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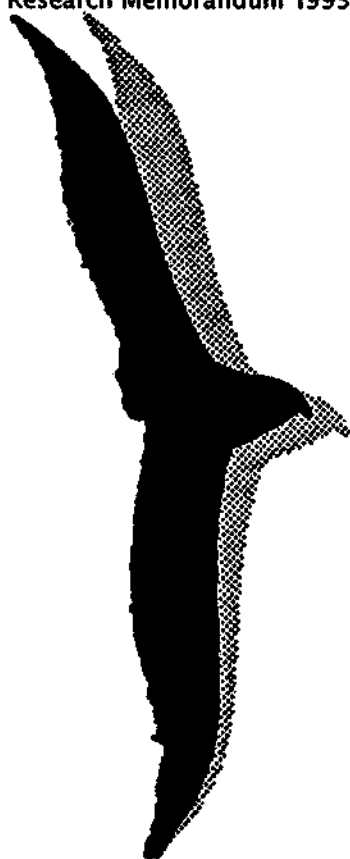
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THE EFFECT OF WAGE RESTRAINT ON LABOUR MARKET FLOWS

by

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ABSTRACT

This paper studies the effects of a wage restraint policy on flows on the labour market. We distinguish flows into and out of employment and consider simple models for these flows. We find that the wage costs particularly affect the flow of employment into unemployment, which can be considered as a measure of job destruction, whereas it has no effect on the number of new hires, which can be considered as a measure of job creation. Therefore, wage moderation has preserved jobs that would otherwise have been destroyed. The inflow of new hires is influenced by investments, the generosity of the social benefit system and by structural mismatch. Apart from wage costs, also interest costs of firms play a role in the job destruction process, particularly since the beginning of the 1980's.

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1. INTRODUCTION

This paper adopts the flow approach to the labour market to identify the factors that determine the inflow in and the outflow from employment in The Netherlands between 1959 and 1991. A common feature in the pattern of employment in many industrialized economies is a slowdown in growth during the recession of 1974-75 and a considerable decline due to the recession of 1981-82. From the second half of the 1980's employment increased again, both in persons and in labour years. In The Netherlands, this increase in employment was quite substantial, compared to other EC-countries. See, e.g., OECD (1989,1991). It is argued that this excellent employment performance was the result of a maintained policy of wage restraint throughout the 1980's. Cf. CPB (1991) and Den Butter (1991).

Traditional studies and models of the labour market, on which the above results are based, focus on stocks, i.e., employment, unemployment and labour supply. The flow approach to labour markets, which has recently gained momentum due to Blanchard and Diamond (1990,1992) among others, concentrates on flows of workers between these stocks. Usually, attention is paid to flows into and out of unemployment, as set out by Nickell (1982) and elaborated in Pissarides (1990). In this paper, however, we distinguish flows into and out of employment.

The flow of workers out of employment is composed of outflow into unemployment and outflow into non-participation, notably disability, (early) retirement and death. Given this total gross outflow from employment and the net change in employment, we can easily derive the gross inflow into employment, i.e., excluding workers who change jobs. Hence, in this paper employment growth is decomposed into its 'building blocks', gross employment inflow and gross employment outflow. These flows differ from flows of job creation and job destruction. Cf. Davis and Haltiwanger (1990,1993). However, it does seem reasonable to use the flow from employment into unemployment, hence the number of layoffs, as an approximation of job destruction and the inflow of new workers as a proxy for job creation. Cf. Den Butter and Broersma (1993).

We find that the policy of wage restraint in The Netherlands, represented by the labour income share, has particularly affected the outflow out of employment into unemployment. Hence, it has preserved jobs that would

otherwise have been destroyed. We also find that, especially since the early 1980's, the interest costs of firms played a role in the outflow into unemployment. Apparently, rising interest costs leads to the destruction of more jobs. Cf. Broersma (1992). Wage costs do however not seem to have a significant impact on the inflow of new workers. This inflow is more affected by investments, which in their turn are based on business prospects and sales expectations. Also the generosity of the social security system influences the inflow into employment. If the opportunity costs of being unemployed are low, unemployed persons are less inclined to search for jobs and hence the number of new hires is lower as well. Finally, also mismatch on regional labour markets appears to affect inflow into employment.

This paper is organized as follows. First, we discuss the various flows on the Dutch labour market in section 2. Section 3 is concerned with the theoretical background of these flows and section 4 presents some estimation and test results. Finally, section 5 concludes.

2. FLOWS ON THE DUTCH LABOUR MARKET

We first of all have to identify the labour market flows that we consider to be essential to study the effects of a policy of wage restraint. We will concentrate on the flow of persons moving out of and into employment. Hence, we abstract from flows within employment, i.e., job-to-job movement, flows from unemployment to non-participation and vice versa. In figure 1, we sketch these relevant flows.

