had a coefficient equal to-.00008 with a p-value of 0.995 and for price-value deviations a coefficient of -0.006 with a pvalue 0.63.

Conclusions

This contribution has showed that deviations between market and either direct or production prices are not short lived. The least we can say is that shocks hitting them take at least 5 years to shrink by one half. However, we have also found abundant evidence that they just do not vanish.

Of course it would be possible to argue that this result descends from poor quality of the data on capital stocks, as done for instance by Ochoa (1984) about his own analysis. This possibility could even be more likely for national accounts data, given the problems they involve in estimating capital stocks. On this point see for instance Australian Bureau of Statistics (1998) and Jaffey (1997)[7]. However, the robustness of our estimates across different computation methods and countries might weaken this argument.

Our results do not tend to support the view that prices and values are close, but they do not tend either support the view that a uniform profit rate is a realistic assumption, which is in accordance with the evidence produced by the literature reviewed in Vaona (2012). This notwithstanding, the debate surrounding the transformation problem has not been useless as argued by, for instance, Farjoun and Machover (1983). It has taught us that surplus value does not stick where it is extracted. The exchange of goods and services in the circulation sphere can redistribute it from one sector to another. Once accepting this, tracing the flows of value among different economic sectors is an indispensable step for whoever does not want to fall in commodity fetishism.

What is the way ahead? To say the least, market prices tend most of the time to stay far from either production prices or values, which should lead us to embrace theories that dispense with the assumption of their closeness.

One possibility is of course the temporal single system interpretation of Marx (Kliman and McGlone, 1988, 1999; Freeman and Carchedi, 1996). One further option would be modelling marginal magnitudes instead of average ones, such as direct and production prices. According to this view, the regulating conditions that govern price dynamics are not average ones, but those

[7] The author thanks Anwar Shaikh for pointing to him these two papers.

prevailing in the firms where capital accumulation either accelerate or decelerate (Tsoulfidis and Paitaridis, 2009).

In addition, when considering the deviations of market prices from production prices, it is just too tempting thinking that they originate from different degrees of competitiveness at the industry level. This would lead to revive past attempts to conjugate the concept of production prices and market power (Semmler, 1984, pp. 147-151; Reati, 1986). In addition, following for instance Duménil and Lévy (1993, p. 155), one could focus on modelling limitations to capital mobility, as market and production prices stay persistently apart.

Finally, not downplaying the importance of the deviations between market prices and either direct and production prices, can be a first step to draw important policy implications. Take the case of Italy, for instance. In 2007 the market price of the Financial Intermediation sector was 12% higher than the production price and 28% than the direct price. On the contrary, in the greater majority of manufacturing sectors, production prices and direct prices were higher than market prices. The median deviation was in the first case of about 4.5% and, in the second, of about 8%. If, after Kaldor (1966) and Thirlwall (1983), we support the view that manufacturing activities are an engine for growth, we will advise policy makers to reverse this pattern.

References

Altissimo F., Ehrmann M. and Smets F. (2006) Inflation persistence and price setting behaviour in the Euro area, Occasional Paper 46, ECB, Frankfurt.

Australian Bureau of of Statistics (1998) Direct Measurement of Capital Stock, OECD, Paris.

Baltagi, B. (2005), Econometric analysis of panel data, Wiley, Chichester.

Blundell R, Bond, S (1998) Initial Conditions and Moment Restrictions in Dynamic Panel Data Models, Journal of Econometrics 87: 115-143.

Bruno, G. S. F. (2005a) Approximating the bias of the LSDV estimator for dynamic unbalanced panel data models. Economics Letters, 87, 361-366.

Bruno, G. S. F. (2005b) Estimation and inference in dynamic unbalanced panel data models with a small number of individuals. CESPRI WP n.165 , Università Bocconi-CESPRI, Milan.

Cockshott WP, Cottrell AF (1997a) Labour time versus alternative value bases: a research note. Camb J Econ 21:545--549

Cockshott WP, Cottrell AF (1997b) Does Marx need to transform? In Bellofiore, R. (ed.), Marxian Economics: A Reapparaisal, Vol. 2, Basingstoke, Macmillan.

Díaz E, Osuna R. (2005-2006) Can we trust cross-sectional price-value correlation measures? Some evidence from the case of Spain. Journal of Post-Keynesian Economics, 28, 345-363.

Díaz E, Osuna R. (2007) Indeterminacy in price-value correlation measures. Empir Econ 33:389--399

Díaz E, Osuna R. (2008) Understanding spurious correlation: a rejoinder to Kliman, Journal of Post-Keynesian Economics, 31, 357-362.

Díaz E, Osuna R. (2009) From Correlation to Dispersion: Geometry of the Price-Value Deviation. Empirical Economics, 36, 427-440.

Duménil, G. and D. Lévy (1993), The economics of the profit rate: Competition, crises, and historical tendencies in capitalism, Edward Elgar, Aldershot, England.

Farjoun, E. and Machover M. (1983) Law of chaos. A probabilistic approach to political economy, Verso Editions, London.

Freeman, A. and G. Carchedi (1996) Marx and non-equilibrium economics, Cheltenham: Edward Elgar.

Jaffey, M. (1998), The Direct observation of Asset Lives. Statistics Canda.

Im K, Pesaran H, Shin Y. 1995. Testing for unit roots in heterogeneous panels. DAE Working Papers Amalgamated Series No. 9526, University of Cambridge.

Im Kyung So, Pesaran M. Hashem, Yongcheol Shin (2003) Testing for unit roots in heterogeneous panels, Journal of Econometrics, 115, 53-74,

Kaldor, N. 1966. Causes of the Slow Rate of Growth of the United Kingdom, Cambridge University Press, Cambridge UK.

Kliman, A. (2002) The law of value and laws of statistics: sectoral values and prices in the U.S. Economy, 1977-1997. Camb J Econ 26:299--311

Kliman, A. (2004) Spurious price-value correlations: some additional evidence and arguments. Research in Political Economy, 21, 223-239.

Kliman, A. (2008), What is spurious correlation? A reply to Diaz and Osuna, Journal of Post-Keynesian Economics, 31, 345-356.

Kliman A., McGlone T. (1988) The transformation non-problem and the non-transformation problem, Capital and Class, 35, 56-83.

Kliman A., McGlone T. (1999): 'A temporal single-system interpretation of Marx's value theory', Review of Political Economy, 11, pp. 33–59.

Mohun, S. (2004) The labor theory of value as foundation for empirical investigations. Metroeconomica, 55, 65-95.

Ochoa, E. (1984) Labor value and prices of production: an interindustry study of the US economy, 1947-1972, PhD Dissertation, New School for Social Research, New York.

Pesaran, Hashem, M. (2007) A simple panel unit root test in the presence of cross-section dependence, J. Appl. Econ. 22: 265–312.

Petrovic, P. (1987) The deviation of production prices from labour values: some methodology and empirical evidence. Camb J Econ 11:197--210.

Reati, A. (1986) The Deviation of Prices from Labour Values: An Extension to the Non-competitive Case, Cambridge Journal of Economics, vol. 10(1), pages 35-42, March.

Robalo Marques, C. (2004) Inflation persistence: facts or artifacts?, ECB Working Paper n. 371, ECB, Frankfurt.

Rogoff, K. (1996). The purchasing power parity puzzle, Journal of Economic Literature, 34, 647-668.

Roodman, D. (2005). Xtabond2: Stata module to extend xtabond dynamic panel data estimator. Center for Global Development, Washington. http://econpapers.repec.org/software/ bocbocode/s435901.htm.

Semmler, W. (1984), Competition, monopoly, and differential profit rates: On the relevance of the classical and Marxian theories of production prices for modern industrial, New York: Columbia University Press.

Shaikh A. M. (1984) The transformation from Marx to Sraffa. In: Mandel E, Freeman A (eds) Ricardo, Marx, Sraffa. Verso, London.

Thirlwall, A. P. (1983), A Plain Man's Guide to Kaldor's Growth Laws, Journal of Post Keynesian Economics, Vol. 5, No. 3, pp. 345-358.

Tsoulfidis, L. (2008). Price-value deviations: Further evidence from input-output data of Japan, International Review of Applied Economics, 22, 707-724.

Tsoulfidis, L. and Maniatis, T. H. (2002), Values, prices of production and market prices: some more evidence from the Greek economy, Cambridge Journal of Economics, 26, 359-369.

Tsoulfidis, L. and Paitaridis D. (2009), On the labor theory of value: statistical artefacts or regularities?, Research in Political Economy, 25, 209-232.

Tsoulfidis, L. and Rieu D. M. (2006), Labor values, prices of production and wage-profit rate frontiers of the Korean economy. Seoul Journal of Economics, 19, 275-295.

Vaona A., 2011. Profit rate dynamics, income distribution, structural and technical change in Denmark, Finland and Italy, Structural Change and Economic Dynamics, 22, 3, 247-268.

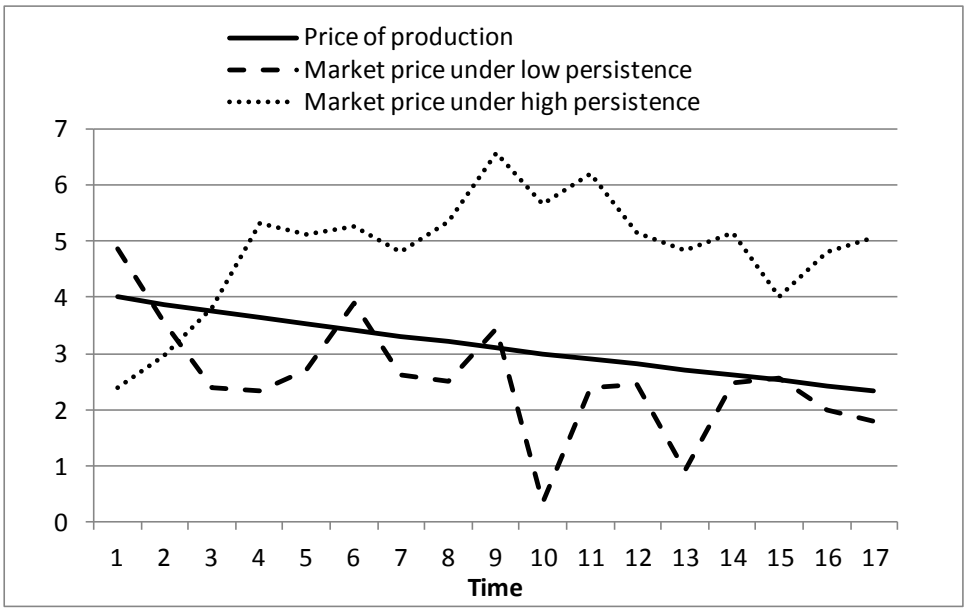
Vaona A., 2012. Further econometric evidence on the gravitation and convergence of industrial rates of return on regulating capital. Journal of Post-Keynesian Economics, 35, 113-136.

Vaona A., 2013. A panel data approach to price-value correlations, Empirical Economics, forthcoming. DOI: 10.1007/s00181-013-0733-2.

Veneziani, R. (2004) The temporal single-system interpretation of Marx's economics: a critical assessment. Metroeconomica, 55, 96-114.

