NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS
SCHOOL OF LETTERS

MSC PROGRAMME IN COUNSELLING AND CAREER GUIDANCE

LABORATORY OF EXPERIMENTAL PEDAGOGY

CENTERS FOR VOCATIONAL GUIDANCE AND COUNSELLING

PROCEEDINGS OF THE 1st INTERNATIONAL CONFERENCE

ATHENS (23-25-1-04)

PROMOTING NEW FORMS OF WORK ORGANIZATION AND OTHER COOPERATIVE ARRANGEMENTS FOR COMPETITIVENESS AND EMPLOYABILITY

With the Support of the European Committee

ATHENS 2004

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FLEXIBLE LABOUR AND LABOUR PRODUCTIVITY GROWTH. AN EMPIRICAL STYDY

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Abstract

During the 1980s and 1990s, trade unions in the Netherlands sacrificed again and again wage increases against the promiss of job creation. Moreover, they tolerated a wage-cost saving flexibilisation of labour relations. This brought the county on a job-intensive but low-productive growth path. Growth rates of GDP per working hour are about half the EU-average since 1984/85. This paper tries to contribute to a better understanding of the Dutch productivity crisis, using firm-level panel data of OSA. It turns out that firms that have a high turnover of personnel do not realize higher productivity growth than firms with more 'rigid' labour relations. Moreover, firms which extensively use temporary contracts realize a signify-cantly lower productivity growth. Whereas young firms realize above-average productivity growth, small firms in general have a significantly lower productivity growth than large firms

1. Introduction: The Dutch labour productivity growth slowdown

Following the "Dutch disease" during the 1970s and against the background of high and steadily rising unemployment during the recession of the early 1980s, trade unions in the Netherlands agreed upon very modest wage increases. Over the last twenty years, wage growth in the Netherlands has been much more modest than in the rest of Europe. Trade unions relied on the principle of 'trading wage increases against jobs'. This policy is called *'loonmatiging'*, often poorly translated into English as 'wage moderation' or 'wage restraint'. Moreover, trade unions tolerated an increasing flexibilization of labour relations. During the last twenty years, there was an increasing share of people working on 'non-typical' working contracts, including temporary contracts without a perspective of tenure, labour hired from manpower agencies, or 'free lance' workers. Obviously, such flexibilization of labour relations allowed for wage cost savings and therefore enhanced the policy of *'loonmatiging'*. As was to be expected from neoclassical theory, this policy of wage cost saving was followed by high rates of job creation that attractted attention in the rest of Europe.

Table 1 is confined to three key variables about the Dutch economy, which we consider relevant for sketching the consequences of the trade union strategy in the Netherlands. Four observations from Table 1 merit attention:

1. In the long run, Dutch GDP growth hardly deviates from the EU average. This means that the fairly modest wage growth during the 1980s and 1990s did *not* translate into above-average growth of GDP. A slightly above-average GDP growth during the 1990s is to be explained by different factors.1

1 An estimate by the Dutch Central Bank (DNB) suggests that, during the 1990s, economic growth in the Netherlands has been enhanced due to the Dutch 'mortgage Keynesianism'. The rise in housing prices allo-wed many households taking extra (highly subsidized) mortages for concumption purposes. According to estimates with the DNB Morkmon model, this caused about 1% extra economic growth per year in 1999 and 2000 (DNB 2002, p. 29-38).

2. During the 1960s and 1970s, rates of labour productivity growth (i.e. growth of GDP per hour worked) in the Netherlands were slightly below the EU average, which might be explained by the relatively large service sector in the Netherlands.
3. During the 1970s and 1980s, EU-wide growth rates of labour productivity declined. The table shows that, from the 1980s onwards, growth of GDP per hour worked in the Netherlands declined even further, reaching just about half of EU average growth (column 2).
4. Together with the decline of labour productivity growth, the labour intensity of GDP growth in the Netherlands rose substantially (see column 3). From the 1950s up to the 1970s, GDP growth was fairly labour-extensive all over Europe. However, during the 1980s and 1990s, the Netherlands sharply deviate from this trend: A one-percent increase in GDP coincides with an 0,57% (in the 1990s even 0,61%) growth of labour hours (as opposed to 0,12 or 0,13 in the EU). This was the famous Dutch job miracle.

