What drives consumer confidence in times of financial crises? Evidence for the Netherlands

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Paul Neisingh and Ad Stokman *

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Abstract

Five years after Lehman Brothers defaulted, the Dutch consumer confidence is still very low. Based on a monthly time series analysis from 1978 onwards, we provide evidence that general economic indicators are not sufficient to explain consumer sentiment. We show that during the Great Recession confidence drops are magnified by the decline in the public's trust in the financial sector and in Europe. Next to financial stability, price stability and political stability are found to be crucial for consumer confidence. Furthermore, we identify autonomous waves of optimism and pessimism. We interpret this as evidence of Keynes' notion of animal spirits.

Full recovery of consumer confidence might take long.

Key words: consumer confidence, trust, animal spirits, financial crisis
JEL-codes: D03, E21, E32, E44

1. Introduction

Five years after Lehman Brothers defaulted, the Dutch consumer confidence is still very low. Initially, Dutch consumer confidence seemed to rebound from the shock generated by the credit crisis. Also in Germany and other northern European countries consumer sentiment recovered. But in the course of 2011 consumer confidence levels in the Netherlands fell back again, deeper and at a higher speed than in neighbouring countries like Germany (figure 1).

Figure 1: Consumer confidence in the euro area
Index indicates balance of positive and negative responses
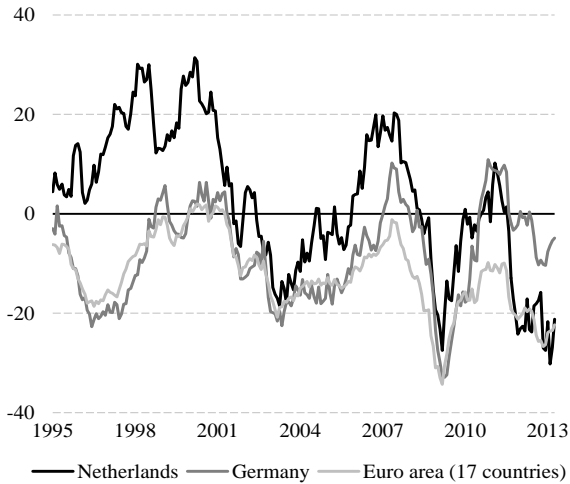
Source: Eurostat

What factors are responsible for Dutch consumers' persistent low levels of confidence? By means of a time series analysis covering four severe economic downturns, we try to establish whether the current state of consumer sentiment differs from previous ones. If so, what might be the implications for consumer spending and economic performance in general? Previous research suggests that simple statistical models can explain a large part of the variation in the consumer confidence indices (Throop, 1992, Fuhrer, 1993). For the Netherlands, we also find that a limited set of macro indicators is sufficient to describe overall consumer confidence for a long episode of 30 years from 1978. But we also find, that from September 2008 onwards, these factors no longer fully explain consumer confidence. We argue that this is related to what happened during the financial crisis.

In Europe, the financial sector had to be supported or rescued by a consortium of national governments, central banks and international institutions like the ECB and the IMF. In the Netherlands, two banks were nationalized and a few smaller banks failed. Furthermore, Dutch pension funds were forced to cut back pension benefits in order to fulfil the minimum required coverage ratios, something highly unusual in a defined benefit system. Under these circumstances, the public's trust in the financial sector - which had always been high even after the failure of a smaller bank in 2004 (Mosch and Prast, 2008) - dropped markedly. Another major public concern is the on-going European debt crisis. The Dutch economy is affected through its dependency on (European) exports and through

the rising loans and guarantees to (peripheral) European countries. The depth and persistence of the European debt crisis is a concern to many and has led to a major loss of public trust in Europe. Another crisis related concern is the struggling Dutch housing market. Since the peak in 2008 average housing prices declined approximately 20%. This led many households find themselves in a situation in which their mortgage credit is larger than the value of their property.