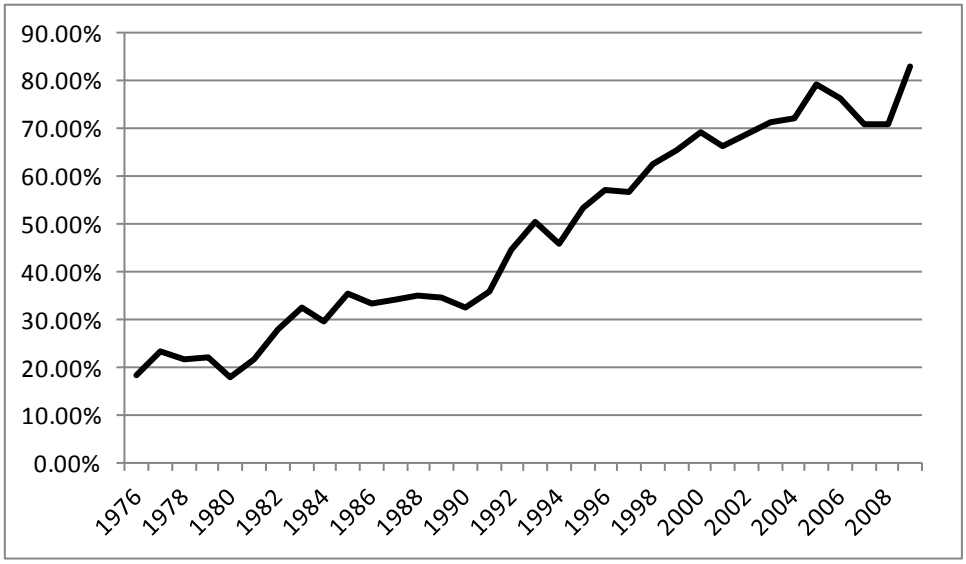
Windmeijer, F (2005) A finite sample correction for the variance of linear efficient two-step GMM estimators. Journal of Econometrics 126: 25-51.

Figure 1 - Simulated prices of production and market prices.

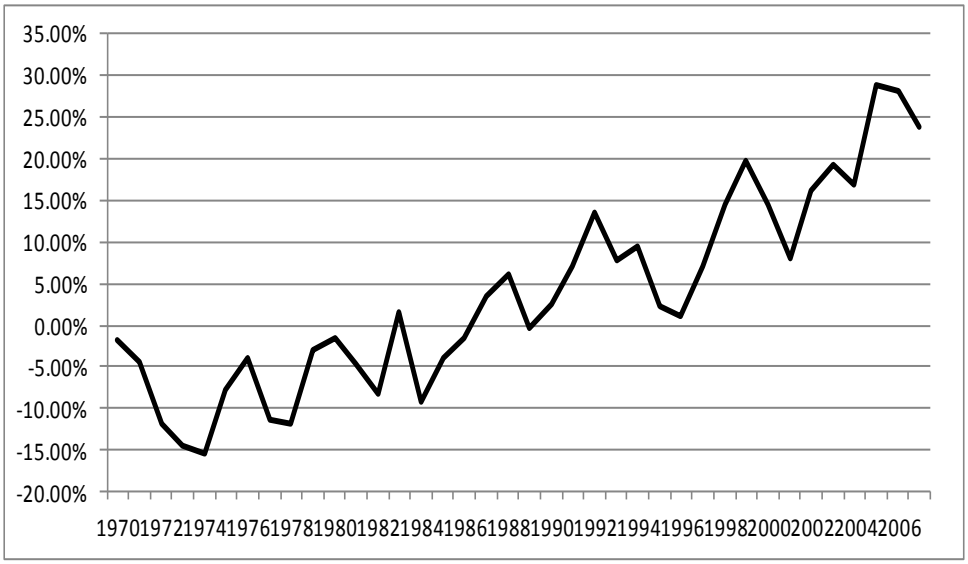


Notes. The price of production was simulated as $p^*_t=8-\sqrt{t}$ where t is a time trend, the market price under low persistence as $p_t=p^*_t+0.2(p_{t-1}-p^*_{t-1})+\varepsilon_t$ where ε_t is a white noise shock and the market price under high persistence as $p_t=p^*_t+0.99(p_{t-1}-p^*_{t-1})+\varepsilon_t$. The equations for market prices are recursive. We initially started with the deviation between production and market prices set equal to a white noise shock and then we applied the equations above. We drop the first 15 simulated observations.

Figure 2 - Relative value-price deviations for selected sectors and countries (%)



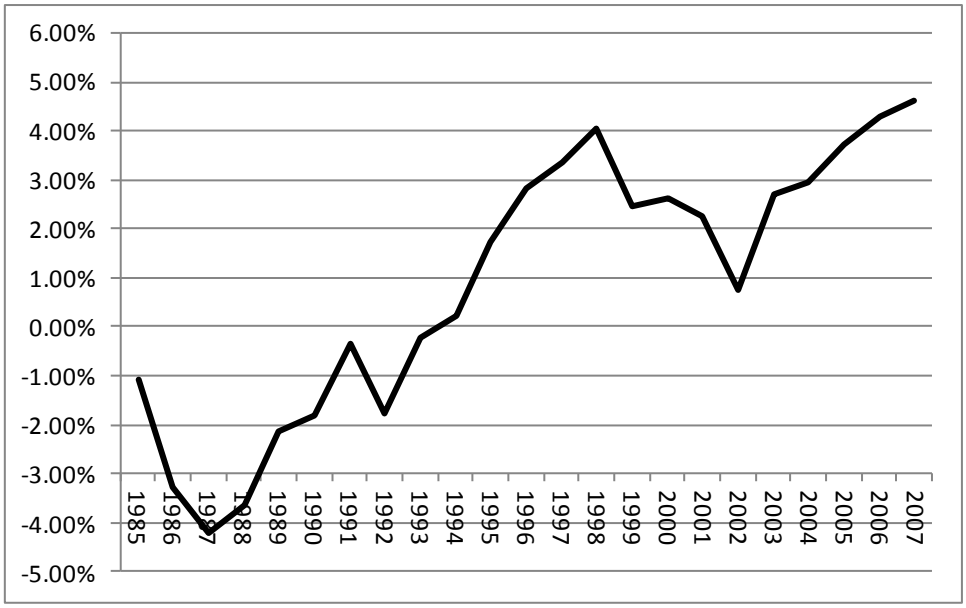
Austria - Food products and beverages



Denmark - Chemicals and chemical products

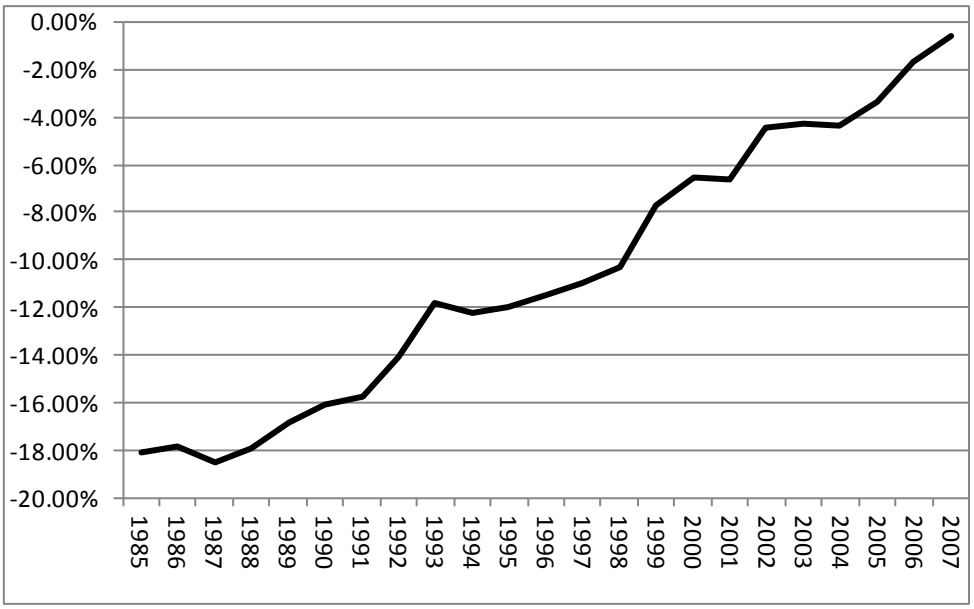
Note: data computed following Kliman (2004). Percentage deviations were computed as the log of relative sectoral money values (MV) less the log of relative sectoral market prices (PROD) times 100. For Denmark the numeraire sector was "Agriculture, hunting and related service activities", while for Austria it was "Agriculture, hunting, forestry and fishing".

Figure 3 - Percentage absolute deviations of production prices from market prices in Italy in the industry "Other non metallic mineral products", 1985-2007



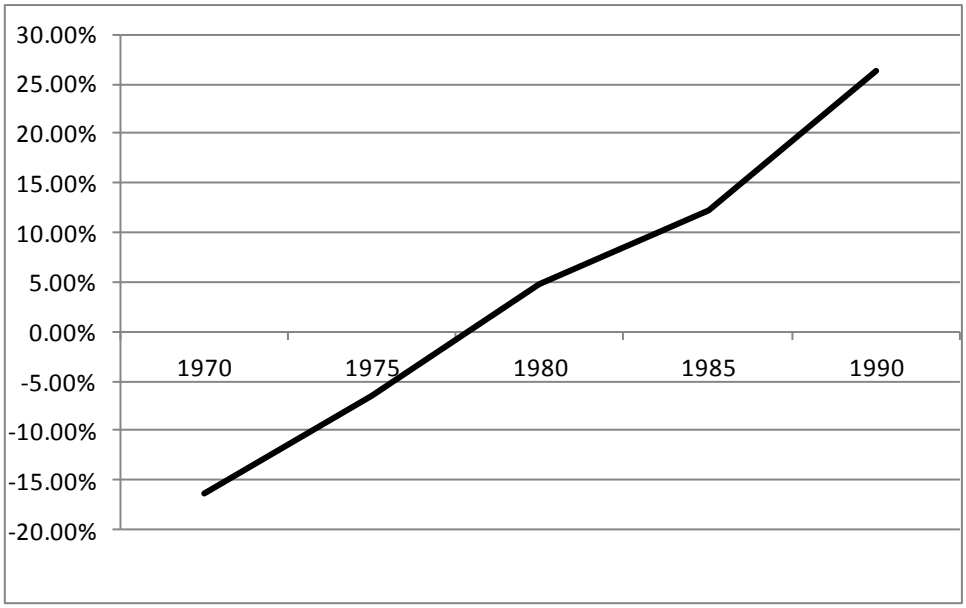
Note: data computed following Diaz and Osuna (2005-2006). Percentage deviations were computed as the log of total production valued at direct prices minus the log of total production valued at market prices times 100.

Figure 4 - Percentage absolute deviations of direct prices from market prices in Italy in the industry "Wholesale and retail trade - repairs", 1985-2007



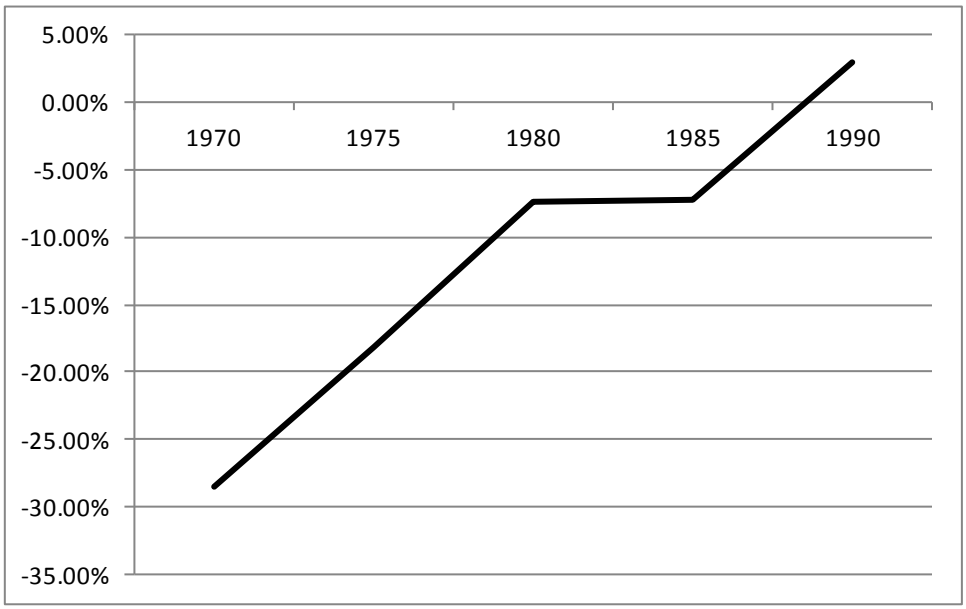
Note: data computed following Diaz and Osuna (2005-2006). Percentage deviations were computed as the log of total production valued at direct prices minus the log of total production valued at market prices times 100.