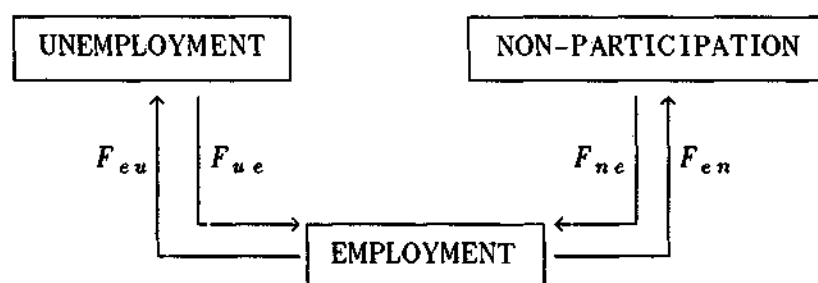


Figure 1. Flows out of and into employment.

Data on the outflow of employment into unemployment (F_{eu}), disability (F_{ed}), early and normal retirement (F_{eer} and F_{er}) and the mortality rate among workers (F_{em}) are available. Hence, it is easy to construct the inflow into employment (F_{in}) from the total outflow out of employment (F_{out}), which is composed of outflow to both unemployment (F_{eu}) and non-participation ($F_{en} = F_{ed} + F_{eer} + F_{er} + F_{em}$), and the net change in employment ΔE , or

$$\Delta E = F_{in} - F_{out}, \quad (1)$$

where Δ is the difference operator, $\Delta x_t = x_t - x_{t-1}$. Equation (1) gives the gross inflow into employment or, in other words, the amount of new hires. Notice that we abstract from voluntary outflow of employment into non-participation, which can be assumed to be small. For more details, we refer to the Appendix.

The levels of these flows into an out of employment for the period 1959-1991, are depicted in figure 2 and their main statistical characteristics are given in table 1.

Table 1. Characteristics of stock and flow series (1959-1991).

	Mean	Standard deviation	Maximum	Minimum
Employment	4 193 273	414 488	5 160 000	3 472 000
Inflow	405 458	133 497	729 033	200 125
Outflow	352 428	116 886	532 901	148 125

In general, two features of these flows are noteworthy. First, their size is large, compared to the net change in employment. Both inflow and outflow amount to some 10 percent of the level of employment, whereas the net change lies on average between 1 and 2 percent of the level of employment. The gross flows are about ten times larger! Thus, the Dutch labour market is characterized by large flows of workers into and out of employment. The actual gross flows are even larger, as we cannot take account of workers moving in and out of employment within one year. Loosely speaking, there might also be high rates of job creation and job destruction, as was also noted by Blanchard and Diamond (1990) in a study of worker flows on the U.S. labour market.

Second, it is clear that The Netherlands have experienced an almost continuing increase in employment, from 3.5 million persons in 1960 to more than 5 million in the 1990's. Only in 1972, 1975 and 1983, employment actually fell. Over the same period, the inflow and outflow varied substantially. In the first half of the 1960's inflow was much higher than outflow and hence employment increased. Notice that due to the recession of 1967 inflow and outflow were approximately equal. The 1968 peak in both inflow and outflow was caused by the introduction of the disability act for employees (WAO). In the 1970's and 80's inflow and outflow moved closer together, with notable exceptions in 1979-1980 and 1986-88, when inflow rose much steeper than outflow and hence employment increased. It was especially this increase in employment that was attributed to the continued policy of wage restraint that was upheld in the Netherlands from the early 1980's onwards. Notice that this sharp increase in employment in the second half of the 1980's was caused in part by an increase in the number of persons working part-time. In the sequel we will identify explanatory variables for these two flow series and we will model their effect.

3. THEORETICAL BACKGROUND

Following definition (1), the employment level in period $t+1$, E_{t+1} , equals employment in the previous period, E_t , plus the number of hires, F_{in} , minus the number of persons leaving employment, F_{out} . Of the latter flow, we assume only the flow into unemployment to be determined by economic circumstances. Throughout the paper we abstract from job-to-job movement. Hence, the inflow of new workers or the hires and the flow of worker into unemployment or the layoffs are determined by

$$F_{in} = hU, \quad (2)$$

$$F_{eu} = lE, \quad (3)$$

where U is the number of unemployed, h is the hiring rate and l is the layoff rate.

Our theoretical considerations are inspired by the main assumptions of traditional matching and equilibrium flow models, as developed by Holt (1970) and Nickell (1982) and elaborated by Pissarides (1990). We assume that only unemployed persons engage in search for a job. Hence, we abstract from the role of employed job searchers. Burgess (1993) investigates the possibility of competition between employed and unemployed job searchers. Broersma (1993) also found substantial influence of such competition on the outflow out of unemployment in The Netherlands. The effect of job-to-job movement on employment is studied by Hassink and Broersma (1993).

