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ECONOMIC SURVEY OF THE NETHERLANDS 2005:

EXPLAINING THE DUTCH LACK OF RESILIENCE FOLLOWING ADVERSE SHOCKS

This is an excerpt of the OECD Economic Survey of the Netherlands, 2005, from the section on resilience in chapter 1, annex 1.A1

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Introduction

1. This excerpt presents the results of an econometric investigation of the Dutch lack of resilience. As discussed in Chapter 1 of the Economic Survey of the Netherlands 2005, the slow pace at which activity returns to trend following adverse shocks appears to stem, mainly, from the sluggish responsiveness of inflation to changes in the business cycle. Indeed, despite substantial slack having built up in 2003 (when the output gap was about -2¼ per cent of GDP), consumer price inflation was still at 2.3%. The persistence of inflation can affect growth through two channels: it can contribute to keeping monetary policy tighter than would be necessary to support domestic demand; and it can cause a real exchange rate appreciation and depress foreign trade. The Netherlands being a relatively small economy, it is unlikely that it can significantly influence by itself the monetary policy decisions of the ECB. Being a very open economy, however, it is likely that a real exchange rate appreciation causes activity to slacken significantly; indeed, foreign trade only made a small contribution to activity growth in the past five years, as relative prices evolved unfavourably and competitiveness deteriorated.

2. To explore the persistence of inflation, three separate econometric exercises are presented in this excerpt. First, Philips curves estimates are used to assess the sensitivity of inflation to the output gap; they show that this sensitivity is low by international standards in the Netherlands (*i.e.*, the sacrifice ratio is high) and that inflation seems to react asymmetrically, responding more slowly when activity falls below potential than when it moves above it. Second, wage equations are estimated to test a possible lack of responsiveness of real wages to the business cycle; this shows that, in fact, real wages do respond quite strongly. Finally, a model describing labour market rigidities suggests that firms are unable to adjust their level of employment quickly during the downswings due to the lack of flexibility of certain labour market institutions, notably due to the strictness of employment protection.[1]

Assessing the sacrifice ratio

3. Philips curves are commonly used to assess the reactivity of inflation to aggregate demand imbalances.[2] They can be used to calculate the sacrifice ratio and give an assessment of the cumulative loss of output necessary to reduce inflation by 1 percentage point. The shape of the Philips curve and the

sacrifice ratio are likely to be affected by institutional factors, notably rigidities on labour and product markets. In order to estimate the sacrifice ratio, the following specification of the (backward-looking expectation) Philips curve has been estimated and its coefficients compared to those for Germany, France, the United Kingdom and the United States:

$$\pi_t = \alpha + \beta(L)\pi_t + \gamma Gap_{t-1} + \delta(L)Exo_t + \varepsilon_t$$

Where π_t is the quarterly inflation rate, L is the lag operator[3], Gap_{t-1} the lagged output gap and Exo_t stands for different exogenous factors, notably changes in import prices and in labour productivity (Table 1). Moreover, in a second specification (equation 2 for each country), periods of above and below trend growth have been separated by differentiating between positive and negative output gaps and estimating two separate coefficients γ_1 and γ_2. Import price inflation is expected to increase inflation rates (hence a positive coefficient is expected). As to productivity growth, it is expected to lower inflation but the size of its impact depends on the type and degree of competition in product markets: with weak competitive forces, firms may capture parts of the gains from productivity growth for themselves, while with strong competition firms are likely to hand over their cost savings to customers, thereby lowering inflation more forcefully.