Figure 5 - Percentage absolute deviations of production prices from market prices in Japan in the motor vehicles sector, 1970-1990



Note: author's elaboration on data from Tsoulfidis (2008). In order to compute percentage deviations we considered the figures in Table 3 of Tsoulfidis (2008) and we subtracted from them 1 in accordance with note 7 in the bespoken paper. Then we multiplied the result by 100.

Figure 6 - Percentage absolute deviations of direct prices from market prices in Japan in the Finance and Insurance industry, 1970-1990



Note: author's elaboration on data from Tsoulfidis (2008). In order to compute percentage deviations we considered the figures in Table 3 of Tsoulfidis (2008) and we subtracted from them 1 in accordance with note 7 in the bespoken paper. Then we multiplied the result by 100.

Table 1 - Computing sectoral money values after Kliman (2004)

Variable notation	Variable name
1	Labour costs (LABR)
2	Self-employed people (SELF)
3	Employees (EMPE)
4 = 1+1*(2/3)	Corrected Labour costs (LABR')
5	Value added in current prices (VALU)
6	Consumption of fixed capital (CFCC)
7=Σ(5-6-4)	Aggregate surplus value (S)
8=7/ Σ(4)	Uniform rate of surplus value (RSV)
9=8*4	Sectoral surplus value
10	Intermediate inputs in current prices (INTI)
11=9+4+10+6	Sectoral money values (MV)

Table 2 - Calculation procedure for the variables from national accounts categories after Diaz and Osuna (2005-2006)

Variable notation	Variable name
1	Net stock of fixed capital
2	Consumption of fixed capital (CFCC)
3 = 1 + 2	Gross stock of fixed capital
4	Intermediate inputs (INTI)
5 = 2 + 4	Nonlabor costs
6	Labor costs (LABR')
7 = 5 + 6	Total costs
8	Net profit(NOPS')
9 = 8 + 2	Gross profit (GOPS')
10 = 8 + 6	Net final income
11 = 9 + 6	Gross final income
12 = 11 + 4	Total production valued at market prices
13 = 8/(7 + 1)	Rate of profit
14 = Σ8/Σ(7 + 1)	Uniform rate of profit
15 = 7 + 14 * (7 + 1)	Total production valued at production prices
16 = 5/MELT–	Nonlabor costs measured in work hours
17	Thousands of work hours
18 = 16 + 17	Labor value of the total production
19 = Σ12/Σ18	MELT+
20 = 18 * 19	Total production valued at direct prices

Note: the calculation of the monetary expression of labor time (MELT) is iterative. MELT– is the previous year's MELT, and is calculated with the data of the previous year using the same procedure applied to the calculation of MELT+ (the current year's MELT).
NOPS and GOPS were corrected for the presence of the self-employed. See Vaona (2011).

Table 3 - Panel unit root test for relative price - value deviations in Austria (1976-2009), data computed following Kliman (2004)

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	3.75983	0.9999	45	1478
ADF - Fisher Chi-square	42.6018	1.0000	45	1478
PP - Fisher Chi-square	49.1747	0.9999	45	1485

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Table 4 - Panel unit root test for relative price - value deviations in Italy (1980-2008), data computed following Kliman (2004)

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 5
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	0.27001	0.6064	24	666
ADF - Fisher Chi-square	35.1452	0.9165	24	666
PP - Fisher Chi-square	31.7489	0.9659	24	672

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Table 5 - Panel unit root test for relative price - value deviations in Denmark (1970-2007), data computed following Kliman (2004)

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.31830	0.3751	35	1292
ADF - Fisher Chi-square	72.0672	0.4093	35	1292
PP - Fisher Chi-square	60.7570	0.7768	35	1295

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Table 6 - Panel unit root test for relative deviations between market and production prices in Norway (1970-2007), data computed following Kliman (2004)

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 7
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.06850	0.1426	39	1423
ADF - Fisher Chi-square	75.5375	0.5579	39	1423
PP - Fisher Chi-square	82.2600	0.3489	39	1443

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Note: results obtained after omitting Mining and quarrying of energy producing materials; Sale, maintenance and repair of motor vehicles and motorcycles - retail sale of automotive fuel; Computer and related activities.

Table 7 - List of sectors to be omitted to obtain nonstationarity after cross-section demeaning, by country

Austria	Denmark	Italy	Norway
• Leather, leather products and footwear. • Hotels and restaurants. • Insurance and pension funding, except compulsory social security. • Computer and related activities.	• Forestry, logging and related service activities. • Food products, beverages and tobacco. • Other non-metallic mineral products. • Machinery and equipment, n.e.c.. • Transport equipment. • Construction.	No sector	• Fishing, fish hatcheries, fish farms and related services. • Mining of metal ores. • Food products, beverages and tobacco. • Textiles. • Leather, leather products and footwear. • Pulp, paper and paper products. • Printing and publishing. • Chemical, rubber, plastics and fuel products. • Other non-metallic mineral products. • Basic metals. • Machinery and equipment, n.e.c. • Office, accounting and computing machinery. • Electrical machinery and apparatus, n.e.c. • Medical, precision and optical instruments. • Motor vehicles, trailers and semi-trailers. • Other transport equipment. • Wholesale, trade and commission excl. motor vehicles. • Water transport. • Air transport. • Financial intermediation. • Computer and related activities.

Note: data computed following Kliman (2004)

Table 8 - Panel unit root test for absolute deviations between market and production prices in Denmark (1975-2007), data computed following Diaz and Osuna (2005-2006)

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.37188	0.3550	15	477
ADF - Fisher Chi-square	32.7111	0.3352	15	477
PP - Fisher Chi-square	29.3985	0.4967	15	480

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Note: results obtained after omitting Basic metals and fabricated metals; Machinery n.e.c. and Transport equipment

Table 9 - Panel unit root test for absolute deviations between market prices and values in Denmark (1975-2007), data computed following Diaz and Osuna (2005-2006)

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-1.67530	0.0469	15	479
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.69032	0.2450	15	479
ADF - Fisher Chi-square	34.6568	0.2553	15	479
PP - Fisher Chi-square	34.4222	0.2643	15	480

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Note: results obtained after omitting Food, Transport, Construction.

Table 10 - Panel unit root test for absolute deviations between market and production prices in Italy (1985-2007), data computed following Diaz and Osuna (2005-2006)

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 3
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.88490	0.1881	25	542
ADF - Fisher Chi-square	61.3471	0.1305	25	542
PP - Fisher Chi-square	55.2752	0.2822	25	550

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Table 11 - Panel unit root test for absolute deviations between market prices and values in Italy (1985-2007), data computed following Diaz and Osuna (2005-2006)

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	0.35434	0.6385	19	411
ADF - Fisher Chi-square	39.9268	0.3845	19	411
PP - Fisher Chi-square	38.4174	0.4506	19	418

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Note: results obtained after omitting Food products, beverages and tobacco; Textiles and textile products; Pulp, paper, paper products, printing and publishing; Rubber and plastics products; Basic metals and fabricated metal products; Electricity, gas and water supply.

Appendix A (not for publication)

Table A1 - List of sectors used for Austria when computing values à la Kliman (2004)

C10T12 Mining and quarrying of energy producing materials
C13T14 Mining and quarrying except energy producing materials
C15 Food products and beverages
C16 Tobacco products
C17 Textiles
C18 Wearing apparel, dressing and dyeing of fur
C19 Leather, leather products and footwear
C20 Wood and products of wood and cork
C21 Pulp, paper and paper products
C22 Printing and publishing
C23 Coke, refined petroleum products and nuclear fuel
C24 Chemicals and chemical products
C25 Rubber and plastics products
C26 Other non-metallic mineral products
C27 Basic metals
C28 Fabricated metal products, except machinery and equipment
C29 Machinery and equipment, n.e.c.
C30 Office, accounting and computing machinery
C31 Electrical machinery and apparatus, n.e.c.
C32 Radio, television and communication equipment
C33 Medical, precision and optical instruments
C34 Motor vehicles, trailers and semi-trailers
C35 Other transport equipment
C36 Manufacturing n.e.c.
C37 Recycling
C40 Electricity, gas, steam and hot water supply
C41 Collection, purification and distribution of water
C45 CONSTRUCTION
C50 Sale, maintenance and repair of motor vehicles and motorcycles - retail sale of automotive fuel
C51 Wholesale, trade and commission excl. motor vehicles
C52 Retail trade excl. motor vehicles - repair of household goods
C55 Hotels and restaurants
C60 Land transport - transport via pipelines
C61 Water transport
C62 Air transport
C63 Supporting and auxiliary transport activities
C64 Post and telecommunications
C65 Financial intermediation, except insurance and pension funding
C66 Insurance and pension funding, except compulsory social security
C67 Activities auxiliary to financial intermediation
C70 Real estate activities
C71 Renting of machinery and equipment
C72 Computer and related activities
C73 Research and development
C74 Other business activities

Table A2 - List of sectors used for Denmark when computing values à la Kliman (2004)

C02 Forestry, logging and related service activities
C05 Fishing, fish hatcheries, fish farms and related services
C10T14 MINING AND QUARRYING
C15T16 Food products, beverages and tobacco
C17T19 Textiles, textile products, leather and footwear
C20 Wood and products of wood and cork
C21T22 Pulp, paper, paper products, printing and publishing
C23 Coke, refined petroleum products and nuclear fuel
C24 Chemicals and chemical products
C25 Rubber and plastics products
C26 Other non-metallic mineral products
C27T28 Basic metals and fabricated metal products
C29 Machinery and equipment, n.e.c.
C30T33 Electrical and optical equipment
C34T35 Transport equipment
C36T37 Manufacturing n.e.c. and recycling
C40T41 ELECTRICITY GAS AND, WATER SUPPLY
C45 CONSTRUCTION
C50 Sale, maintenance and repair of motor vehicles and motorcycles - retail sale of automotive fuel
C51 Wholesale, trade and commission excl. motor vehicles
C52 Retail trade excl. motor vehicles - repair of household goods
C55 Hotels and restaurants
C60 Land transport - transport via pipelines
C61 Water transport
C62 Air transport
C63 Supporting and auxiliary transport activities
C64 Post and telecommunications
C65 Financial intermediation, except insurance and pension funding
C66 Insurance and pension funding, except compulsory social security
C67 Activities auxiliary to financial intermediation
C70 Real estate activities
C71 Renting of machinery and equipment
C72 Computer and related activities
C73 Research and development
C74 Other business activities

Table A3 - List of sectors used for Italy when computing values à la Kliman (2004)

C05 Fishing, fish hatcheries, fish farms and related services
C10T12 Mining and quarrying of energy producing materials
C13T14 Mining and quarrying except energy producing materials
C15T16 Food products, beverages and tobacco
C17T18 Textiles and textile products
C19 Leather, leather products and footwear
C20 Wood and products of wood and cork
C21T22 Pulp, paper, paper products, printing and publishing
C23 Coke, refined petroleum products and nuclear fuel
C24 Chemicals and chemical products
C25 Rubber and plastics products
C26 Other non-metallic mineral products
C27T28 Basic metals and fabricated metal products
C29 Machinery and equipment, n.e.c.
C30T33 Electrical and optical equipment
C34T35 Transport equipment
C36T37 Manufacturing n.e.c. and recycling
C40T41 ELECTRICITY GAS AND, WATER SUPPLY
C45 CONSTRUCTION
C50T52 Wholesale and retail trade - repairs
C55 Hotels and restaurants
C60T64 TRANSPORT, STORAGE AND COMMUNICATIONS
C65T67 Financial intermediation
C70T74 Real estate, renting and business activities