Furthermore, we assume imperfect information when unemployed search for the 'best' job and employers search for the 'best' worker. When these two find each other, a successful match may take place when the vacancy is filled by the job seeker, which thus results in a new hire. Finally, we also assume that the flows of workers across various states are generated by random shocks that affect the firm in a positive (opening of a new vacancy) or in a negative way (layoffs). These shocks are distributed around a zero mean and constant variance. Various structural shifts can be incorporated in this concept, like the one introduced by Lilien (1982), inducing larger flows of workers, i.e., more hires and layoffs each period. However, at the same time this not necessarily implies an increase in the number of successful matches. For instance, firms may require different skills than the ones offered by laid off workers. The same applies when jobs are offered in one region, but job seekers are in another and both are unwilling or unable to meet. This means that mismatch can generate an asymmetric impact of structural shifts on the size of F_{in} and F_{eu} and may thus lead to higher unemployment.

Hires

Based on these arguments, we can write the hiring rate h and the layoff rate l as functions of a vector of explanatory variables. The hiring rate h is the product of the job offer rate by firms, θ , and the job acceptance rate of unemployed, ρ . Hence,

$$h = \theta \rho. \tag{4}$$

We relax the equilibrium flow assumption and do allow for disequilibrium

situations in this setting. This implies that we no longer assume constant demand, a constant composition of the labour force and constant characteristics of vacancies and unemployed, i.e., a constant level of mismatch. We now identify variables that determine θ and ρ .

The number of jobs a firm offers are connected to the desired level of employment the firm wants attain. This desired level of employment depends on relative prices, (technology) shocks, expectations and the like, as was argued by Nickell (1986). We assume that the number of jobs offered are determined by the overall level of costs incurred by the firm; especially the costs involved in filling and maintaining this job. We assume these costs to consist mainly of labour costs, but also interest costs on debts may be important, to create and maintain a job.

On the other hand, the actual and prospective business performance of the firm is another important determinant for offering a job. If the firm wants to prepare for expectations of a buoyant market, then it may offer more jobs. We simply assume that these prospects and expectations are associated with current aggregate demand. This demand may come from households and other firms and it may come from the home market or from abroad. Aggregate demand therefore includes consumption, investments and terms of trade.

The inclusion of investments may pose a problem at the micro level, since it is connected with the other production factor, capital. A relation between job offers and capital depends on the functional form of the production function. In case of fixed coefficients *ex post*, an increase in capital yields an increase in labour, or more job offers. In macroeconomics, on the other hand, investments are often associated with expectations. According to standard Keynesian reasoning, an increase in investments is seen as a major cause for boosting employment.

Finally, we have to include variables that represent changes in the composition of the labour force and changes in characteristics of unemployed and vacancies, that may be associated with a change in equilibrium flows or a situation of disequilibrium. For this reason, we also include the Lilien-index of structural change in the sectoral employment growth, ss , and a regional mismatch indicator, mm . Hence,

$$\theta = \theta(c, ad, ss, mm), \quad (5)$$

where c is the cost level, which consists of labour and interest costs, and ad stands for aggregate demand.

The job acceptance rate ρ depends on the replacement rate, as a measure of the opportunity costs of being unemployed.,

$$\rho = \rho(rr). \quad (6)$$

Combining (5) and (6) and taking logarithms yields the hiring rate,

$$\log h = \log \theta(c, ad, ss, mm) + \log \rho(rr). \quad (7)$$

Layoffs

We use Burgess and Nickell (1990) to find a specification for the layoff rate. The decision to layoff a person is based on some planning on the part of the firm. The firm plans to employ a certain number of workers each period. If the firm is struck by a negative shock, this may imply a revision of the employment plan and may thus result in laying off a number of workers. As mention earlier, we abstract from voluntary quits.

The number of persons a firm wants to layoff is equal to the difference between actual and planned employment. Thus the layoff rate l can be written as a function of planned employment E^p ,

$$l = l(E^p).$$

Planned employment is based on profit maximizing behaviour of the firm, as set out in Nickell (1986). It typically depends on variables like the relative cost level of the firm, in particular the labour costs, but also the interest payments of debts, aggregate demand, and a set of variables representing the state of the labour market. Cf. Burgess and Nickell (1990). We approximate the latter by the index of structural change in the composition of the labour force ss . Thus, the layoff rate l , written in logarithms, is specified as

$$\log l = \log l(c, ad, ss). \quad (9)$$

4. DATA

This section briefly discusses some of the data used below. Details of the definitions and sources are given in the Appendix. We start with the hiring rate h , which is defined as the inflow into employment F_{in} , normalized by the beginning of the year unemployment stock. Since it exceeds unity it cannot be interpreted as a probability. The unemployment data refer to the beginning of the year, so it is a predetermined variable.