4. The econometric results suggest that inflation reacts weakly to changes in demand imbalances in the Netherlands, compared with the United States or other EU countries (Germany, France, and the United Kingdom). In both the basic and the extended specification (equations 1 and 3), the Dutch sacrifice ratio (5.6 and 6.6, respectively) is considerably higher than those of the other countries (which range from 2.1 in the basic specification for the United Kingdom to 3.7 for the United States, again in the basic specification).What is more, asymmetries can be detected in the case of the Netherlands, with the coefficient for the negative output gap being statistically not different from zero, an indication of a lack of inflation responsiveness in the presence of weak aggregate demand (this is also true for France). This contrasts with the results for the United States where both negative and positive output gaps exercise pressure on inflation or with the situation in Germany and the United Kingdom, where prices are more reactive to weak demand than to strong demand conditions. As regards the additional variables (specification 2), import prices have a statistically significant impact only in the Netherlands and the United Kingdom (with the expected sign), whereas productivity growth lowers inflation in all countries (albeit only at a 10% significance level for France and the United States).

Are real wages flexible?

5. The slow responsiveness of inflation to slack may result from real wage rigidity. The second econometric estimate presented here therefore evaluates the sensitivity of real wages to labour market conditions. Wage equations are estimated for 17 OECD countries, for the periods 1970 to 1995 and 1970 to 2004, using annual data (Table 1.A1.2). The wage equations are based on the following specification taken from OECD (1997) and Blanchard and Katz (1997):

$$\Delta w_t = a + \beta\pi_t + (1-\beta)\pi_{t-1} + \lambda(w_{t-1} - p_{t-1} - x_{t-1}) - \gamma U_{t-1} + \delta Exo_{t-1} + \varepsilon_t$$
$$\Leftrightarrow \quad \Delta w_t - \pi_{t-1} = a + \beta\Delta\pi_t + \lambda(w_{t-1} - p_{t-1} - x_{t-1}) - \gamma U_{t-1} + \delta Exo_{t-1} + \varepsilon_t$$

representing a traditional expectations augmented Phillips curve including an error correction term, λ, based on the deviation of real wages from trend productivity levels, x_t. In this specification nominal wage growth, Δw_t, is a function of the level of the unemployment rate, U_t, (adaptively formed) expected inflation, $\beta\pi_t$-$(1-\beta)\pi_{t-1}$ and other exogenous factors, Exo_{t-1}.[4] Other variables included are: i) the difference between the growth in the GDP and private consumption deflators; and ii) an error-correction term, necessary for most European countries, Australia, Canada and Japan to account for co-integration between

real wage inflation and unemployment, iii) the change in the difference between actual and trend labour productivity (as measured by an Hodrick Prescott-filter) for the United States. The variable measuring the gap between GDP and private consumption deflators reflects the fact that employees are interested in wage rates relative to consumer prices while employers are interested in wage rates deflated by output prices. The expected sign of this variable is positive. Finally, the error-correction term implies that real wages adjust over time towards a level determined by trend productivity and the unemployment rate.[5]

Table 1. Phillips curve estimates for the Netherlands, other selected European countries and the USA

Dependent variable π_t

		Gap(t-1)	Negative Gap(t-1)	Positive Gap(t-1)	Import prices (t-1)	Productivity (t-1)	Adj. R^2	Breusch-Godfrey LM test (5 lags)	No. of observations	Time period	Lags included
Germany	**(1)**	0.277***	--	--	--	--	0.48	F(6, 145) = 0.934	155	1966:Q1-	1,4,6
		(4.13)	--	--	--	--	--	P>F = 0.47	--	2004:Q4	--
	(2)	--	-0.390**	0.197*	--	--	0.48	F(6, 144) = 0.948	155	1966:Q1-	1,4,6
		--	(2.59)	(1.70)	--	--	--	P>F = 0.46	--	2004:Q4	--
	(3)	0.300***	--	--	-0.020	-0.057**	0.48	F(6, 134) = 1.301	146	1968:Q1-	1,4,6
		(4.29)	--	--	(1.12)	(2.14)	--	P>F = 0.26	--	2004:Q4	--
France	**(1)**	0.355***	--	--	--	--	0.77	F(8, 121) = 1.660	135	1971:Q1-	1,2,4,6,8
		(3.48)	--	--	--	--	--	P>F = 0.12	--	2004:Q4	--
	(2)	--	-0.135	0.746***	--	--	0.77	F(8, 120) = 1.761	135	1971:Q1-	1,2,4,6,8
		--	(0.86)	(3.18)	--	--	--	P>F = 0.09	--	2004:Q4	--
	(3)	0.399***	--	--	0.012	-0.103*	0.78	F(8, 119) = 2.002	135	1971:Q1-	1,2,4,6,8
		(3.78)	--	--	(1.18)	(1.74)	--	P>F = 0.05	--	2004:Q4	--
Netherlands	**(1)**	0.177***	--	--	--	--	0.40	F(3, 125) = 1.422	132	1971:Q4-	1,2,3
		(2.84)	--	--	--	--	--	P>F = 0.24	--	2004:Q4	--
	(2)	--	-0.056	0.290**	--	--	0.41	F(3, 124) = 1.695	132	1971:Q4-	1,2,3
		--	(0.46)	2.47)	--	--	--	P>F = 0.17	--	2004:Q4	--
	(3)	0.152**	--	--	0.040***	-0.45**	0.46	F(3, 123) = 0.817	132	1971:Q4-	1,2,3
		(2.54)	--	--	(3.18)	(2.28)	--	P>F = 0.49	--	2004:Q4	--