The high rates of job growth explain why Dutch trade unions were ready to maintain quite modest wage claims even long after the recession of the early 1980s. In interpreting the Dutch job miracle, one should remind that an economy can grow only in two ways: Either by using more labour or by making labour more productive. Following the 1982 Wassenaar agreement, the Dutch economy strongly relied on the first-named option: Using more labour. As can be seen from column 1 of table 1, the Dutch job miracle during the 1980s and 1990s can hardly be explained by a GDP growth that was slightly above the EU-average. Nor was it due to superior export performance.2 It is mainly due to a highly labour-intensive growth during the 1980s and 1990s (column 3) and a strikingly low labour productivity growth (column 2).

2 During the entire period of '*loonmatiging*', Dutch export market shares with respect to the most important OECD countries even declined. While the Netherlands lost export market shares, they did preserve a positive trade balance, as *'loonmatiging'* contributed to slow down import penetration (see Kleinknecht & Naastepad 2002).

Table 1:
GDP growth (1), labour productivity growth (2) and the labour intensity of GDP growth (3).
The Netherlands compared to the European Union

	Average annual GDP growth (1)		Average annual GDP growth per hour worked (2)		Growth of labour hours per 1% GDP growth (3)	
	EU-14*	Nether-lands	EU-14*	Nether-lands	EU-14*	Nether-lands
1950-1960	4,5	4,6	4,2	4,2	0,07	0,10
1960-1973	5,2	4,9	5,7	4,5	-0,09	0,07
1973-1980	2,6	2,4	3,0	2,5	-0,15	-0,05
1981-1990	2,4	2,2	2,1	1,0	0,12	0,57
1990-2000	2,5	2,8	2,2	1,1	0,13	0,61

* Annual average growth rates of EU-14 (excluding Luxemburg)
Source: Calculations based on figures from the website of the Groningen Growth and Development Centre (www.eco.rug.nl/ggdc)

In recent years, there is a growing awareness in the Netherlands, that the low-productivity-high-employment growth path may not be sustainable in the long run. Many of the jobs created in the 1980s and 1990s may be called artificial jobs – most of them would not exist had the country had the same labour productivity growth as its neighbours. Moreover, during the second half of the 1990s, the highly labour-intensive growth (column 3, Table 1) lead to an increasingly tight labour market. As was theoretically expected, scarcity of labour drove up wages (in spite of trade unions trying to keep wage increases low). As labour productivity growth rates continued to be low, the wage rises of the late 1990s translated into lower company profits and a deteriorating foreign trade position.

This paper tries to contribute to a better understanding of the Dutch productivity problem by reporting some micro-econometric analyses, based on firm-level panel data of the *Organization for Strategic Labour Market Research* (OSA). We draw from a more voluminous report in Dutch, confining ourselves to analyses of the Dutch manufacturing sector.3 The next section reports a summary of regression estimates that explain inter-firm differences in labour productivity growth. This can say something about micro-level patterns behind the macro-economic figures in table 1. While the impact of slow wage growth can hardly be assessed with our firm-level analysis, we can test the impact of flexible labour relations on productivity. In section 3 we round up with conclusions about the broader meaning of the findings.

3 Similar analyses among service sector firms tended to be less reliable due to data deficiencies; for details see Dekker & Kleinknecht (2003).

2. The impact of flexible labour on labour productivity growth

2.1 Hypotheses

One can argue that easier hiring and firing of personnel and a higher labour turnover might be favourable for a firm's innovation performance. First, it leads to a larger inflow of fresh people that may enrich the pool of a firm's innovative ideas and open up new networks. Second, easier hiring and firing of personnel makes it easier to replace less productive workers by more motivated and productive ones. This would lead us to expect a higher productivity growth among the firms that have taken a lead in making their labour relations more flexible.