The layoff rate is given by the outflow of persons from employment to unemployment, F_{eu} , normalized by the employment stock of the beginning of the year. The cost variable, c , is composed of labour costs, for which we take the labour income share, and interest costs, for which we take the interest share. Cf. Appendix. Investments i are the real investments in fixed capital. The replacement rate was calculated as the ratio of the unemployment insurance benefit and the net industrial wages.

Structural change in the composition of the labour force is represented by the Lilien-index for structural shifts in growth rates of sectoral employment. Regional mismatch is represented by the sum of the absolute value of the residuals of a regression of unemployment on a constant and the vacancies for each Dutch province.

4. ESTIMATION AND TEST RESULTS

This section presents the estimation results of models (8) and (9). All variables involved are in logarithms. Our modelling strategy is to move from general to specific and to test the adequacy of our models with a number of misspecification tests. This general specification will then be simplified, by deleting variables with insignificant parameters. The validity of these simplifications are tested with a standard F -test.

Equations (8) and (9) can easily be rewritten in error correction form and the presence of cointegration can be tested.

$$\begin{aligned} \Delta \log h_t = & \alpha_1 \Delta \log \theta_t(c, ad, ss, mm) + \alpha_2 \Delta \log \rho_t(rr) + \\ & - \gamma [\log h - \beta_1 \log \theta(c, ad, ss, mm) - \beta_2 \log \rho(rr)]_{t-1} \end{aligned} \quad (10)$$

$$\Delta \log l_t = \alpha_3 \Delta \log l_t(c, ad, ss) - \delta [\log l - \beta_3 \log l(c, ad, ss)]_{t-1} \quad (11)$$

A static regression of the long-term of (10) yields the Durbin-Watson test statistics on cointegration of 1.80. This rather high value has two implications. First, the presence of a long-term relation cannot be rejected. Second, this equation needs only little additional dynamics to be adequate. For the static regression of the long-term part of (11), we found a Durbin-Watson statistic of 0.86, indicating that also here cointegration cannot be rejected.

Next (10) and (11) were estimated and tested, where we also included a time trend in the models, since application of the augmented Dickey-Fuller test showed that both dependent variables were trend stationary. Most of the other series were $I(1)$. The estimation and test results are given in table 2 and 3, respectively, where only the simplified models are presented.

We start the discussion with the model for the hiring rate in table 2. The F -test on parameter restrictions to test the validity of moving from the general specification to the model in the first column of table 2 is $F(10,15) = 1.552$. Hence, this simplification cannot be rejected. The model has two striking features. First, the value of the adjustment parameter γ is close to minus unity. Second, the parameter values for the change in the replacement rate and the lagged replacement rate are of the same magnitude. This implies that the model of column 1 can be restricted to that in column 2 with $\log h_t$ as dependent variable and $\log rr_t$ as one of the explanatory variables. Diagnostic tests do not indicate that these models are severely misspecified.

This model has the following implications. The hiring rate is not affected by the labour costs. Instead, investments play a prominent role. In their turn, investments may be determined by expectations and business prospects, on which labour costs may exert influence. Hence, if labour costs affect hiring of new workers, it is only indirectly so. In addition, the replacement rate has a negative impact on the hiring rate. If, however, we view the pattern of the recursively estimated parameter of the replacement rate, its influence became significant only from 1985 onwards. Apparently, the social benefit system was then perceived as generous by the unemployed,

in relation to net wages, and consequently they were less inclined to accept a job offer. Hence, less new hires take place. Finally, also regional mismatch is important; the more unemployed are in the 'wrong' region, with respect to available vacancies, the less new hires are made. Inspection of the recursively estimated coefficient of this variable revealed that its influence is declining over the period 1986-1991. This may imply that during the second half of the 1980's the immobility of unemployed decreased.

Next, we turn to the models of table 3. The model in the first column is a valid simplification of the general specification (14). The F -test on parameter restrictions yields $F(11,18) = 1.037$. The labour costs appear to be the sole variable that affect the outflow of workers into unemployment. Hence, the higher the labour costs, the more jobs may be destroyed and hence the more workers are laid off. Notice that this mechanism is in accordance with the scrapping condition in the vintage model approach, adopted by the Dutch Central Planning Bureau. On the other hand, this also implies that the policy of wage restraint only affects the outflow into unemployment. More wage restraint then implies that less jobs are destroyed and hence less workers are made redundant. In other words, wage restraint leads to preservation of jobs that will otherwise be destroyed.

Inspection of the recursively estimated coefficient of the labour income share in figure 3, shows that its effect decreased significantly from 1979 onwards. Notice that in this period the policy of wage restraint was also implemented and at the same time there was a huge inflow into unemployment, due to the recession of 1981-82. A reason for this decline may be the importance of the interest costs of firms, in relation to their employment plan. Cf. Broersma (1992).