Next to these concerns, the Netherlands has been facing a distressed political landscape during the last decade. Fed by public dissatisfaction with the performance of public services (e.g. health care, safety and integration of ethnic minorities) volatility in electoral outcomes increased and established political parties lost support vis-à-vis new parties on both sides of the political spectrum. At the same time, these new parties often lost support quickly as well. All Dutch cabinets that took office after 1998 resigned before the end of their four year term. This created uncertainty about the political and economic course of the country. Klomp and De Haan (2009) find that political instability increases economic volatility. A recent household survey that was conducted by DNB among 2,000 Dutch citizens confirms that the lasting political uncertainty has undermined the public's faith in the economy.

The relevance of consumer confidence has been widely investigated in the economic literature. The evidence on the relevance of consumer confidence in addition to the information contained in other economic indicators is mixed (Ludvigson, 2004). Several studies, though, suggest that consumer sentiment has predictive power not possessed by economic indicators (e.g. Eppright, Arguea and Huth, 1998). The sentiment indicator is found to be particularly informative under circumstances of strong fluctuations in the economy (Garner, 1991, Blanchard, 1993). Broadly speaking, there are two complementary views: the *information view* and Keynes' *animal spirits view* (Barsky and Sims, 2012). The *information view* regards consumer confidence as a representation of rational future expectations. Theoretically, any role given to consumer confidence to explain future spending is not consistent with rational economic expectations (Hall, 1978). This means that explanations of the predictive power of consumer confidence have to be found outside of the rational expectations theoretical framework with frictionless markets. For example, borrowing constraints can prevent the consumer from consuming more today in anticipation of the increase in income (ECB, 2013). As consumer sentiment can be updated almost instantaneously, its prime value added is that it is leading future economic developments, but does not independently affect these developments. For the Netherlands, Granger causality tests tell us that changes in consumer confidence lead changes in spending (Annex A, Table A.1). Figure B.1 (Annex B) shows that consumer confidence and growth of real private consumption follow a very similar pattern.

Animal spirits, on the other hand, are a manifestation of *overly* optimistic or pessimistic perceptions on the part of households, so that they desire more or less consumption then is optimal under perfect information. To quote Keynes: 'Our decisions to do something positive (…) can only be taken as a result of animal spirits - of a spontaneous urge to action rather than inaction, and not as the

outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities'. According to Katona (1951), consumer expenditures are a combination of objective financial resources (consumers' ability) and their subjective perception of the world (consumers' willingness). This implies that even if negative shocks do not directly affect their ability to buy, it might affect consumers' willingness-to-buy. Koppl (1991) argues that Keynes uses the term animal spirits to express and explain irrational behaviour. However, given limited time, limited knowledge and cognitive capabilities, it might actually be rational to use intuition, rules of thumb and heuristics (see for example, Camerer Loewenstein and Rabin, 2004, Melberg, 2005).

In this paper, we take a closer look at the determinants of consumer confidence in the Netherlands. The remainder of the paper is structured as follows. Section 2 introduces the specification of our model explaining consumer confidence. Section 3 offers a brief description of the data. Section 4 discusses the main estimation results and section 5 concludes.

2. Specification

Starting point of our time series analysis is the finding from a Dutch Household Survey among 2,000 Dutch respondents that individuals base their economic beliefs and sentiments primarily on general, non-personal information of a cyclical nature (DNB, 2005).

In the base model, consumer confidence (cc) is determined by a combination of readily available macroeconomic indicators (X_i). In the extended model, trust-indicators (Z_j) are included that capture specific, unconventional shocks that hit Europe and the Dutch economy, specifically the loss of trust in financial and political institutions.

$$cc = \alpha_0 + \sum \alpha_i X_i + \sum \beta_j Z_j + \varepsilon \tag{1}$$

We also examine the presence of animal spirits. How we extract animal spirits from our data will be discussed in greater detail in Section 4. As animal spirits directly refer to *willingness-to-buy*, equation 1 will be estimated both for the overall index of consumer confidence and the sub-index 'willingness-to-buy'.