On the other hand, a higher degree of labour flexibility also has disadvantages. For example, a permanently high rate of people joining and leaving a firm may diminish social cohesion and trust and increase the danger of moral hazard. In other words, such flexibility will diminish social capital, forcing firms to invest into monitoring and control. Moreover, the so-called '*hold up*' problem may become more relevant: As labour relations are (expected to be) only of short duration, employers and employees may hesitate to invest into the labour relation. For example, the employer may under-invest into the human capital of his flexible workers, but the employees themselves may also invest less in firm-specific knowledge, networks, trust etc. High external mobility of people increases the probability that one cannot (fully) appropriate the benefits of such investment.

Flexible and short-run labour relations may also favour the leaking of confidential information and of technological knowledge, which may discourage investments in R&D and innovation. In other words, high (external) labour market flexibility may aggravate the problem of market failure due to positive externalities. Moreover, firms with a more flexible workforce are likely to experience increased costs of hiring, selection and on-the-job-training. They may also suffer in terms the quality of their services since frequent changes of personnel may cause problems of information transfer between people leaving the firm and people coming in. A firm's historical memory may become weaker.

It is hard to predict theoretically whether such negative aspects of flexible labour will compensate the advantages named earlier. We therefore engage in an empirical exploration using cross-section firm-level data by OSA.

2.2 The model

In our attempt to assess the impact of flexible labour on labour productivity growth, we include in our estimate indicators of three types of flexibility:

(1) An indicator of labour turnover (i.e. percentages of people that left or joined the firm during the past year),
(2) Percentages of personnel on temporary contracts (without a perspective of tenure) and
(3) An indicator of internal flexibility (i. e. percentages of personnel that changed their function or department during the past year).

We add control variables, including:

- Firm size and age. While young technology-based firms may realize high productivity growth, smaller firms tend to take little advantage from scale economies and may be lacking resources. We therefore include as explanatory variables firm size and a dummy for firms that are younger than 5 years.
- Sector dummies should account for differences in technological opportunity between sectors.
- Sales growth should account for the so-called Verdoorn law (i.e. a relationship between sales growth and productivity growth).
- Control variables for innovative behaviour. The OSA database covers a rich choice of innovation indicators, including indicators related to R&D input, innovation about (i.e. shares in sales of innovative products), or qualitative information (e. g. '*Did you introduce a major new technology during the last two years*'; or '*does your firm have an advanced position with respect to mechanization and automatisation of production processes?*').

The database also covers related variables that are likely to have a positive impact on labour productivity growth. Among these are:

- Percentages of personnel with higher education;
- A firm's export intensity;
- Investment in fixed assets;
- Manpower training;
- The age structure of personnel.

In our preliminary estimates, it turned out that the latter group of variables caused considerable problems with multicollinearity. Therefore, many of these variables needed to be dropped. Moreover, the various versions of innovation variables also were highly multicollineair. In the end, we decided to use the following simple dummy variable for innovative behaviour:

- 'Non-innovators': firms without any R&D activities;
- 'Strong innovators': firms that perform R&D on a permanent basis and have R&D expenditures as a percentage of sales of 5% or larger.
- 'Normal innovators': all others (i. e. firms with only occasional R&D and/or firms with an R&D intensity of less than five percent).

This simplification helped to solve some of our problems with multicollinearity. Nonetheless, several interesting variables still had to be excluded. Among these are a firm's export intensity (which was significant in most versions when innovation variables were omitted), and investments in fixed assets (as a percentage of sales or per employee). As expected, this latter variable was highly significant in all versions but also has a high correlation with various innovation variables. Percentages of personnel with higher education were sometimes significant and sometimes not, depending on the specification. The same holds for manpower training efforts. As the latter two variables have a degree of multicollinearity with the innovation variables, they are omitted from our final version documented in Table 2. The only innovation variable that had no correlation with the other innovation variables was based on the question '*Has your firm an advanced position with respect to the mechanization and automatisation of production processes?*'. This variable says something about the speed by which old vintages of capital are replaced by new ones which should, of course, have an impact on labour productivity.