In the 1970's, when borrowing was cheap and many firms accumulated huge debts. Production technologies became more and more capital intensive, necessitating higher investments, and hence more debts. When interest rates rose in the early 1980's, a lot of firms faced increasing interest payments and bankruptcy. In its turn, this caused an increase in job destruction and hence an increase of the flow into unemployment. Therefore, it seems natural to include the interest costs on debts as explanatory variable in the model of the layoff rate.

This is done in the second column of table 3, where the log of the

interest share was included in the error correction part of the model. Unfortunately, the interest costs of firms are available only from 1977 onwards, so the sample size is reduced to only 14 observations. In this case, the adjustment parameter δ of the model is close to unity. Hence, the model can be restricted to that in column 3 with $\log l_t$ as the dependent variable. The model shows that also interest costs on debts have a significant positive effect on the outflow of workers into unemployment. Increasing interest payments may raise the cost level of the firm in such a way that layoffs are the only option for the firm to survive.

Since all variables in both tables are in logarithms, the coefficients equal the elasticities. An increase in real investment with one percentage point implies an increase in new hires of 2.6 percentage point. On the other hand, when considering the model in the third column of table 3, an increase in the labour income share of one percentage point raises the flow into unemployment with more than 4 percentage points. The elasticity of the interest share is much smaller. So a shock in the driving variables exerts a large impact on the hiring and layoff rate. The elasticities are larger compared to a model of the net change in employment, where the wage elasticity is usually about -0.5. Cf. Den Butter (1991). Hence, the impact of the driving variables is much larger on the gross flows than on the net change in employment. Moreover, the driving variables differ in their impact on the gross flows, which cannot be distinguished when only the net change in employment is considered. Therefore, the flow approach to labour markets may provide a much richer framework for further research than the traditional stock approach.

5. CONCLUDING REMARKS

We have identified the flow series that make up the change in employment in the Netherlands from 1959 to 1991. The flow out of employment consists of persons moving into unemployment and persons moving into non-participation. We consider only the first flow to be dependent upon economic conditions. These two flows in combination with the net change in employment, yield the gross inflow into employment. The Dutch labour market is characterized by

huge gross flows into and out of employment. Hence, it is still characterized by very dynamic features.

We have developed a tentative theory, based on the properties of standard equilibrium flow and matching models, to provide an economic specification of our models for hiring and layoff rate. When these theories are tested, using annual data for the Netherlands, we find that the hiring rate is particularly determined by investments, whereas the layoff rate is affected by the labour costs. Furthermore, the replacement rate and regional mismatch also affect the hiring rate, but the effect of regional mismatch decreases over the sample, whereas the effect of the replacement rate has only recently become significantly different from zero. Finally, apart from the labour costs, also the interest costs of firms have a significant impact on the layoff rate. This represents the increasing importance of the financial structure of firms on their employment decisions.

It has been asserted that the increase in employment in the second half of the 1980's, was mainly caused by the policy of wage restraint that was pursued by the Dutch authorities. We find that this wage restraint may only have led to the preservation of jobs that would otherwise have been scrapped. The creation of new jobs, which is closely connected to the inflow of new workers, is much more connected to business prospects and sales expectations. Since the employment growth in the period 1986-1988, was due to an exceptionally high inflow of new workers, it is doubtful whether wage restraint alone was the major reason for this growth. High investments seem to have been a much more important factor.

A policy to stimulate investment, or more general, to facilitate business conditions, may increase employment more than a policy of wage restraint only. The government should facilitate the creation of new jobs, which have a higher productivity and are more competitive, instead of preserving existing jobs, which have lower productivity and are less competitive. Job creation can be invoked by providing entrepreneurial incentives, good sales expectations, profitable business prospects and a flexible labour market. Finally, the results with this flow approach to labour markets shows the importance of analyzing gross labour market flows, instead of concentrating on stocks only. Cf. Den Butter and Broersma (1993).

Table 2. Estimation and test results of the hiring rate.

dependent variable: $\Delta\log(H_t/U_{t-1})$		$\log(H_t/U_{t-1})$
<i>constant</i>	10.24 (6.892)	13.43 (18.54)
<i>time</i>	-0.121 (-6.626)	-0.157 (-15.46)
$\Delta\log(rr)_t$	-1.430 (-2.337)	
$\log(H/U_{-1})_{t-1}$	-0.775 (-6.617)	
$\log(I/P_i)_{t-1}$	2.039 (6.584)	2.575 (10.50)
$\log(rr)_{t-1}$	-2.259 (-7.378)	
$\log(mm)_{t-1}$	-0.105 (-2.403)	-0.142 (-2.961)
$\log(rr)_t$		-2.561 (-8.881)
R^2	0.749	0.970
<i>S.E.</i>	0.128	0.146
<i>T</i>	33	33
$F_{AR}(1,24)$	0.171	$F_{AR}(1,26)$ 1.237
$\chi_{AR}^2(6)$	6.65	6.67
$\chi_N^2(2)$	0.572	1.348
$F_{ARCH}(1,32)$	0.111	0.508