Table A4 - List of sectors used for Norway when computing values à la Kliman (2004)

C02 Forestry, logging and related service activities
C05 Fishing, fish hatcheries, fish farms and related services
C10T12 Mining and quarrying of energy producing materials
C13 Mining of metal ores
C14 Other mining and quarrying
C15T16 Food products, beverages and tobacco
C17 Textiles
C18 Wearing apparel, dressing and dyeing of fur
C19 Leather, leather products and footwear
C20 Wood and products of wood and cork
C21 Pulp, paper and paper products
C22 Printing and publishing
C23T25 Chemical, rubber, plastics and fuel products
C26 Other non-metallic mineral products
C27 Basic metals
C28 Fabricated metal products, except machinery and equipment
C29 Machinery and equipment, n.e.c.
C30 Office, accounting and computing machinery
C31 Electrical machinery and apparatus, n.e.c.
C32 Radio, television and communication equipment
C33 Medical, precision and optical instruments
C34 Motor vehicles, trailers and semi-trailers
C35 Other transport equipment
C36T37 Manufacturing n.e.c. and recycling
C40 Electricity, gas, steam and hot water supply
C41 Collection, purification and distribution of water
C45 CONSTRUCTION
C50 Sale, maintenance and repair of motor vehicles and motorcycles - retail sale of automotive fuel
C51 Wholesale, trade and commission excl. motor vehicles
C52 Retail trade excl. motor vehicles - repair of household goods
C55 Hotels and restaurants
C60 Land transport - transport via pipelines
C61 Water transport
C62 Air transport
C63 Supporting and auxiliary transport activities
C64 Post and telecommunications
C65T67 Financial intermediation
C70 Real estate activities
C71 Renting of machinery and equipment
C72 Computer and related activities
C73 Research and development
C74 Other business activities

Table A5 - List of sectors used for Denmark when computing production and direct prices à la Diaz and Osuna (2005-6)

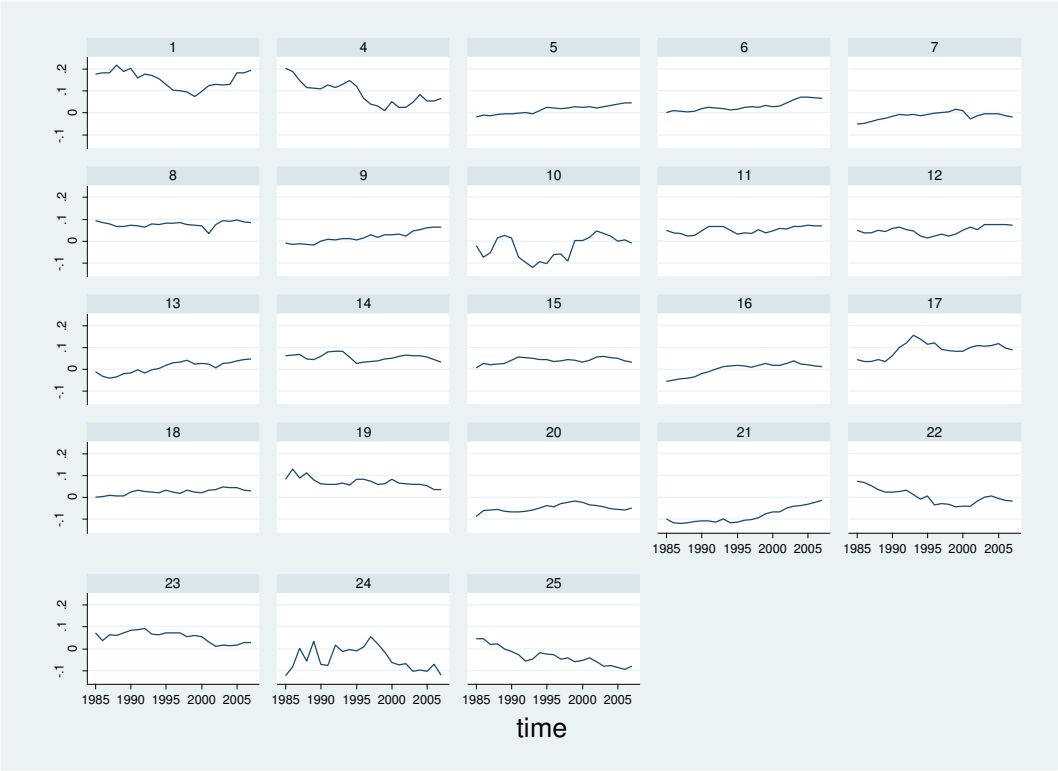
C01T05 AGRICULTURE, HUNTING, FORESTRY AND FISHING
C10T14 MINING AND QUARRYING
C15T16 Food products, beverages and tobacco
C17T19 Textiles, textile products, leather and footwear
C20 Wood and products of wood and cork
C21T22 Pulp, paper, paper products, printing and publishing
C23T25 Chemical, rubber, plastics and fuel products
C26 Other non-metallic mineral products
C27T28 Basic metals and fabricated metal products
C29 Machinery and equipment, n.e.c.
C30T33 Electrical and optical equipment
C34T35 Transport equipment
C36T37 Manufacturing n.e.c. and recycling
C40T41 ELECTRICITY GAS AND, WATER SUPPLY
C45 CONSTRUCTION
C50T55 WHOLESALE AND RETAIL TRADE - RESTAURANTS AND HOTELS
C60T64 TRANSPORT, STORAGE AND COMMUNICATIONS
C65T74 FINANCE, INSURANCE, REAL ESTATE AND BUSINESS SERVICES

Table A6 - List of sectors used for Italy when computing production and direct prices à la Diaz and Osuna (2005-6)

C01T02 Agriculture, hunting and forestry
C05 Fishing, fish hatcheries, fish farms and related services
C10T12 Mining and quarrying of energy producing materials
C13T14 Mining and quarrying except energy producing materials
C15T16 Food products, beverages and tobacco
C17T18 Textiles and textile products
C19 Leather, leather products and footwear
C20 Wood and products of wood and cork
C21T22 Pulp, paper, paper products, printing and publishing
C23 Coke, refined petroleum products and nuclear fuel
C24 Chemicals and chemical products
C25 Rubber and plastics products
C26 Other non-metallic mineral products
C27T28 Basic metals and fabricated metal products
C29 Machinery and equipment, n.e.c.
C30T33 Electrical and optical equipment
C34T35 Transport equipment
C36T37 Manufacturing n.e.c. and recycling
C40T41 ELECTRICITY GAS AND, WATER SUPPLY
C45 CONSTRUCTION
C50T52 Wholesale and retail trade - repairs
C55 Hotels and restaurants
C60T64 TRANSPORT, STORAGE AND COMMUNICATIONS
C65T67 Financial intermediation
C70T74 Real estate, renting and business activities

Appendix B (not for publication)

Figure B1 - Log deviations of total production valued at production prices from total production valued at market prices by sector, Italy - 1985-2007 (Diaz and Osuna's computation approach)



1: Agriculture, hunting and forestry; 4: Mining and quarrying except energy producing materials; 5: Food products, beverages and tobacco; 6: Textiles and textile products; 7: Leather, leather products and footwear; 8: Wood and products of wood and cork; 9: Pulp, paper, paper products, printing and publishing; 10: Coke, refined petroleum products and nuclear fuel; 11: Chemicals and chemical products; 12: Rubber and plastics products; 13: Other non-metallic mineral products; 14: Basic metals and fabricated metal products; 15: Machinery and equipment, n.e.c.; 16: Electrical and optical equipment; 17: Transport equipment; 18: Manufacturing n.e.c. and recycling; 19: Electricity gas and water supply; 20: Construction; 21: Wholesale and retail trade - repairs; 22: Hotels and restaurants; 23: Transport, storage and communications; 24: Financial intermediation; 25: Real estate, renting and business activities.

Figure B2 - Log deviations of total production valued at production prices from total production valued at market prices in Fishing and Mining industries, Italy - 1985-2007 (Diaz and Osuna's computation approach)

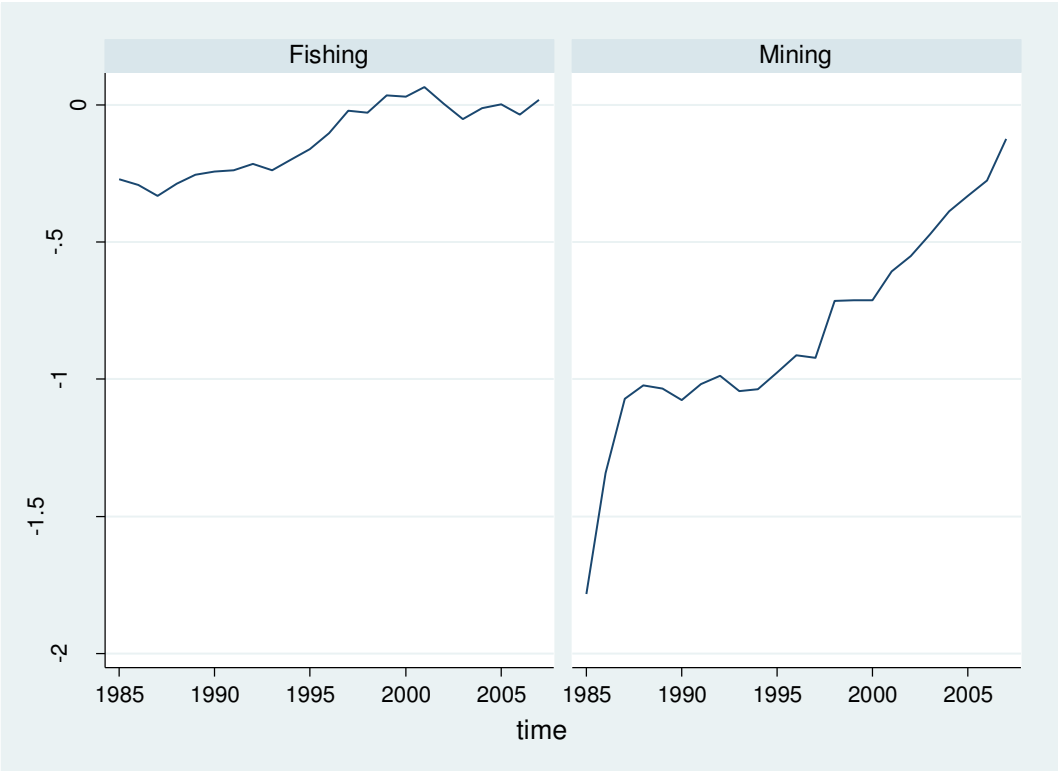
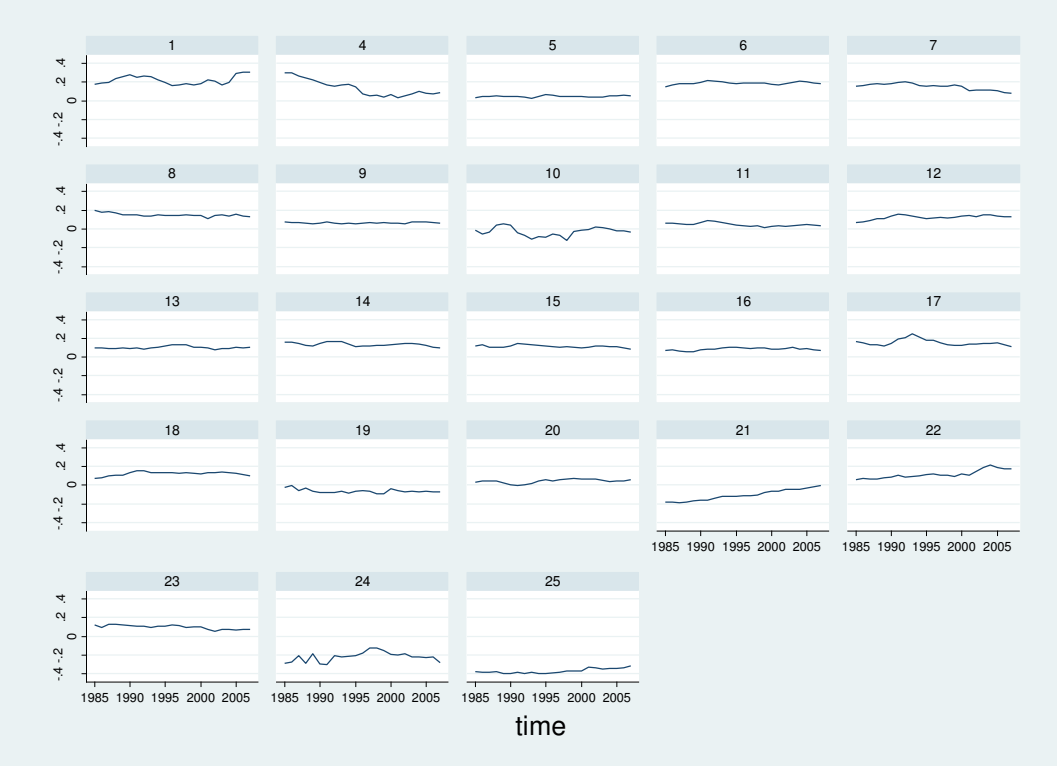