In an earlier version of our estimate, we also included a dummy variable for the age structure of personnel. We expected that firms that have high shares of personnel in

high age classes would show less labour productivity growth. To our surprise, this age variable was insignificant.4 A possible explanation are the relatively generous schemes for early retirement and for persons with a handicap (WAO). These schemes allowed firms to easily quit less motivated or less productive personnel. As only very healthy and highly motivated people keep working until the age of 65, having high shares of personnel in higher age classes does not seem to matter for a firm's labour productivity growth.

2.3 Results

The results about the impact of flexible labour relations are mixed. A high turnover of personnel does not seem to influence labour productivity growth. As sketched above, a high labour turnover may be positive for labour productivity growth due to high rates of 'fresh blood' coming in or due to the easier replacement of less productive workers by more productive ones. Seemingly, such a positive impact is more or less compensated by negative effects of a high turnover: A short time horizon of personnel; less dedication to work; a loss of trust, and an inadequate information transfer from people leaving to people coming in, weakening the organization's historical memory. Some of these arguments might be summarized under the notion of 'hold up': In order to make a labour relation fully productive, employer and employee need to 'invest' into the labour relation (i. e. into networks, trust, firm specific knowledge etc.). If the (expected) duration of the labour relation is short, such investments will not take place.

Against our expectations, high percentages of personnel that change functions or departments within the firm have an insignificantly negative sign in our productivity equation. We had expected that greater internal flexibility would allow for greater allocative efficiency and hence productivity growth. However, in practice, high internal flexibility might often be linked to major organizational changes, associated with lay-offs of personnel. Such lay-off campaigns may unleash processes of adverse selection: If people feel that their job is threatened, they will apply for jobs elsewhere. The most capable people will usually be the first to find a new job and leave. The less capable people are trapped in the firm and are internally reorganized. This adverse selection process might explain why we find an (insignificantly) negative impact of internal flexibility on labour productivity growth.

High percentages of people on temporary contracts (without a perspective of tenure) have a highly significant negative impact on labour productivity growth. In this case, some of the above-named factors are likely to be relevant: Lack of 'investment' into the labour relation due to a short time-horizon, less trust and loyalty and easier leaking of confidential information, a short organizational memory etc.

Most of our other variables have the expected sign. We find that larger firms indeed show higher growth rates of labour productivity. The same holds for firms of less than 5 years old. As expected, the Verdoorn coefficient is highly significant. A one-percent

4 This is inconsistent with recent findings by Gelderblom et al. (2003) who find that older people do have a lower productivity.

growth of sales coincides with an 0,24% rise in labour productivity which is low by international standards. Other than expected, we find few differences between industries. Firms that report that they have '*an advanced position with respect to mechanization and automatisation of production processes*' have a modestly higher (+1%) productivity growth (insignificant). Firms that belong to the group of 'strong innovators' have a 1,9% higher labour productivity growth. To our surprise, this effect is insignificant which has to do with relatively high standard errors within the group of innovators.

Closer inspection of the data revealed that there is indeed more turbulence within the group of innovators. For example, innovators have significantly higher probabilities of contracting out (and 'contracting-in') of activities, of mergers and acquisitions or other types of organisational change. While such changes are typical for an innovative environment, they can cause higher standard errors, either because of real turbulence or by negatively affecting the quality of data reporting. One should note in this context that problems with noise increase as we use several variables for an indicator. For example, in order to arrive at our labour productivity measure, we computed 'value added', taking sales minus inputs bought from other firms, minus depreciation. The resulting value added was then divided by labour input. Moreover, we had to link two subsequent surveys (with a two-year distance) at the firm level. Linking firms that participated in two subsequent surveys can be another source of noise that is hard to control: Due to mergers, acquisitions and other organisational change, firms can change during two years.