Our focus is on consumer sentiment for the Dutch population as a whole. Although, differences in age, level of education or gender matter, consumer confidence developments for these sub-groups develop very similarly over time (Annex B, figure B.2). A summation or aggregation bias, therefore, is not expected to create serious problems. More importantly, for the population as a whole, consumer confidence statistics date back to 1978, instead of 2002 for sub groups of respondents. This puts us in a position to compare consumer sentiment behaviour during The Great Recession with the other 'big' economic downturns of the early 1980s, the early 1990s and 2000s and to investigate whether 'this time is different'.

3. Data

Consumer confidence

On a monthly basis Statistics Netherlands surveys consumers on five questions: (1) how does the respondent assess the economy in the recent past (positive, neutral, negative), (2) how does the respondent assess the economy for the near future, (3) how does he or she view his/her personal financial situation over the recent past (4) and for the near future, and (5) if he/she considers this a the right time for the purchase of large expensive goods (e.g. furniture, washing machine, TV). Every sub-index equals the balance of positive and negative assessments, with the total index (cc) averaging the five sub-indices and the willingness-to-buy index (wtb) averaging the balanced scores for items (3), (4) and (5). These questions are put to a representative sample of 1,000 Dutch consumers every month.

General economic indicators

The explanatory variables can be arranged in two groups: those that relate to general economic conditions and those that relate to trust in financial and political institutions (Annex B, Figure B.3 and Figure B.4 respectively).

The general economic indicators are the annualized growth rate of real disposable income, the annualized growth rate of real private consumption, the unemployment rate, the stock exchange index, the spread of the long and short-term interest rate and the growth rate of the housing price deflated by the CPI. We also included a measure of perceived inflation next to the level of official inflation (inflation$_{perceived}$). The introduction of the euro as a new currency in 2002 caused perceived inflation to be high even though true inflation levels remained low. All independent variables are based on publically available data.

Reverse causality can be an issue due to the interdependency between consumer related variables. Economic indicators might affect consumer confidence, but consumer confidence could also affect the economic indicators. Therefore we use the development of the German rather than the Dutch stock market and interest rate levels. Pairwise correlations between Dutch and German stock price levels and interest rates of respectively 0.97 and 0.99 indicate that the German data are indeed a good proxy of the Dutch stock and money markets. This pairwise correlation is much weaker for other economic indicators. In these cases Dutch data have been used and we have tested whether the determinants are (weakly) exogenous.

Trust indicators

Next to these standard economic indicators the regressions consist of data that measure the level of financial and political distress (Annex B, Figure B.4). As a proxy for the European debt crisis we use the yield spread on 10 year government bonds between Greece and Germany. This spread serves as an indicator of the severity of the crisis. The developments at the Dutch pension funds are addressed by including the average coverage ratio of the pension funds. The coverage ratio is the proportion

between total assets and the present value of future pension liabilities. If the coverage ratio is insufficient (i.e. below 105) pension funds are obliged to develop a recovery plan. If the coverage ratio remains insufficient, cuts in benefits are the last solution. Such cut backs affect the income of all participants; both the active, inactive and retired. In the following, covshort$_{pension}$ is the part of the coverage ratio below 105 (e.g. if the average coverage ratio of pension funds is 95, covshort$_{pension}$ equals 10).

We also include direct lack-of-trust measures surveyed by the European Commission on how people think about the eu(ro zone) from 1999 onwards (lacktrust$_{eu}$) and DNB surveys on publics' faith in the Dutch financial sector from 2004 onwards (lackstrust$_{finsec}$). Concerning trust in Europe, no data are available before the year 1999 and, therefore, trust levels have been kept fixed at the 1999 level. Information on trust in the Dutch financial sector is available from 2004 onwards. As trust in the Dutch financial sector has always been considered solid, we assume the trust levels before the year 2004 are fixed at the 2004 level.