Figure B3 - Log deviations of total production valued at direct prices from total production valued at market prices by sector, Italy - 1985-2007 (Diaz and Osuna's computation approach)



1: Agriculture, hunting and forestry; 4: Mining and quarrying except energy producing materials; 5: Food products, beverages and tobacco; 6: Textiles and textile products; 7: Leather, leather products and footwear; 8: Wood and products of wood and cork; 9: Pulp, paper, paper products, printing and publishing; 10: Coke, refined petroleum products and nuclear fuel; 11: Chemicals and chemical products; 12: Rubber and plastics products; 13: Other non-metallic mineral products; 14: Basic metals and fabricated metal products; 15: Machinery and equipment, n.e.c.; 16: Electrical and optical equipment; 17: Transport equipment; 18: Manufacturing n.e.c. and recycling; 19: Electricity gas and water supply; 20: Construction; 21: Wholesale and retail trade - repairs; 22: Hotels and restaurants; 23: Transport, storage and communications; 24: Financial intermediation; 25: Real estate, renting and business activities.

Figure B4 - Log deviations of total production valued at direct prices from total production valued at market prices in Fishing and Mining industries, Italy - 1985-2007 (Diaz and Osuna's computation approach)

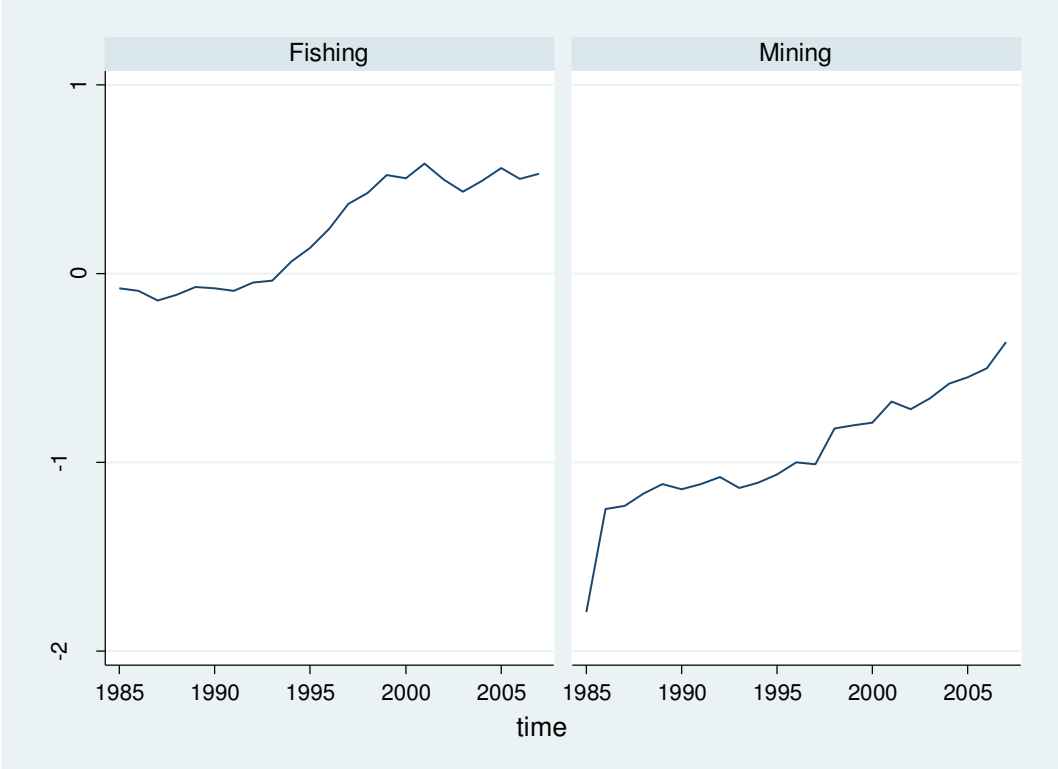
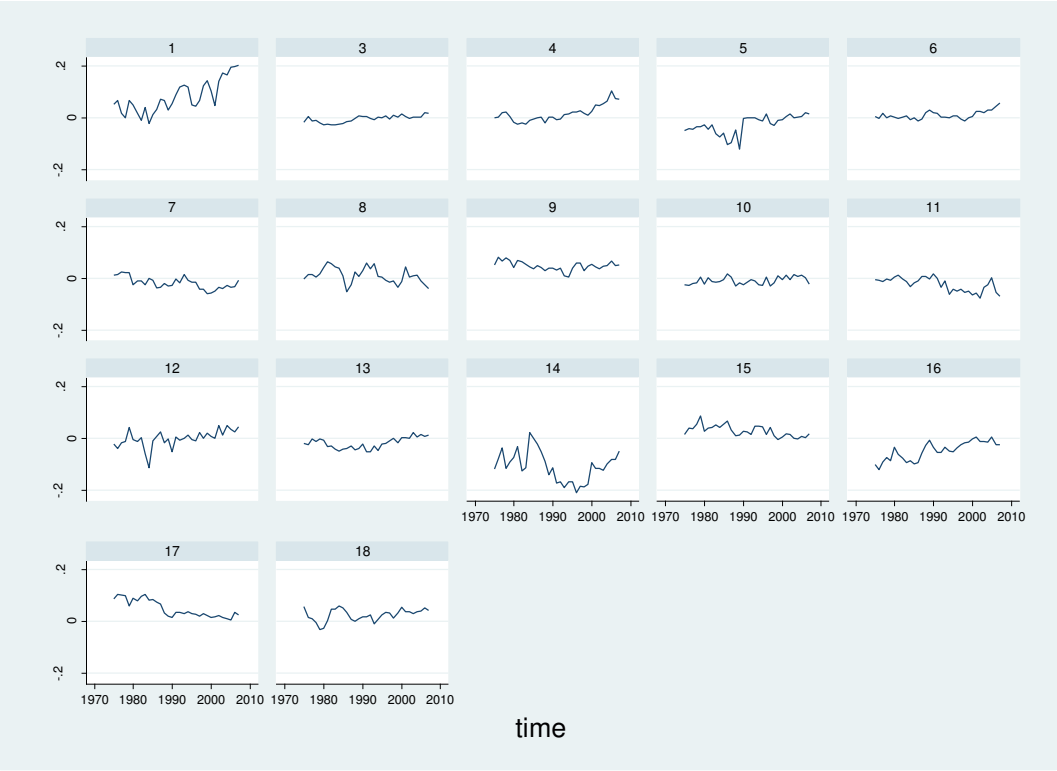


Figure B5 - Log deviations of total production valued at production prices from total production valued at market prices by sector, Denmark - 1975-2007 (Diaz and Osuna's computation approach)



Note: 1: Agriculture, hunting, forestry and fishing; 3: Food products, beverages and tobacco; 4: Textiles, textile products, leather and footwear; 5: Wood and products of wood and cork; 6: Pulp, paper, paper products, printing and publishing; 7: Chemical, rubber, plastics and fuel products; 8: Other non-metallic mineral products; 9: Basic metals and fabricated metal products; 10: Machinery and equipment, n.e.c.; 11: Electrical and optical equipment; 12: Transport equipment; 13: Manufacturing n.e.c. and recycling; 14: Electricity gas and water supply; 15: Construction; 16: Wholesale and retail trade - restaurants and hotels; 17: Transport, storage and communications; 18: Finance, insurance, real estate and business services.

Figure B6 - Log deviations of total production valued at production prices from total production valued at market prices in the Mining sector, Denmark - 1975-2007 (Diaz and Osuna's computation approach)