The *t*-values are denoted in parentheses below the parameter values. The models include a dummy variable for the introduction of the WAO in 1968. R^2 is the correlation coefficient, *S.E.* is the residual standard error, *T* is the number of observations available, F_{AR} is the *F*-version of Godfrey's (1979) LM test on residual autocorrelation, which is particularly reliable in small samples (see, Kiviet 1986), χ_{AR}^2 is the Ljung-Box (1978) test on residual autocorrelation, χ_N^2 is the Jarque-Bera (1980) test on normally distributed residuals and F_{ARCH} is Engle's (1982) test on autoregressive conditional heteroskedasticity (ARCH). The test statistics indicate their distribution under the null hypothesis, including the appropriate degrees of freedom.

Table 3. Estimation and test results of the layoff rate.

dependent variable: $\Delta \log(F_{eu,t}/E_{t-1})$	$\Delta \log(F_{eu,t}/E_{t-1})$	$\log(F_{eu,t}/E_{t-1})$	
<i>constant</i>	-1.715 (-3.076)	-6.436 (-4.447)	-5.217 (-6.162)
<i>time</i>	0.013 (3.369)	0.079 (4.312)	0.065 (5.162)
$\log(F_{eu}/E_{-1})_{t-1}$	-0.386 (-3.911)	-1.252 (-5.140)	
$\log(ls)_{t-1}$	1.284 (2.263)	5.379 (4.065)	4.592 (4.222)
$\log(rs)_{t-1}$		1.141 (3.662)	0.914 (4.105)
R^2	0.441	0.765	0.797
<i>S.E.</i>	0.161	0.093	0.093
<i>T</i>	33	14	14
$F_{AR}(1,28)$	1.002	$F_{AR}(1,8)$ 1.995	$F_{AR}(1,9)$ 1.232
$\chi^2_{AR}(6)$	7.79	5.19	5.20
$\chi^2_N(2)$	2.533	0.457	0.802
$F_{ARCH}(1,32)$	0.013	$F_{ARCH}(1,13)$ 0.001	0.148

Figure 2. Employment stock (left scale) and flows (right scale) in The Netherlands, 1959-1991.