For a long time, the political landscape in the Netherlands had been dominated by three to four political parties. This changed around 2001 (DNB, 2004, p. 65-66). In this paper we speak of political instability when new political parties receive a lot of votes in polls. Support for these parties (Leefbaar Nederland, Lijst Pim Fortuyn, Trots op Nederland and the PVV) in monthly polls conducted by TNS NIPO have been taken as a proxy for political turmoil (lacktrust$_{pol}$).

All variables are shown in Appendix B. The figures labelled B.3 pictures the general economic indicators, the figures B.4 the financial and political stability indicators.

4. Main results

In this section, we first investigate whether Dutch consumer confidence - the total index and the willingness-to-buy sub-index - can be described by a (linear) combination of general economic aggregates (section 4.1). This is the base model. In the extended model, we add trust indicators for the financial sector, Europe and the Dutch political climate (section 4.2). The presence of animal spirits is examined in section 4.3.

4.1 Contribution of general economic indicators

We start by checking whether consumer confidence is stationary or not. Because sentiment series are by construction bounded and lie in between -100 and +100 standard unit root tests may not be applicable in which case they need to be corrected (Cavaliere and Xu, 2013). If the bounds are sufficiently far away, conventional unit root tests behave according to the standard asymptotic theory. In our case, the minimum value is -48 and the maximum value +27, justifying the use of standard unit root tests. The consumer confidence series for the Netherlands have a unit root of order 1 (Annex A, Table A.2). In most European countries and in the US, consumer confidence series are non-stationary, German confidence being the main exception. The candidate I(1) determinants are the annualized

quarterly growth rate of real disposable income (which is border I(0)/I(1)), the annualized quarterly growth rate of real private consumption, the unemployment rate, the annual inflation rate and/or the level of perceived inflation, the annual growth rate of the real house price, the overall German (Dutch) stock price index and the difference between the German (Dutch) long and short-term interest rate - the yield spread - as a measure of the monetary policy stance. Perceived inflation is measured by the share of Dutch people experiencing high inflation.

Table 2 summarizes the main OLS-estimation results for Equation 1. In all cases, normality of the residuals cannot be rejected; so the standard t-statistics (based on HAC standard errors) are valid and can be interpreted as in case of OLS estimation with stationary variables (Stock, Watson, 1993). The first two columns contain the estimation results for the base model ($\beta_j = 0$) and the episode starting in January 1978 and ending in August 2008 (the month before the failure of Lehman). In the first

Table 2 Estimation results Eq. (1) for overall consumer confidence in the Netherlands