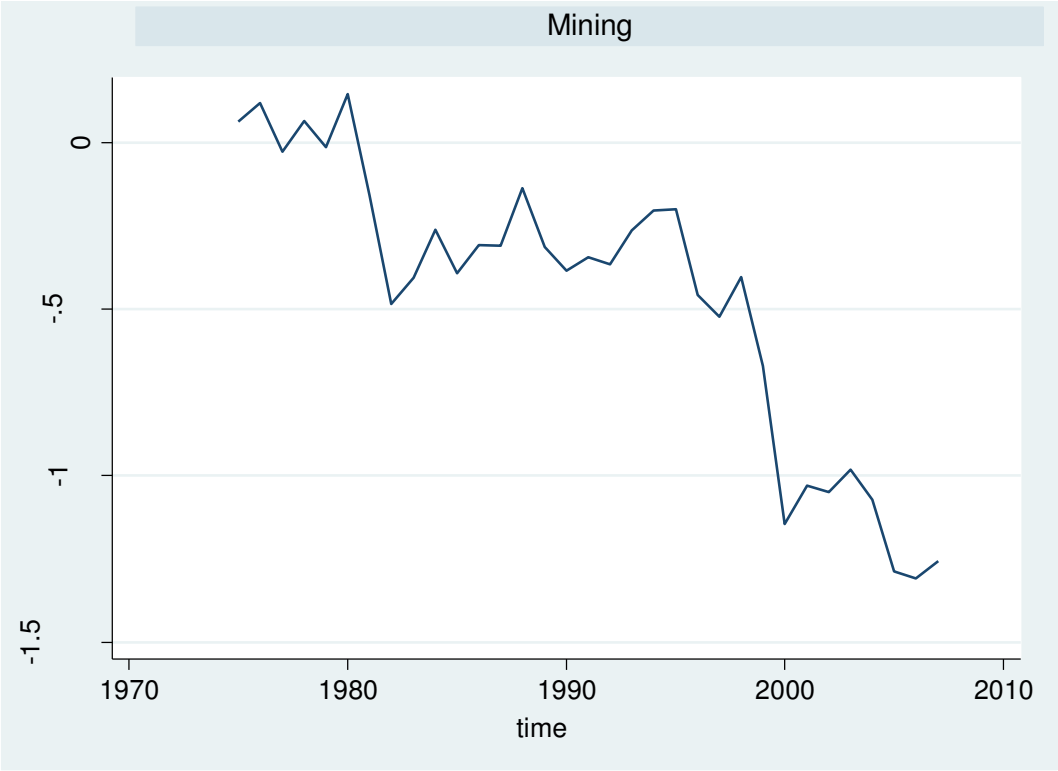
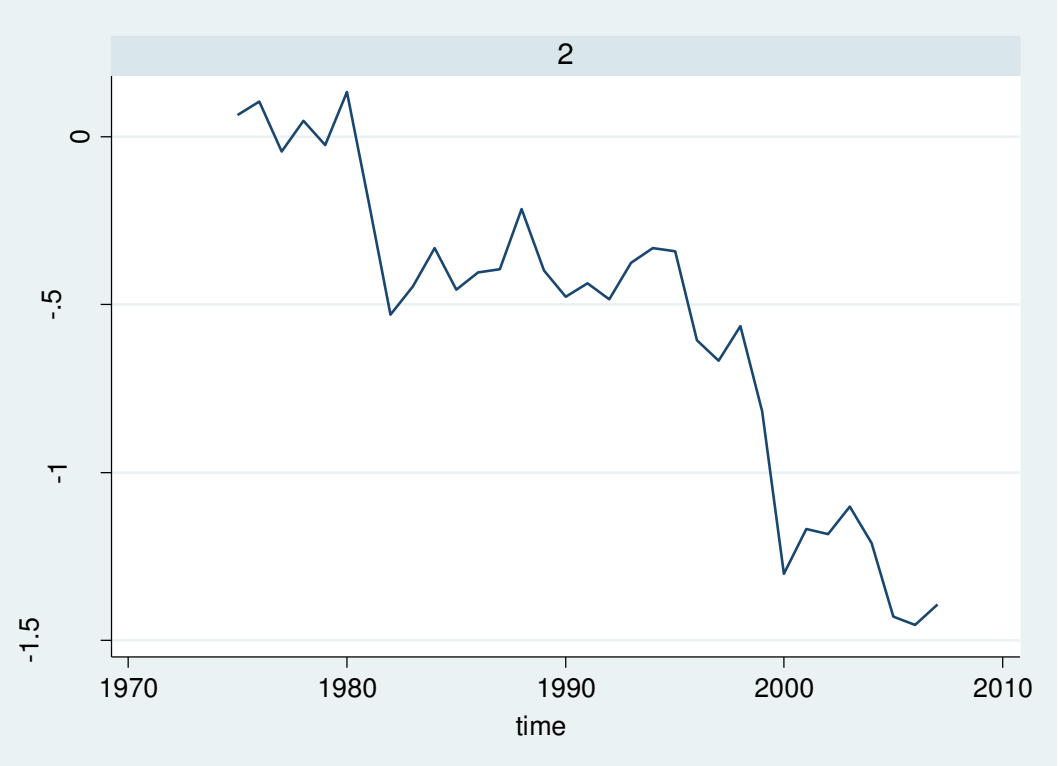


Figure B7 - Log deviations of total production valued at direct prices from total production valued at market prices by sector, Denmark - 1975-2007 (Diaz and Osuna's computation approach)

Note: 1: Agriculture, hunting, forestry and fishing; 3: Food products, beverages and tobacco; 4: Textiles, textile products, leather and footwear; 5: Wood and products of wood and cork; 6: Pulp, paper, paper products, printing and publishing; 7: Chemical, rubber, plastics and fuel products; 8: Other non-metallic mineral products; 9: Basic metals and fabricated metal products; 10: Machinery and equipment, n.e.c.; 11: Electrical and optical equipment; 12: Transport equipment; 13: Manufacturing n.e.c. and recycling; 14: Electricity gas and water supply; 15: Construction; 16: Wholesale and retail trade - restaurants and hotels; 17: Transport, storage and communications; 18: Finance, insurance, real estate and business services.

Figure B8 - Log deviations of total production valued at direct prices from total production valued at market prices by sector, Denmark - 1975-2007 (Diaz and Osuna's computation approach)



Notes: 2. Mining and quarrying.

Figure B9 - Log deviations of relative total production valued at direct prices from relative total production valued at market prices by sector, Denmark - 1970-2007 (Kliman's computation).

Note

1. C02 Forestry, logging and related service activities; 2. C05 Fishing, fish hatcheries, fish farms and related services; 4. C15T16 Food products, beverages and tobacco; 5. C17T19 Textiles, textile products, leather and footwear; 6. C20 Wood and products of wood and cork; 7. C21T22 Pulp, paper, paper products, printing and publishing; 8. C23 Coke, refined petroleum products and nuclear fuel; 9. C24 Chemicals and chemical products; 10. C25 Rubber and plastics products; 11. C26 Other non-metallic mineral products; 12. C27T28 Basic metals and fabricated metal products; 13. C29 Machinery and equipment, n.e.c.; 14. C30T33 Electrical and optical equipment; 15. C34T35 Transport equipment; 16. C36T37 Manufacturing n.e.c. and recycling; 17. C40T41 Electricity, gas and water supply; 18. C45 Construction; 19. C50 Sale, maintenance and repair of motor vehicles and motorcycles - retail sale of automotive fuel; 20. C51 Wholesale, trade and commission excl. motor vehicles; 21. C52 Retail trade excl. motor vehicles - repair of household goods; 22. C55 Hotels and restaurants; 23. C60 Land transport - transport via pipelines; 24. C61 Water transport; 25. C62 Air transport; 26. C63 Supporting and auxiliary transport activities; 27. C64 Post and telecommunications; 28. C65 Financial intermediation, except insurance and pension funding; 29. C66 Insurance and pension funding, except compulsory social security; 30. C67 Activities auxiliary to financial intermediation; 31. C70 Real estate activities; 32. C71 Renting of machinery and equipment; 33. C72 Computer and related activities; 34. C73 Research and development; 35. C74 Other business activities.

Figure B10 - Log deviations of relative total production valued at direct prices from relative total production valued at market prices in the mining and quarrying industry, Denmark - 1970-2007 (Kliman's computation).

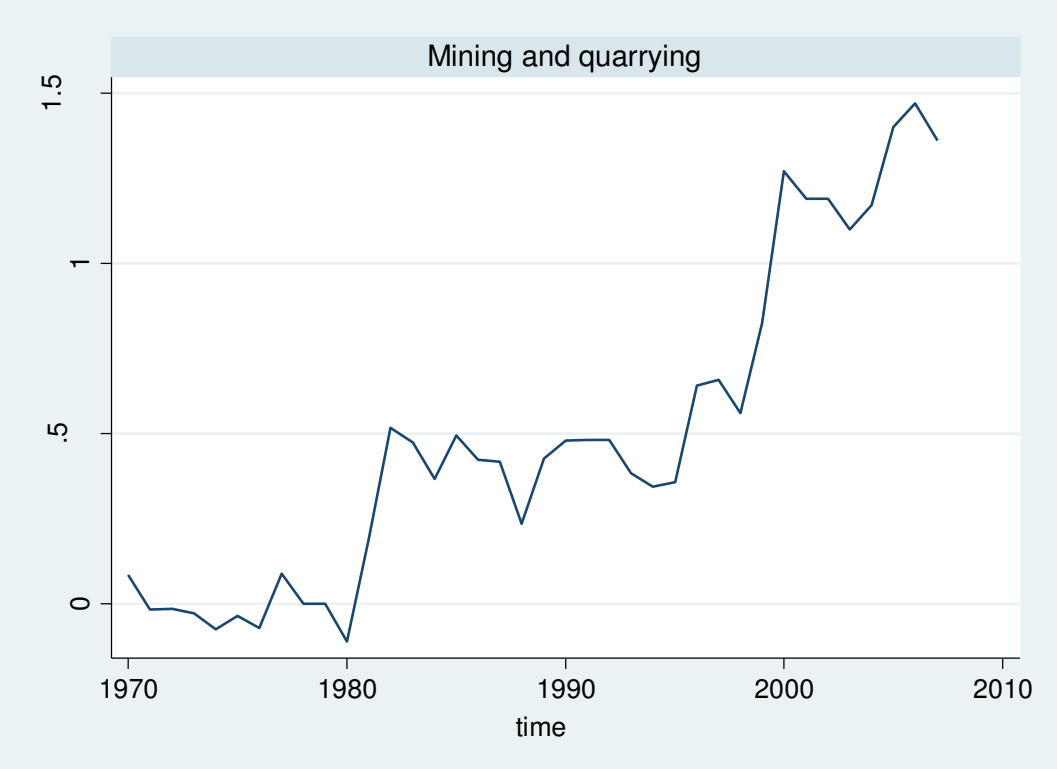
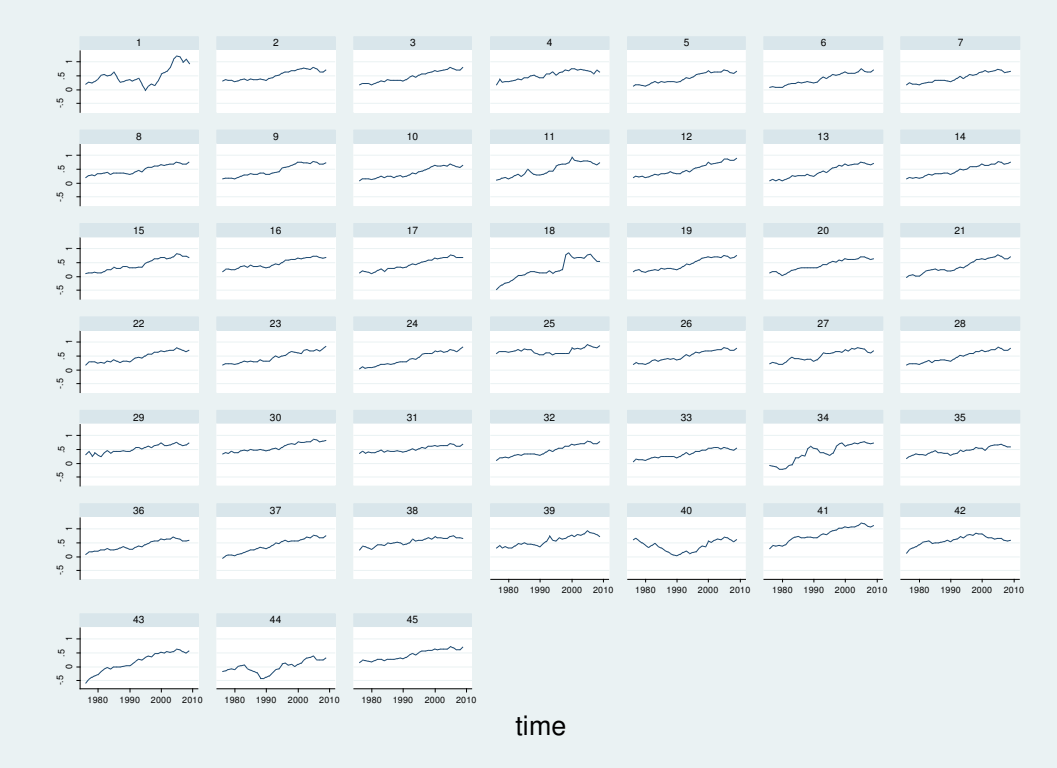
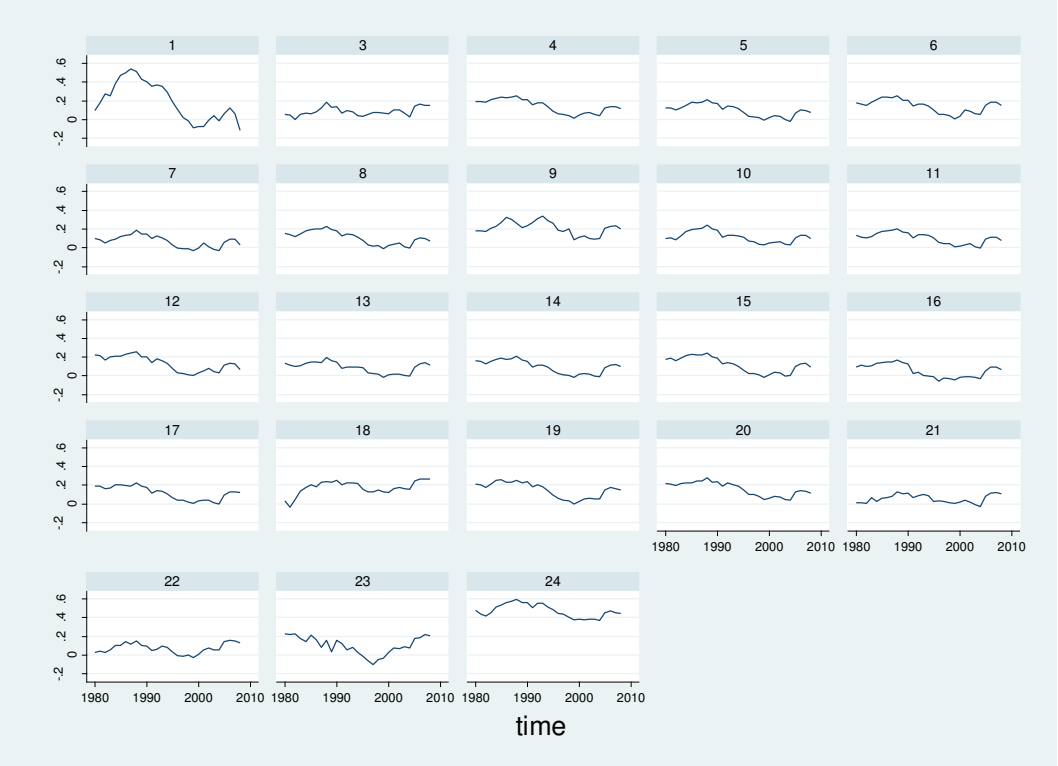