Table 2:
Factors that explain differences between firms in labour productivity growth (Value added per employee, periods: 1992-94, 1994-96 en 1996-98)

Explanatory variables:	Coeffi-cients:	t-values:
Firm size: 20-99 employees#	4,03	1,7*
Firm size: 99-499 employees#	7,82	3,2**
Firm size: 500 and more employees #	12,00	2,8***
Firm is younger than 5 years	4,26	2,3**
Sales growth (Verdoorn effect)	0,24	5,0***
'Strong' innovator##	1,90	1,0
'Normal' innovator##	0,17	0,1
Has advanced position in mechanization and automatisation of production	1,01	0,5
Labour turnover during the past year	-0,08	-0,5
Percentage of employees changing function or department during past year	-0,26	-1,5
Percentage of employees with a temporary contract	-0,26	-2,5**
Industry dummies:		
Textiles, clothing, leather	13,56	1,5
Wood and paper	6,96	1,7
Printing and publishing	0,47	0,15
Chemicals, plastic, glass	0,71	0,3
Basic metals en metal products	5,38	1,8
Mechanical engineering	1,39	0,5
Electrical industry, electrical machines	-1,93	-0,5
Automobiles and other transportation means	4,03	0,7
Furnitures	0,20	0,1
Reference group: food and tobacco	-	-
Dummy: observations measured in 1996 (reference year: 1994)	0,00	0,0
Dummy: observations measured in 1998 (reference year: 1994)	3,08	1,4
Constant term	0,48	0,1
Numbers of observations	594	

R-squared	0,21

*** significant at 1% level; ** significant at 5% level; * significant at 10% level

[#] reference group: firms with 5-19 employees

[##] reference group: non-innovators

3. Summary and conclusions

Our regression equations confirm a number of a priori expectations. For example, we find that large firms, due to various types of scale economies, realize significantly higher rates of labour productivity growth than their smaller counterparts. This implies that the macroeconomic pattern of lowly productive and highly labour-intensive growth in the Netherlands (visible in table 1) is to an important degree due to the weak productivity performance of small and medium-sized enterprises. Other than small firms, young firms (younger than 5 years) do realize significantly higher rates of labour productivity growth.

Moreover, the pattern in table 1 was also enhanced by employing people on temporary contracts. Firms with high rates of people on temporary contract realize significantly lower rates of labour productivity growth. However, for the other indicator of (external) flexibility of labour (a high labour turnover) we find no such effects. In this case, the above-sketched positive and negative effects of flexibility on labour productivity seem to be more or less in balance. In principle, a high rate of people changing function (or department) within the firm should enhance allocative efficiency and enhance productivity. However, the context in which high internal flexibility tends to occur (adverse selection during restructuring and lay-off), seems to cancel out the positive effects of flexibility on productivity.

Highly innovative firms in our sample realize on average 1,9 percent more labour productivity growth. Moreover, manufacturing firms that claim that they have '*an advanced position in mechanisation and automatization of production processes*' (compared to their competitors) realize one percent more labour productivity growth. However, all those percentages are (strictly statistically spoken) 'insignificant' due to large standard errors. High standard errors may in part be due to noise in the data due to high rates of structural change within the group of innovators (i.e. restructuring; mergers and acquisitions or contracting-out). While such factors may be complementary to innovative strategies, they may create organisational turbulence, which increases the probability of reporting incorrect figures in a survey. On the other hand, innovation is a typical 'high risk – high return' activity. It therefore seems almost 'natural' that figures about innovative firms show higher variances. Having these points in mind, one should probably not dismiss the above-named percentages as 'unimportant', simply because they are statistically insignificant.

In all versions of our labour productivity regressions, the Verdoorn effect was highly significant. In our firm-level estimate, one percent sales growth coincides with 0,24 percent labour productivity growth in manufacturing. This comes close to the picture from aggregate statistics, and, after 1985, Dutch Verdoorn coefficients are low by international standards. Above, we offered the hypothesis that the decline of labour productivity growth is caused by very modest wage increases during the 1980s and parts of the 1990s and by wage cost saving flexibilization of labour relations. Various parts of economic theory suggest that a causal relationship exists between wage growth and labour productivity growth, notably:

(i) In standard *neo-classical theory*, an increase in the relative price of labour leads to substitution of capital for labour, shifting along a given production function, until the marginal productivity of labour equals the given real wage. Causality in this

argument runs from relative factor prices to choice of technique and hence productivity.