| Consumer confidence	1978m1 – 2008m8		1978m1 -2013m1				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Economic factors							
constant	-19.7	10.5	1.48	5.43	2.70	8.92	13.0
	(1.8)	(1.4)	(0.2)	(0.9)	(0.5)	(1.7)	(2.8)
unemployment rate	0.35	-3.12	-2.06	-2.62	-2.35	-2.24	-2.38
	(0.3)	(3.2)	(2.0)	(3.1)	(3.0)	(3.2)	(3.6)
growth real income	1.73	1.08	1.25	1.02	1.03	0.97	0.95
	(5.6)	(5.2)	(4.8)	(4.5)	(4.4)	(4.0)	(4.0)
growth real private consumption	0.46	0.15	0.33	0.17	-	-	-
	(2.0)	(1.2)	(1.9)	(1.4)			
inflation	-1.65	-0.53	0.30	-0.71	-	-	-
	(1.6)	(0.7)	(0.4)	(0.9)			
share people experiencing high inflation	-	-0.70	-0.52	-0.54	-0.57	-0.50	-0.54
		(8.4)	(7.6)	(7.6)	(8.5)	(8.2)	(8.0)
rise real house price	1.04	0.37	1.21	0.45	0.52	0.55	0.41
	(4.2)	(2.1)	(8.2)	(2.4)	(3.1)	(3.6)	(2.5)
stock index Germany (2005=100)	0.10	0.12	0.05	0.15	0.15	0.20	0.20
	(2.3)	(3.9)	(1.4)	(4.6)	(4.5)	(6.9)	(7.3)
yield spread Germany	0.61	2.79	1.25	1.86	2.03	2.18	2.55
	(0.6)	(3.9)	(4.8)	(2.7)	(2.9)	(3.2)	(3.6)
Trust factors							
lacktrust$_{pol}$	-	-	-	-0.47	-0.42	-0.51	-0.47
				(3.5)	(3.8)	(5.8)	(5.5)
covshort$_{pension}$	-	-	-	-1.26	-1.26	-1.23	-0.97
				(5.7)	(5.4)	(5.5)	(3.7)
spread long-term interest rate Greece-Germany	-	-	-	-0.40	-0.44	-0.13	-
				(2.5)	(2.8)	(0.8)	
lacktrust$_{eu}$	-	-	-	-	-	-0.38	-0.33
						(3.9)	(3.3)
lackstrust$_{finsec}$	-	-	-	-	-	-	-0.74
							(2.4)
$\bar{R}^2$	0.58	0.82	0.75	0.83	0.83	0.84	0.85
Unit root test 1)	-3.97	-4.96	-5.46	-5.61	-5.55	-5.98	-5.98
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Normality test 2)	4.23	0.69	2.06	2.91	0.22	1.08	2.55
	[0.12]	[0.71]	[0.36]	[0.23]	[0.90]	[0.58]	[0.28]
Quandt-Andrews breakpoint test 3)	34.5	9.3	24.8	-	-	-	-
	[0.00]	[0.40]	[0.00]				

Note: HAC t-statistics in parentheses (absolute values)   Probabilities in brackets
1) t-statistic   2) Jarque-Bera test statistic   3) Ave LR F-statistic

column perceived inflation has been left out of the base model. Co-integration is rejected and the Quandt-Andrews breakpoint-test (shortly QA-test) suggests that there is at least one breakpoint. Figure B.4 shows that the number of people who experience high inflation rose fast after the introduction of the euro. After adding perceived inflation, a stable co-integrating relationship arises between consumer confidence and unemployment, growth real disposable income, perceived inflation, growth real housing price, the German stock index and the German yield spread (Table 2, column 2). Real consumption growth and recorded inflation are not significant. The QA breakpoint-test reveals that there are no structural breaks. All estimated parameters have the expected sign. Dutch consumers become more confident when unemployment falls, the growth rate of real income rises, perceived inflation drops, the growth rate for real house prices rises, when stock prices rise and the yield curve steepens.

The base model breaks down when we extent the original sample with the period September 2008 – January 2013 (Table 2, column 3). The QA-breakpoint-test suggests that there is at least one breakpoint in the full sample. This also becomes apparent when we perform an out-of-sample forecast. A forecast starting in January 2006 based on the base model estimated for the sample 1978-2005 (Annex A, Table A.3, column 1) produces sentiment levels which initially track actual confidence levels satisfactory, but after two-and a half years start to overstate the underlying true values rapidly (Figure 2a). This suggests that after the outbreak of the financial crisis new influences may have been activated that we have not seen or noticed before and that have undermined consumer confidence in a structural way.