Figure B11 - Log deviations of relative total production valued at direct prices from relative total production valued at market prices in the mining and quarrying industry, Austria - 1976-2009 (Kliman's computation).



Note. 1. C10T12 Mining and quarrying of energy producing materials; 2. C13T14 Mining and quarrying except energy producing materials; 3. C15 Food products and beverages; 4. C16 Tobacco products; 5. C17 Textiles; 6. C18 Wearing apparel and dressing; 7. C19 Leather, leather products and footwear; 8. C20 Wood and products of wood and cork; 9. C21 Pulp, paper and paper products; 10. C22 Printing and publishing; 11. C23 Coke, refined petroleum products and nuclear fuel; 12. C24 Chemicals and chemical products; 13. C25 Rubber and plastics products; 14. C26 Other non-metallic mineral products; 15. C27 Basic metals; 16. C28 Fabricated metal products, except machinery and equipment; 17. C29 Machinery and equipment, n.e.c.; 18. C30 Office, accounting and computing machinery; 19. C31 Electrical machinery and apparatus, n.e.c.; 20. C32 Radio, television and communication equipment; 21. C33 Medical, precision and optical instruments; 22. C34 Motor vehicles, trailers and semi-trailers; 23. C35 Other transport equipment; 24. C36 Manufacturing n.e.c.; 25. C37 Recycling; 26. C40 Electricity, gas, steam and hot water supply; 27. C41 Collection, purification and distribution of water; 28. C45 Construction; 29. C50 Sale, maintenance and repair of motor vehicles and motorcycles - retail sale of automotive fuel; 30. C51 Wholesale, trade and commission excl. motor vehicles; 31. C52 Retail trade excl. motor vehicles - repair of household goods; 32. C55 Hotels and restaurants; 33. C60 Land transport - transport via pipelines; 34. C61 Water transport; 35. C62 Air transport; 36. C63 Supporting and auxiliary transport activities; 37. C64 Post and telecommunications; 38. C65 Financial intermediation, except insurance and pension funding; 39. C66 Insurance and pension funding, except compulsory social security; 40. C67 Activities auxiliary to financial intermediation; 41. C70 Real estate activities; 42. C71 Renting of machinery and equipment; 43. C72 Computer and related activities; 44. C73 Research and development; 45. C74 Other business activities

Figure B12 - Log deviations of relative total production valued at direct prices from relative total production valued at market prices in various industries, Italy - 1980-2008 (Kliman's computation).



1. C05 Fishing, fish hatcheries, fish farms and related services; 3. C13T14 Mining and quarrying except energy producing materials; 4. C15T16 Food products, beverages and tobacco; 5. C17T18 Textiles and textile products; 6. C19 Leather, leather products and footwear; 7. C20 Wood and products of wood and cork; 8. C21T22 Pulp, paper, paper products, printing and publishing; 9. C23 Coke, refined petroleum products and nuclear fuel; 10. C24 Chemicals and chemical products; 11. C25 Rubber and plastics products; 12. C26 Other non-metallic mineral products; 13. C27T28 Basic metals and fabricated metal products; 14. C29 Machinery and equipment, n.e.c.; 15. C30T33 Electrical and optical equipment; 16. C34T35 Transport equipment; 17. C36T37 Manufacturing n.e.c. and recycling; 18. C40T41 ELECTRICITY GAS AND, WATER SUPPLY; 19. C45 CONSTRUCTION; 20. C50T52 Wholesale and retail trade - repairs; 21. C55 Hotels and restaurants; 22. C60T64 TRANSPORT, STORAGE AND COMMUNICATIONS; 23. C65T67 Financial intermediation; 24. C70T74 Real estate, renting and business activities.

Figure B13 - Log deviations of relative total production valued at direct prices from relative total production valued at market prices in the mining and quarrying of energy producing materials, Italy - 1980-2008 (Kliman's computation).

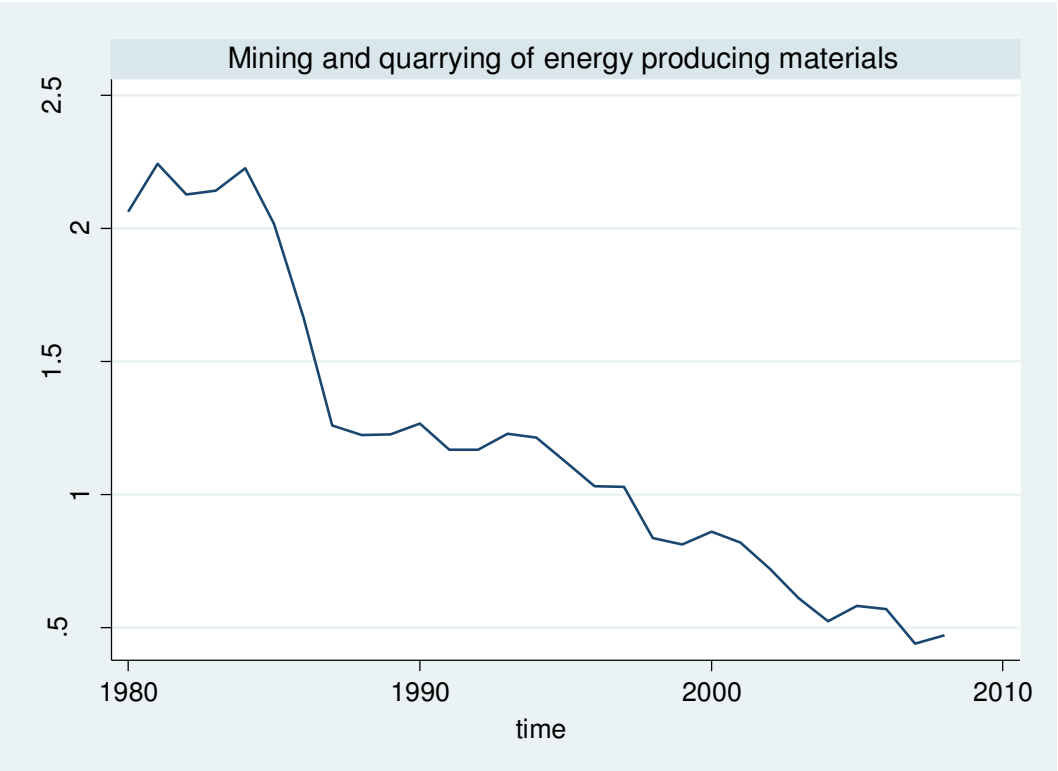
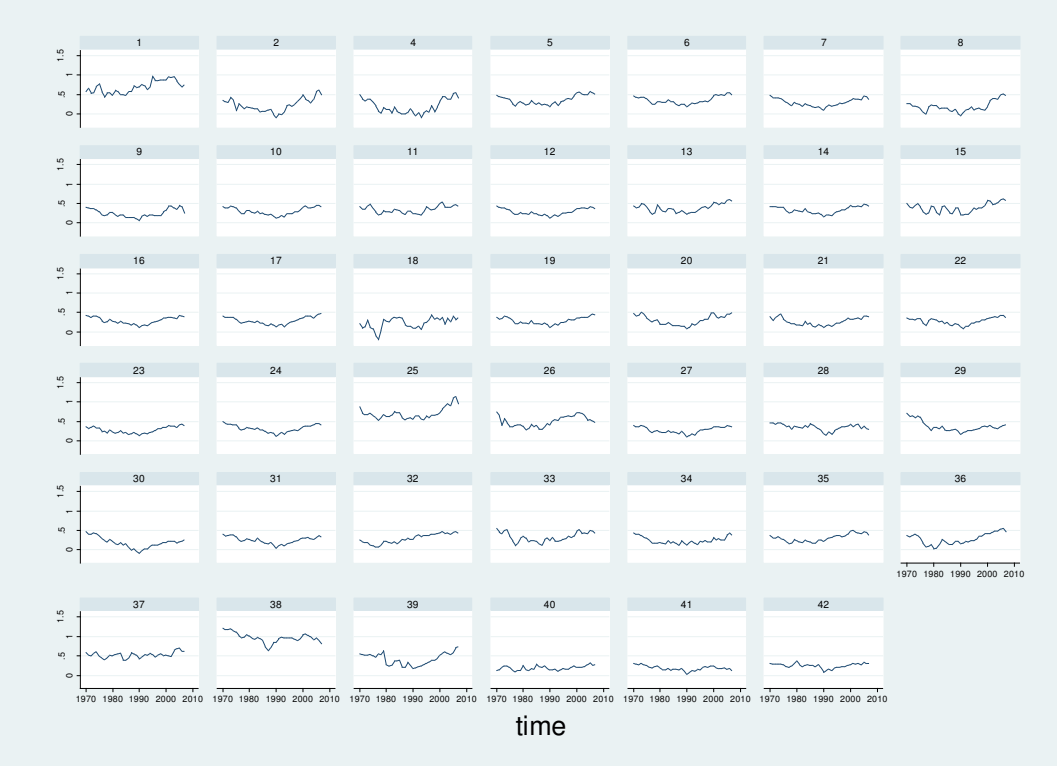
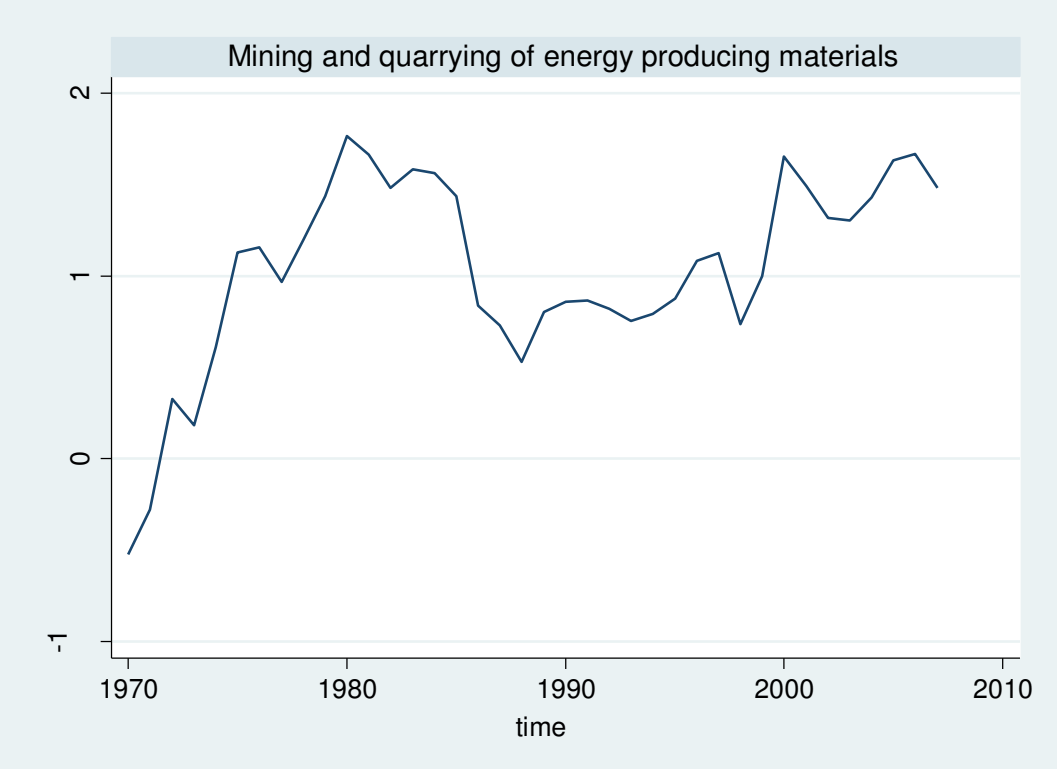