(ii) In *vintage models*, wage increases lead to scrapping of old, labour-intensive vintages of capital in favour of new and more productive vintages of capital.

(iii) In the theory of *induced technological change*, higher relative wages increase the labour-saving bias of newly developed technology (Hicks 1932; Kennedy 1964; Ruttan 1997);

(iv) In the *Schumpeterian theory of creative destruction*, one can argue that, due to their monopoly rents from innovation, innovating firms can better live with an aggressive wage policy by trade unions. Higher real wage growth enhances the Schumpeterian process of *'creative destruction*' in which innovators compete away technological laggards. Conversely, slow wage growth and flexible labour relations increase the likelihood of survival of low-quality entrepreneurs. While this is favourable for employment in the short-run, it leads to a loss of innovative dynamism in the long run (Kleinknecht 1998).

(v) According to Schmooklerian demand-pull theory5 and the Verdoorn-Kaldor law, higher effective demand raises innovative activity and labour productivity. This implies that wage restraint or downward wage flexibility may impede innovation as far as it leads to a lack of effective demand.

(vi) Within an *endogenous growth framework* (e.g. Foley and Michl 1999: 288–98), a profit-maximising firm's decision to invest in (labour productivity increasing) R&D, can be shown to depend on the share of wages in total costs. The higher the wage share, the more profitable it becomes to devote resources to increasing the productivity of labour.

Some of these theories point to a direct link between wages and labour productivity growth. Others, such as the '*creative destruction*' argument, suggest that overall innovation activity may slow down in response to lower wage cost pressure. In any case, all those pieces of theory contribute to explain the post-1980 decline of Dutch productivity growth observed in column 2 of table 1.

Unfortunately, the OSA database did not allow for a straightforward test these hypotheses. However, in earlier versions of our estimates, we found strong evidence that, among manufacturing firms, investments (per worker or as a percentage of sales) had a highly significant positive impact on labour productivity growth. This is not surprising as much productivity growth is 'embodied' in new investment goods. Due to problems with multicollinearity, the investment variable had to be omitted from the final version of our estimate. Related research demonstrated recently that a slight decline of investment ratios in Dutch industry can explain part of the slowdown in labour productivity growth (Naastepad & Kleinknecht, 2004).

During our period of investigation (1994-1998) there were two factors that can be assumed to have had a positive impact on labour productivity growth:

1. Legislation with respect to a 'disabled persons insurance act' (WAO) and early retirement schemes were quite generous. This allowed Dutch firms to quit many less productive workers at fairly low costs. This must have enhanced labour productivity growth and it explains our above finding that there is no lower labour productivity growth among firms that have high shares of older

5 The classical reference is Schmookler (1966); for a recent survey and empirical support see Brouwer and Kleinknecht (1999).

workers. The relatively low percentages of people that continue to work at the age of 55-65 years consist of very healthy and motivated people.

2. In the Netherlands, economic growth was particularly strong during 1994-2000. This is likely to be related to the build-up of private debt that was made possible by strongly rising housing prizes. This is sometimes referred to as the Dutch 'mortgage Keynesianism', i.e. deficit spending by private households that was enhanced by a generous subsidy scheme for mortgages. Via the Verdoorn effect, this must have fostered labour productivity growth.

It is remarkable that, in spite of these two positive counter-effects, overall labour productivity growth in the Netherlands has so severely declined. This underlines the relevance of the above-sketched arguments about the impact of wage cost pressure on labour productivity growth.

In the nearer future, these two positive effects may disappear, as a similar bubble in the housing market is not likely to be repeated and Dutch government is heading for a more restrictive access to early retirement schemes and for a tougher control of access to the 'disabled persons insurance act' (WAO). This is likely to exercise a negative influence on productivity growth in the coming years. Summing up, we expect the problem of low productivity growth in the Netherlands to keep us busy for some more time.

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