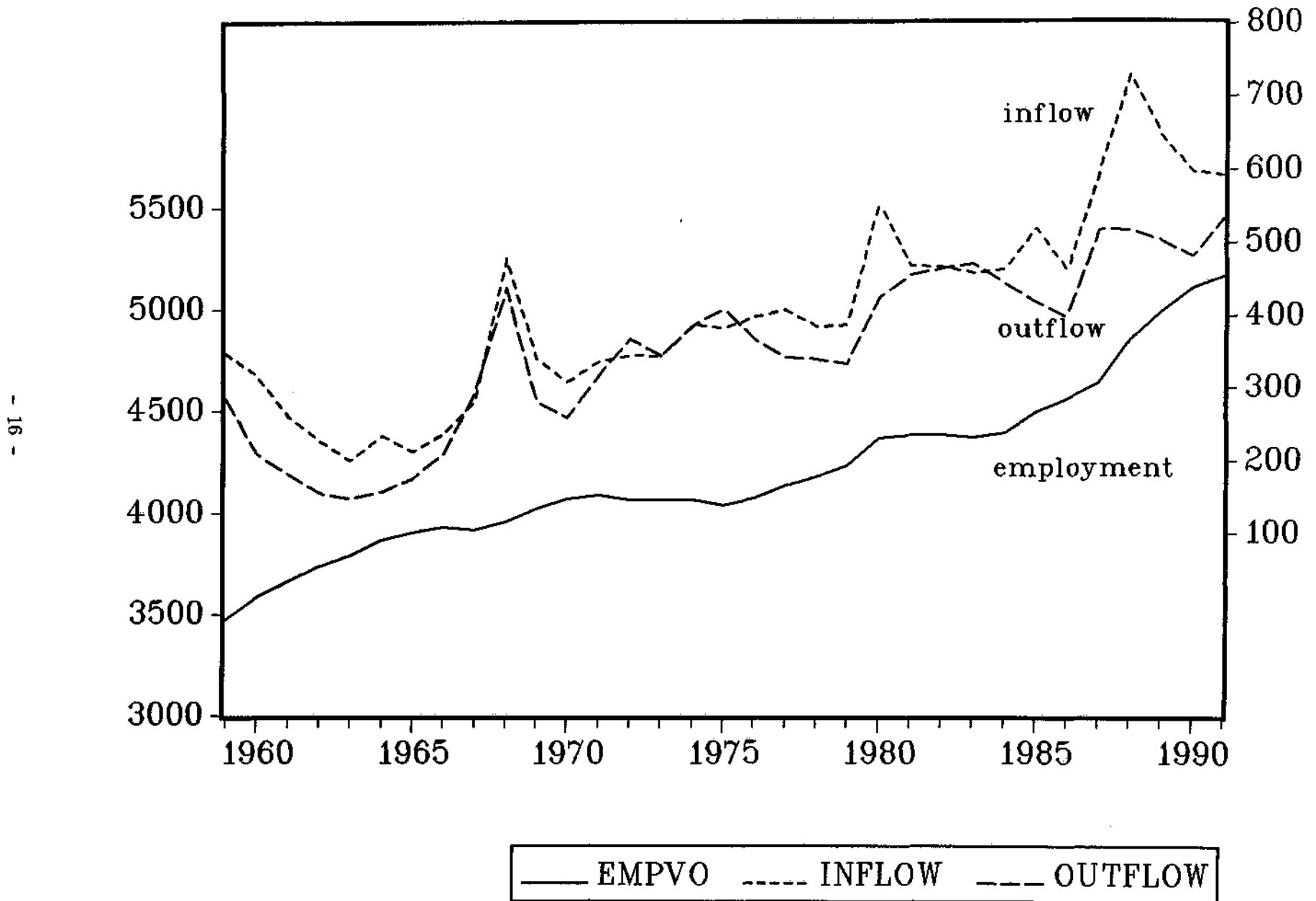
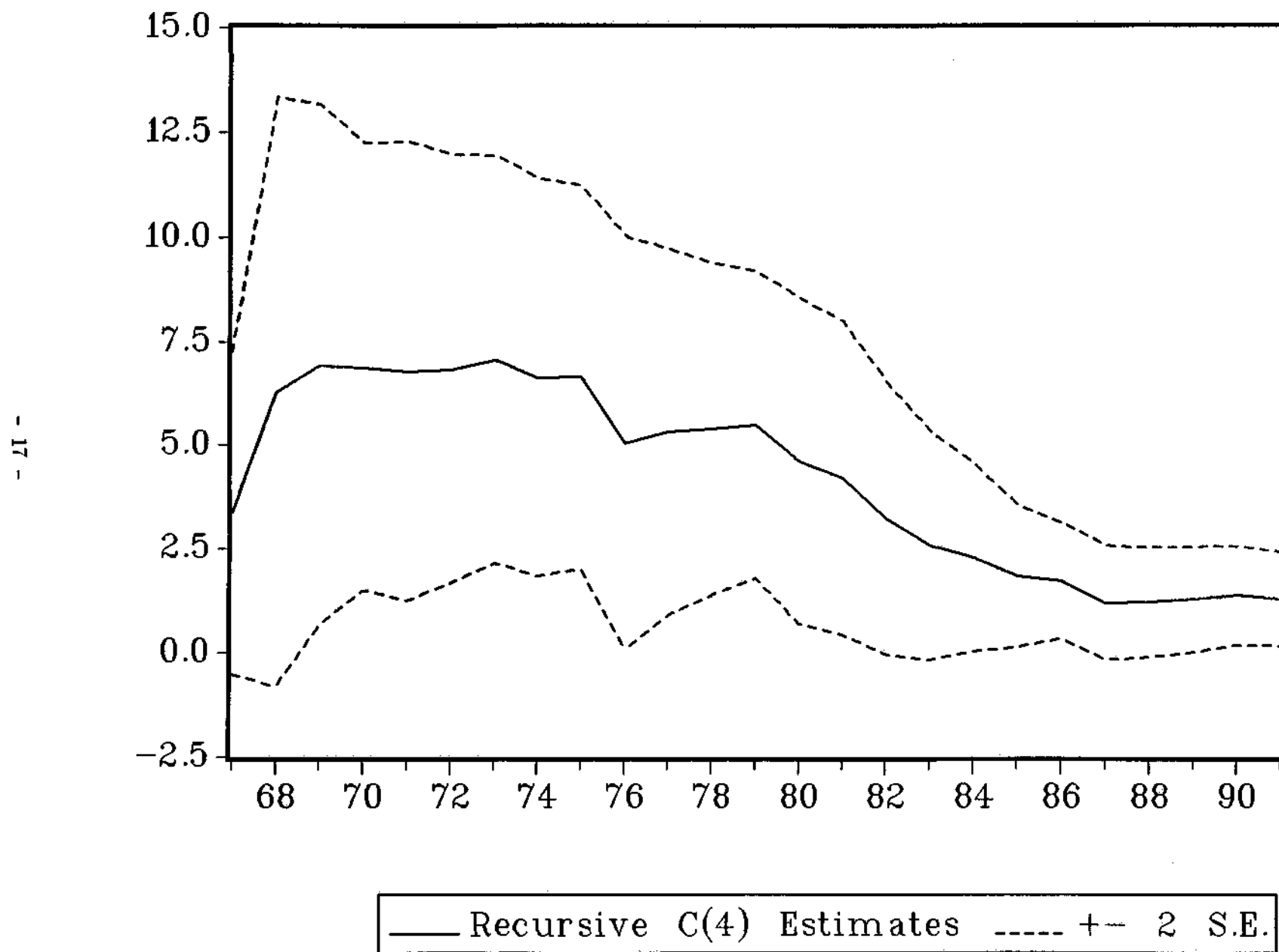


Figure 3. Recursively estimated coefficient of the labour income share in model of table 3 column 1, with 2 standard error boundaries.