Table 1. Phillips curve estimates for the Netherlands, other selected European countries and the USA (continued

Dependent variable π_t

		Gap(t-1)	Negative Gap(t-1)	Positive Gap(t-1)	Import prices (t-1)	Productivity (t-1)	Adj. R^2	Breusch-Godfrey LM test (5 lags)	No. of observations	Time period	Lags included
United Kingdom	**(1)**	0.467**	--	--	--	--	0.66	F(5, 129) = 2.151	139	1970:Q1-	1,2,4,5
		(3.11)	--	--	--	--	--	P>F = 0.06	--	2004:Q4	--
	(2)	--	-0.503**	0 .412	--	--	0.66	F(5, 128) = 2.160	139	1970:Q1-	1,2,4,5
		--	(2.18)	(1.37)	--	--	--	P>F = 0.06	--	2004:Q4	--
	(3)	0.414**	--	--	0.101***	-0.237**	0.69	F(5, 128) = 1.772	139	1970:Q1-	1,2,4,5
		(2.88)	--	--	(3.41)	(3.10)	--	P>F = 0.12	--	2004:Q4	--
United States	**(1)**	0.273***	--	--	--	--	0.51	F(3, 156) = 1.400	162	1964:Q1-	1,3
		(4.69)	--	--	--	--	--	P>F = 0.324	--	2004:Q4	--
	(2)	--	-0.223**	0.341***	--	--	0.51	F(3, 155) = 1.264	162	1964:Q1-	1,3
		--	(2.31)	(2.84)	--	--	--	P>F = 0.29	--	2004:Q4	--
	(3)	0.279***	--	--	0.006	-0.083*	0.51	F(3, 154) = 1.074	162	1964:Q1-	1,3
		(4.72)	--	--	(0.45)	(1.87)	--	P>F = 0.36	--	2004:Q4	--

Note: The table presents the Phillips curve estimates for the Netherlands in comparison with those for Germany, France, the United Kingdom and the USA, using quarterly data. Dependent variable is annualised quarterly CPI inflation for Germany and the USA and annualised quarterly HICP for France, the Netherlands and the United Kingdom, regressed on its own lags, the lagged output gap, lagged import prices inflation (by one quarter), and lagged labour productivity growth. The sum of lagged inflation coefficients has been constrained to one, up to eight lags have been chosen on the basis of their significance level and autocorrelation of residuals. T-statistics are given in parentheses and significance levels indicated by asterisks, with ***: 1% significance level, **: 5% level and *: 10% level. Breusch-Godfrey Lagrange-Multiplier tests for autocorrelation in the residuals have been reported.

In order to test for the asymmetry of the Phillips curve with respect to negative vs. positive output gaps (see Cournède *et al.* 2005 for a discussion of this approach), the specification (2) includes the two parts of the output gap separately. F-tests for parameter equality between negative and positive output gaps (not shown here) indicate that asymmetry can be assumed for France and the Netherlands but not for Germany, the United Kingdom and the USA, *i.e.*, prices react as strongly to negative as to positive output gaps in the latter countries, while in the former ones, inflation is downward sticky.