Figure B14 - Log deviations of relative total production valued at direct prices from relative total production valued at market prices in various industries, Norway - 1970-2007 (Kliman's computation).



1. C02 Forestry, logging and related service activities; 2. C05 Fishing, fish hatcheries, fish farms and related services; 3. C10T12 Mining and quarrying of energy producing materials; 4. C13 Mining of metal ores; 5. C14 Other mining and quarrying; 6. C15T16 Food products, beverages and tobacco; 7. C17 Textiles; 8. C18 Wearing apparel, dressing; 9. C19 Leather, leather products and footwear; 10. C20 Wood and products of wood and cork; 11. C21 Pulp, paper and paper products; 12. C22 Printing and publishing; 13. C23T25 Chemical, rubber, plastics and fuel products; 14. C26 Other non-metallic mineral products; 15. C27 Basic metals; 16. C28 Fabricated metal products, except machinery and equipment; 17. C29 Machinery and equipment, n.e.c.; 18. C30 Office, accounting and computing machinery; 19. C31 Electrical machinery and apparatus, n.e.c.; 20. C32 Radio, television and communication equipment; 21. C33 Medical, precision and optical instruments; 22. C34 Motor vehicles, trailers and semi-trailers; 23. C35 Other transport equipment; 24. C36T37 Manufacturing n.e.c. and recycling; 25. C40 Electricity, gas, steam and hot water supply; 26. C41 Collection, purification and distribution of water; 27. C45 CONSTRUCTION; 28. C50 Sale, maintenance and repair of motor vehicles and motorcycles - retail sale of automotive fuel; 29. C51 Wholesale, trade and commission excl. motor vehicles; 30. C52 Retail trade excl. motor vehicles - repair of household goods; 31. C55 Hotels and restaurants; 32. C60 Land transport - transport via pipelines; 33. C61 Water transport; 34. C62 Air transport; 35. C63 Supporting and auxiliary transport activities; 36. C64 Post and telecommunications; 37. C65T67 Financial intermediation; 38. C70 Real estate activities; 39. C71 Renting of machinery and equipment; 40. C72 Computer and related activities; 41. C73 Research and development; 42. C74 Other business activities.

Figure B15 - Log deviations of relative total production valued at direct prices from relative total production valued at market prices in the mining and quarrying of energy producing materials, Norway - 1970-2007 (Kliman's computation).



Appendix C (not for publication)

This appendix sets out the results concerning panel unit root tests once considering aggregate percentage deviations of market prices from direct prices computed à la Kliman (2004). In other words they are the counterparts of Tables 3 to 6 once not using any sector as numeraire.

Table C1 - Panel unit root test for aggregate price - value deviations in Austria (1976-2009), data computed following Kliman (2004)

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.59456	0.2761	29	947
ADF - Fisher Chi-square	58.7788	0.4468	29	947
PP - Fisher Chi-square	71.7357	0.1061	29	957

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Note. The following sectors were dropped to obtain non-stationarity of the remaining sectors: C15 Food products and beverages; C17 Textiles; C18 Wearing apparel and dressing; C19 Leather, leather products and footwear; C22 Printing and publishing; C26 Other non-metallic mineral products; C29 Machinery and equipment, n.e.c.; C32 Radio, television and communication equipment; C34 Motor vehicles, trailers and semi-trailers; C35 Other transport equipment; C40 Electricity, gas, steam and hot water supply; C45 Construction; C50 Sale, maintenance and repair of motor vehicles and motorcycles - retail sale of automotive fuel; C55 Hotels and restaurants; C66 Insurance and pension funding, except compulsory social security; C72 Computer and related activities; C74 Other business activities

Table C2 - Panel unit root test for aggregate price - value deviations in Italy (1980-2008), data computed following Kliman (2004)

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.04871	0.1472	14	388
ADF - Fisher Chi-square	32.4651	0.2560	14	388
PP - Fisher Chi-square	34.1116	0.1972	14	392

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Note. The following sectors were dropped to obtain non-stationarity of the remaining sectors: C15T16 Food products, beverages and tobacco; C17T18 Textiles and textile products; C19 Leather, leather products and footwear; C20 Wood and products of wood and cork; C21T22 Pulp, paper, paper products, printing and publishing; C24 Chemicals and chemical products; C25 Rubber and plastics products; C29 Machinery and equipment, n.e.c.; C36T37 Manufacturing n.e.c. and recycling, C40T41 ELECTRICITY GAS AND, WATER SUPPLY; C55 Hotels and restaurants.

Table C3 - Panel unit root test for aggregate price - value deviations in Denmark (1970-2007), data computed following Kliman (2004)

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.55929	0.0595	19	699
ADF - Fisher Chi-square	44.2232	0.2255	19	699
PP - Fisher Chi-square	42.2523	0.2923	19	703

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Note. The following sectors were dropped to obtain non-stationarity of the remaining sectors: C02 Forestry, logging and related service activities; C15T16 Food products, beverages and tobacco; C17T19 Textiles, textile products, leather and footwear; C20 Wood and products of wood and cork; C21T22 Pulp, paper, paper products, printing and publishing; C25 Rubber and plastics products; C26 Other non-metallic mineral products; C27T28 Basic metals and fabricated metal products; C29 Machinery and equipment, n.e.c.; C34T35 Transport equipment; C36T37 Manufacturing n.e.c. and recycling; C51 Wholesale, trade and commission excl. motor vehicles; C55 Hotels and restaurants; C65 Financial intermediation, except insurance and pension funding; C73 Research and development; C74 Other business activities.

Table C4 - Panel unit root test for aggregate deviations between market and production prices in Norway (1970-2007), data computed following Kliman (2004)

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.53401	0.0625	19	695
ADF - Fisher Chi-square	42.6780	0.2770	19	695
PP - Fisher Chi-square	44.1097	0.2290	19	703

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Note. The following sectors were dropped to obtain non-stationarity of the remaining sectors: C02 Forestry, logging and related service activities; C05 Fishing, fish hatcheries, fish farms and related services; C10T12 Mining and quarrying of energy producing materials; C13 Mining of metal ores; C14 Other mining and quarrying; C15T16 Food products, beverages and tobacco; C18 Wearing apparel, dressing and dyeing of fur; C20 Wood and products of wood and cork; C21 Pulp, paper and paper products; C23T25 Chemical, rubber, plastics and fuel products; C27 Basic metals; C28 Fabricated metal products, except machinery and equipment; C29 Machinery and equipment, n.e.c.; C31 Electrical machinery and apparatus, n.e.c.; C33 Medical, precision and optical instruments; C35 Other transport equipment; C40 Electricity, gas, steam and hot water supply; C61 Water transport; C62 Air transport; C65T67 Financial intermediation; C71 Renting of machinery and equipment.

Appendix D (not for publication)

This appendix is devoted to the results concerning panel unit root tests once inflating MELT- in Table 2 by considering the annual inflation rate of total production, computed as the annual difference in logs of the values of the deflator of total production (PRDP in the STAN OECD database).

Table D1 - Panel unit root test for absolute deviations between market and production prices in Denmark (1975-2007), data computed following Diaz and Osuna (2005-2006)

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 3
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-1.52126	0.0641	15	476
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.91171	0.1810	15	476
ADF - Fisher Chi-square	33.5309	0.3000	15	476
PP - Fisher Chi-square	35.7843	0.2152	15	480

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Note. The following sectors were dropped to obtain non-stationarity of the remaining sectors: C27T28 Basic metals and fabricated metal products; C29 Machinery and equipment, n.e.c.; C34T35 Transport equipment.

Table D2 - Panel unit root test for absolute deviations between market prices and values in Denmark (1975-2007), data computed following Diaz and Osuna (2005-2006)

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	0.58254	0.7199	13	416
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	1.37552	0.9155	13	416
ADF - Fisher Chi-square	22.6273	0.6539	13	416
PP - Fisher Chi-square	23.2253	0.6202	13	416

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Note. The following sectors were dropped to obtain non-stationarity of the remaining sectors: C15T16 Food products, beverages and tobacco; C29 Machinery and equipment, n.e.c.; C34T35 Transport equipment; C36T37 Manufacturing n.e.c. and recycling; C45 Construction.

Table D3 - Panel unit root test for absolute deviations between market and production prices in Italy (1985-2007), data computed following Diaz and Osuna (2005-2006)

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 5
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-0.53719	0.2956	13	306
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.06273	0.1440	13	306
ADF - Fisher Chi-square	31.6908	0.2035	13	306
PP - Fisher Chi-square	38.1651	0.0585	13	325

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Note. The following sectors were dropped to obtain non-stationarity of the remaining sectors: C10T12 Mining and quarrying of energy producing materials; C19 Leather, leather products and footwear; C20 Wood and products of wood and cork; C23 Coke, refined petroleum products and nuclear fuel; C26 Other non-metallic mineral products; C27T28 Basic metals and fabricated metal products; C29 Machinery and equipment, n.e.c.; C34T35 Transport equipment; C36T37 Manufacturing n.e.c. and recycling; C40T41 Electricity, Gas and Water Supply; C45 Construction; C65T67 Financial intermediation.

Table D4 - Panel unit root test for absolute deviations between market prices and values in Italy (1985-2007), data computed following Diaz and Osuna (2005-2006)

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	0.74339	0.7714	7	169
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.57064	0.0581	7	169
ADF - Fisher Chi-square	19.9784	0.1308	7	169
PP - Fisher Chi-square	19.9756	0.1309	7	175

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Note. Non-stationarity was found only when including in the dataset the following sectors: C01T02 Agriculture, hunting and forestry; C05 Fishing, fish hatcheries, fish farms and related services; C13T14 Mining and quarrying except energy producing materials; C34T35 Transport equipment; C45 Construction; C50T52 Wholesale and retail trade - repairs; C55 Hotels and restaurants.