Figure 2a: Base model of consumer confidence
Index indicates balance of positive and negative responses

Figure 2b: Extended model of consumer confidence
Index indicates balance of positive and negative responses
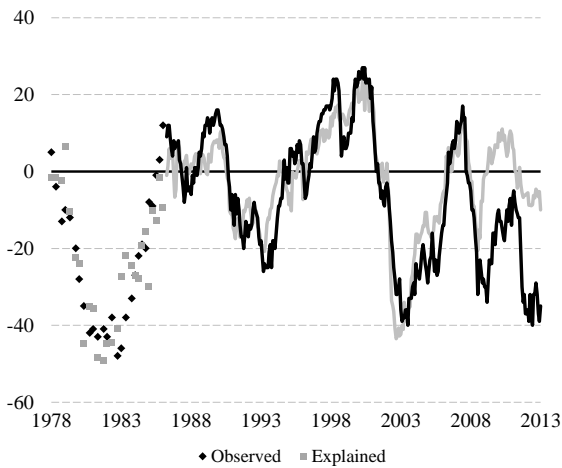
Explained in sample (1978-2005) and forecasted out-of-sample (2006-2013:1)
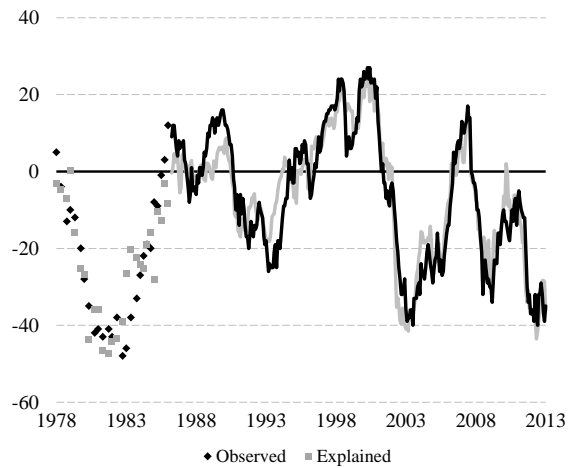
Explained in sample (1978-2013:1)

4.2 Contribution of trust

As a first step, we add the (part of) coverage ratio of pension funds below the critical value of 105, the spread between the long-term interest rates of Greek and German sovereign bonds and the political distress index to Equation 1. All three determinants are highly significant and have the expected signs

(Table 2, column 4 and 5). Next we add the lack-of-trust-in-Europe indicator (Table 2, column 6). Finally, we add the lack-of-trust-in-the–financial-sector indicator to the equation (Table 2, column 7). The estimation results show that these factors are all highly significant and have the expected downward effect on consumer confidence. Taken together these new channels cover the gap shown in figure 2a (see Figure 2b above), interestingly, without affecting the estimated parameters found for the base model over the sample 1978-August 2008. Instrumental variables estimation with the German all share index and German interest rates as instruments for the Dutch all share index and Dutch interest rates does not alter the findings (Annex A, Table A.3, column 3).

Figure 3 pictures the contribution of the main drivers of consumer confidence since the introduction of the euro. About half of the consumer sentiment movements in this episode originate from general economic conditions, the other half roughly speaking from factors that are directly linked to factors affecting price stability, financial stability in the Netherlands and Europe and political stability. Early 2000s, high levels of perceived inflation after the introduction of the euro and political distress were two main sources of the drop in consumer confidence; animal spirits being the other (for a more detailed discussion see section 4.3). Since the outbreak of the financial crisis, a decline in the public's trust in the financial sector and in Europe substantially undermined consumer confidence.