Source: Secretariat's estimations.

6. The results presented in Table 2 suggest that real wage rate inflation in the Netherlands is responsive to changes in unemployment: a one percentage point increase in the unemployment rate reduces real wage rate inflation by 0.65%, which is broadly in line with the response in most European countries included in the study and only a little less than in the United States. The elasticity of real wage inflation with respect to unemployment in the Netherlands has declined over time, as it has in a number of other countries: in the regression run over 1970-1995, this elasticity was 0.96%, which was high by international comparison. At the same time, the error correction term, defined as the difference between the lagged real wage rate and lagged labour productivity, is no longer significant[6] when the regression is run over the entire observation period (1970-2004). This is a positive development as it implies that factors that decrease the wages that firms can afford to pay conditional on the level of technology, such as energy prices, interest rates and payroll taxes, no longer affect the NAIRU.[7]

Evaluating employment adjustment costs

7. Even though real wages may be responsive to changes in unemployment, unemployment itself may react to changes in the business cycle only with a lag. This is particularly the case if firms are unable to adjust their workforce freely, due to rigidities embedded in the settings of labour market institutions. The high value of EPL can be taken as an indicator of relatively high costs of employment adjustment, but there are other structural policies that also have an influence. Measuring the reactivity of employment with respect to shocks hence requires the construction of a composite indicator of employment adjustment costs that summarizes the effects of different structural policies.

8. One possible way to build such an indicator consists of measuring the disequilibrium that may exist between labour demand and labour supply (derived from a calibrated inter-temporal macroeconomic model) as follows:

$$\omega = \arg\min \sum_t \left[n_t - \left(\omega n_t^d + (1-\omega) n_t^s \right) \right]^2$$

where ω is measuring the extent to which employment is supply rather than demand determined and n^d and n^s the revealed optimal choices for labour demand and labour supply by firms and households, which may be based on a standard optimisation framework (for details see Semmler and Gong, 2005, Ch. 8).

9. The results presented in Table 3 suggest that adjustment costs are high in the Netherlands by international standards (ω parameter close to zero), which tends to keep employment levels far from firms' desired levels. The contrast is particularly striking with the United States, the United Kingdom and Ireland, where the ω parameter is much higher – employment deviates less from labour demand in these countries.

10. As might be expected, this composite indicator is highly inversely correlated with the strictness of EPL – countries where employment deviates from firms' demand, such as the Netherlands, tend to have strict EPL. The composite indicator is also highly inversely correlated with the product market regulation (PMR) indicator and with unemployment benefit replacement rates. Regulation that restricts product market competition can contribute to employment deviating from demand by reducing firm turnover and hence turnover in the labour market, which would make it more costly to adjust employment to firms' desired levels. Similarly, high unemployment benefit replacement rates -- they are the highest in the Netherlands among the countries included in the study -- can reduce labour supply following adverse shocks, lowering the gap between the evolution of employment and labour supply.

Table 2. Aggregate wage Equations

Dependent variable: Growth of real wage ($\Delta(w_t\text{-}Pcp_{t-1})$)