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DATA APPENDIX: SOURCES AND DEFINITIONS

Abbreviations

CBS	Centraal Bureau voor de Statistiek (Central Bureau of Statistics)
CPB	Centraal Planbureau (Central Planning Bureau)
OECD	Organization of Economic Cooperation and Development

Definitions and sources

F_{eu} : flow out of employment into unemployment, due to firing. Or the inflow of persons in unemployment insurance (WW) (x 1000).

source: Sociale Verzekeringsraad, *Kroniek van de sociale verzekeringen*, 1992.

F_{ed} : flow out of employment into disability. Or the inflow of persons in disability insurance (WAO/AAW) (x 1000).

source: Sociale Verzekeringsraad, *Kroniek van de sociale verzekeringen*, 1992.

F_{eer} : flow out of employment into early retirement (VUT) (x 1000).

source: CBS, *Statistisch Jaarboek* and author's calculations.

F_{er} : flow out of employment into retirement (AOW) (x 1000)

source: CBS, *Statistisch Jaarboek*.

calculated as *inflow retired persons* = $\Delta(AOW) + deaths_{65+}$, where $\Delta(AOW)$ is the change in retired persons and *deaths*₆₅₊ is the number of deaths in the cohort 65 and older. This inflow was then multiplied with the participation rate of persons of 60-64 years old to give F_{er} .

F_{ue} : flow out of unemployment due to firing, into employment. Or the number of persons on an unemployment assurance benefit (WW) finding employment (x 1000).

source: Sociale Verzekeringsraad, *Kroniek van de sociale verzekeringen*, 1992.

F_{in} : new hires from unemployment and non-participation, i.e., $F_{ue} + F_{ne}$, excluding hires of job-to-job movers (x 1000).

source: calculated as $F_{in} = \Delta E + F_{eu} + F_{en}$, where $F_{en} = F_{ed} + F_{eer} + F_{er}$ is the flow of employment into non-participation.

E : employment, i.e., the number of employees (x 1000).

source: OECD, *Labour Force Statistics*.

U : unemployment in thousands of persons.

source: CPB, *Lange Reeksen*.

ls: labour costs, as percentage of the value added of firms.

source: CPB, *Lange Reeksen*.

rs: Interest costs as percentage of value added of non-financial firms.

source: CBS, *Nationale Rekeningen (National Account Statistics)*.

It is calculated as $rs = 100\% - ls - ps$. Cf. Keus (1989). The profit share *ps* is based on the following entries of table S10.1 of the *Nationale Rekeningen*: entry 2116 minus the government share; entry 2117 minus the income of self-employed; entry 6310.

ad: aggregate demand, which is assumed to consist of a domestic and a foreign part, with real consumption, real investment and terms of trade.

C: private consumption

P_c: price deflator of consumption goods

source: IMF, *International Financial Statistics*.

I: investment in gross capital formation.

P_i: price deflator of investment goods.

source: OECD, *National Account Statistics and Main Economic Indicators*.
CBS, *Statistisch Jaarboek*.

ttr: terms of trade (import price index over export price index).

source: IMF, *International Financial Statistics*.

ss: Lilien's (1982) index for structural shifts for six sectors.

This index is calculated as

$$ss = \left\{ \sum_{i=1}^6 (E_{it}/E_t) [\Delta \log E_{it} - \Delta \log E_t]^2 \right\}^{1/2}$$

source: CBS, *Statistisch Jaarboek*.

rr: replacement ratio, defined as the daily unemployment insurance benefit, times seven, divided by the average weekly net wages in industry.

source: Sociale Verzekeringsraad, *Kroniek van de sociale verzekeringen*, 1992.

CBS, *Statistisch Jaarboek*.

mm: mismatch index for the eleven provinces in the Netherlands.

This index is calculated as the absolute value of the forecasted error of the individual *UV*-curves, hence

$$U_{it} = \alpha_0 + \alpha_1 V_{it} + \varepsilon_{it},$$

$$mm = \sum_{i=1}^{11} |\varepsilon_{it}|.$$

source: CBS, *Sociaal-economische maandstatistiek*.
CBS, *Statistisch Jaarboek*.

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