1970-2004									
	Constant	U	Ln(U)	$\Delta\pi_t$	Pgdp-pcp	Error Correction	Prod. Gap	Adj. R^2	DW
Australia	1.33**	-0.73***	--	--	--	-0.12**	--	0.25	1.69
Austria	0.04***	-0.59***	--	--	1.62***	--	--	0.76	1.22
Belgium	0.08***	-0.78***	--	0.56***	--	--	--	0.80	2.17
Canada	2.69**	-0.43**	--	0.80***	--	-0.25**	--	0.50	1.50
Germany[1]	1.75***	-1.05***	--	--	--	-0.17***	--	0.65	2.60
West Germany[2]	--	--	--	--	--	--	--	--	--
Denmark	0.03***	-0.37***	--	0.69***	0.67***	--	--	0.61	1.82
Finland	0.00	-0.50***	--	--	0.77***	-0.08*	--	0.39	1.60
France	1.17***	-0.60***	--	0.69***	--	-0.11***	--	0.93	1.82
Italy	0.06***	-0.56***	--	--	0.49*	--	--	0.55	1.83
Japan	6.36***	--	-0.08***	--	--	-0.41***	--	0.58	1.33
Luxembourg	2.67***	-1.39***	--	0.92***	--	-0.25***	--	0.58	2.18
Netherlands	**0.04*** **	**-0.65*** **	**--**	**--**	**--**	**--**	**--**	**0.19**	**1.22**
Norway	2.54***	-0.92***	--	--	--	-0.20***	--	0.46	1.58
Portugal	0.09***	-1.35***	--	--	--	--	--	0.50	1.66
Sweden	3.15***	--	-0.03***	--	0.60**	-0.24***	--	0.37	1.55
United Kingdom	2.20**	-0.25**	--	--	0.67***	-0.22**	--	0.38	1.45
United States	0.06***	-0.76***	--	--	--	--	-0.02**	0.50	1.43

1970-1995									
	Constant	U	Ln(U)	$\Delta\pi_t$	Pgdp-pcp	Error Correction	Prod. Gap	Adj. R^2	DW
Australia	1.76**	-0.86***	--	--	--	-0.16*	--	0.29	1.73
Austria	0.02**	-1.71***	--	--	1.31***	-0.34***	--	0.83	1.20
Belgium	1.42*	-0.63***	--	0.60***	--	-0.13*	--	0.87	2.12
Canada	2.68**	0.54**	--	0.69**	--	-0.25**	--	0.56	1.71
Germany[1]	--	--	--	--	--	--	--	--	--
West Germany[2]	3.31***	-0.67***	--	0.83***	--	-0.31***	--	0.90	1.81
Denmark	0.03***	-0.39***	--	0.69***	0.63**	--	--	0.64	1.72
Finland	-0.05	-0.79***	--	0.96***	0.68*	-0.19*	--	0.72	1.40
France	0.02**	-0.74***	--	0.68***	--	-0.12***	--	0.95	2.14
Italy	3.61***	-0.87***	--	--	0.77***	-0.34***	--	0.74	2.34
Japan	4.97***	--	-0.13***	--	--	-0.32***	--	0.68	1.68
Luxembourg	3.06***	-2.31**	--	0.81**	--	-0.28***	--	0.62	2.59
Netherlands	**3.87*** **	**-0.96*** **	**--**	**--**	**--**	**-0.38*** **	**--**	**0.52**	**1.45**
Norway	1.77**	-0.69*	--	--	--	-0.14**	--	0.15	1.82
Portugal	0.11***	-1.61***	--	--	--	--	--	0.58	1.89
Sweden	2.65**	--	-0.03***	--	0.52**	-0.20**	--	0.43	1.34
United Kingdom	3.04**	-0.27**	--	--	0.72**	-0.30**	--	0.41	1.40
United States	0.06***	-0.82***	--	--	--	--	-0.09**	0.44	1.66

1. Germany 1991-2004
2. West Germany 1970-1991

Note: The table presents wage curve estimates for 17 OECD countries both for the period 1970-2004 and 1970-1995 using annual data. The wage equations are based on the specification discussed in OECD (1997), where the dependent variable are nominal wages (w_t) deflated by lagged consumer price inflation (Pcp_{t-1}). Explanatory variables are unemployment (U_t) either in absolute or logarithmic (ln(Ut)) value, the acceleration of consumer price inflation ($\Delta\pi_t$), the difference between GDP deflator inflation and Consumer price inflation ($DPgdp_t$ - $DPcp_t$) and an Error correction term, necessary for most European countries, Australia, Canada and Japan to account for co-integration between real wage inflation and unemployment. For the USA, the change in the difference between actual and trend labour productivity (as measured by a Hodrick Prescott-filter) growth has been found to be significant as well (DProd. Gap). P-values are given in parentheses, asterisks indicate the significance level, where: ***: 1%, **: 5%, *: 10%.

Source: Secretariat estimations.

Table 3. Composite indicator for labour market rigidities (ω)[1]

Country	Omega[2] (ω)	EPL[3]	PMR[4]	UB generosity[5]
Austria	0.22	2.4	1.8	32.9
Belgium	0.24	2.5	2.1	39.0
Canada	0.21	1.1	1.4	15.3
Germany	0.26	2.6	1.9	26.7
Spain	0.20	3.0	2.3	30.3
Finland	0.13	2.2	2.1	33.5
France	0.10	2.8	2.5	36.9
United Kingdom	0.34	1.0	1.1	16.6
Ireland	0.32	1.1	1.5	29.1
Italy	0.13	3.1	2.8	34.5
Japan	0.14	1.9	1.9	12.2
Netherlands	**0.07**	**2.3**	**1.8**	**52.2**
Norway	0.19	2.7	1.8	41.3
Sweden	0.21	2.6	1.8	24.3
United States	0.40	0.7	1.3	13.6
EU[6]	0.20	2.3	1.9	32.4
Average	0.21	2.1	1.9	29.2
Correlation with ω		-0.67***	-0.69***	-0.57**

1. The composite indicator for labour market rigidities has been calculated as the predictor that minimises the difference between the weighted average of labour supply, n^s, and labour demand, n^d, on the one hand, and actually observed employment on the other. Optimal labour demand and supply are derived from an inter-temporal optimising framework following Semmler and Gong (2005). Differences in hours worked have been accounted for by taking total hours worked as the reference value for both labour demand and labour supply. In addition the table reports the OECD-indicators for the strictness of employment protection legislation, the level of wage bargaining coordination, the unionisation rates, the tightness of product market regulation and unemployment benefit (UB) generosity.

2. Omega measures the deviation of actual employment from the level of employment optimally desired by firms on average during 1970-2004. The indicator varies from 0 to 1, with 0 signalling that the level of employment is equal to the supply of labour desired by households and 1 signalling that it is equal to the demand of labour by firms.

3. EPL indicator varies from 0 to 6, with 0 being the least restrictive. The indicator refers to the value of Version 2 in the later 1990s.

4. The product market regulation indicator. It varies from 0 to 6, with 0 being the least restrictive.

5. Unemployment benefit replacement rate average over a five-year period for three family types, value for 1999.

6. Average of above EU countries.

Source: Secretariat estimations, OECD Employment Outlook 2003 and 2004, and Conway, P., Janod, V. and Nicoletti, G. (2005), "Product Market Regulation in OECD Countries, 1998 to 2003", *OECD Economics Department Working Paper*, No 419.

NOTES

1. The econometric work summarised in this excerpt follows the recent strand of the literature, which shows that the rigidity of employment is an element to take into account when explaining sluggish responsiveness of inflation and wide and persistent swings in output (Trigari (2004) and Walsh (2005)).

2. Alternatively, inflation persistence can also be measured using univariate estimates such as the sum of the autocorrelation coefficient if inflation is modelled as an autoregressive process (see Levin and Piger (2004) for an overview of different measures and problems related to them).

3. The sum of the lags has been constrained to sum to unity. Up to 8 lags have been estimated and lags with statistically insignificant coefficients have been dropped.

4. For some countries, the unemployment term enters in log form to take account of a non-linear relationship between wage growth and unemployment.

5. For Australia, Austria, West Germany, Finland (only for the period 1970-2004), Italy, Norway, Sweden and the United Kingdom, the coefficient for the second-order price difference was found to be close to 1. The coefficient has therefore been restricted to 1, *i.e.* nominal wages are deflated by current prices. For Germany, Japan, the Netherlands, Portugal and the USA, the coefficient was insignificant or close to zero and has been dropped. For Japan and Sweden, the natural logarithm of the unemployment rate has been used.

6. This is also true for Austria, Belgium, and Italy.

7. Blanchard and Katz (1997).

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