Figure 3 Decomposition of consumer confidence into main contributors
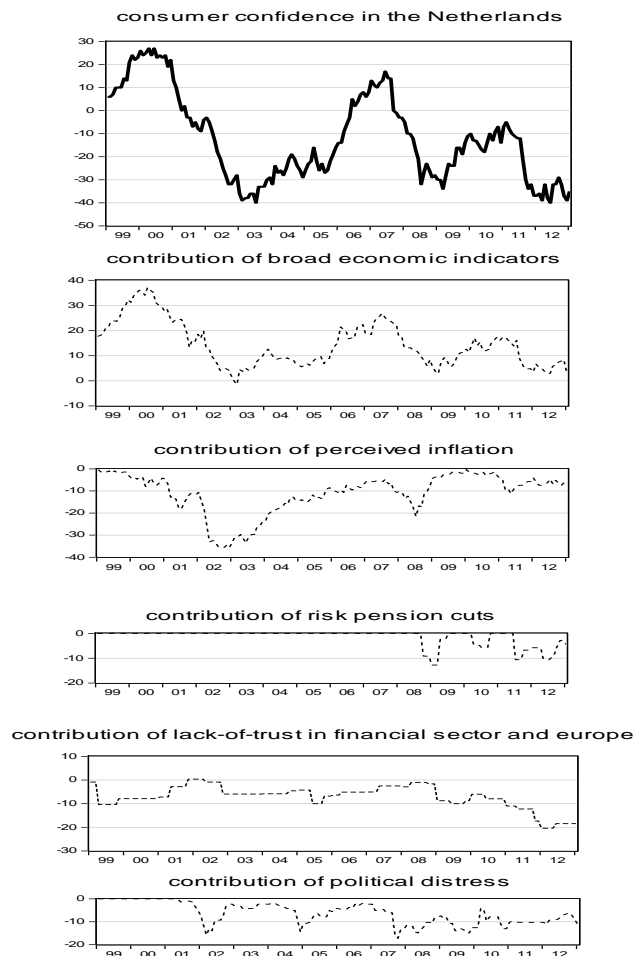
Equation 1 is symmetric in its treatment of cc, X and Z. In order to establish the direction of causality and the lag structure, we need to take a closer look at the error-correction representation of the data (Equation 2). Some determinants are exogenous, like the German stock index and German interest rates; they are not expected to respond to developments in the Dutch economy. For the remaining variables this has been tested as follows: if we replace Δcc_t as dependent variable in equation 2 by $\Delta X_{i,t}$ ($\Delta Z_{j,t}$), and $\Delta X_{i,t}$ ($\Delta Z_{j,t}$) does not adjust to the equilibrium error, it is considered weakly exogenous as defined by Engle, Hendry and Richard (1983). All variables - except confidence itself - are found to be weakly exogenous (see the t-statistics of the estimated error-correction parameter μ in Table 3).

The estimated adjustment parameter μ for overall consumer confidence in Equation 2 is 0.17 (see next section) and significant. This implies a half time of deviations from the steady state level of about three months. In the next subsection, we take a closer look at the interpretation of this adjustment process.

$$\Delta cc_t = \partial_0 + \sum \partial_i\, \Delta X_{t-1,i} + \sum \varphi_j\, \Delta Z_{t-1,j} - \mu\, ecm_{t-1} + \varepsilon_t \qquad (2)$$

Table 3 Are explanatory variables weakly exogenous?

Left-hand variable in eq. 2		Left-hand variable in eq. 2 (trust)	
	t-statistic μ		t-statistic μ
Δcc	6.1	$\Delta inflation_{perceived}$	-1.1
$\Delta unemployment$	1.6	$\Delta lacktrust_{pol}$	1.4
$\Delta growth\ real\ income$	-1.6	$\Delta covshort_{pension}$	-0.4
$\Delta growth\ real\ consumption$	-0.2	$\Delta lacktrust_{eu}$	0.9
$\Delta rise\ real\ house\ price$	0.8	$\Delta lackstrust_{finsec}$	1.3

4.3 Contribution of animal spirits

The two core features of animal spirits are that they represent autonomous fluctuations in beliefs that have an impact on spending behaviour, and that these effects do not last (Blanchard, 1993). To investigate the presence of animal spirits, we take a closer look at the sub-index willingness-to-buy. This index explicitly captures consumers' attitude towards their own financial situation in the near past and near future and whether they consider the time is right for major purchases. These data are available from May 1986 onwards. Like overall consumer confidence, the willingness-to-buy index is a non-stationary I(1) series. Table 4 contains the estimation results for the long-term steady state for both the overall consumer confidence index and the willingness-to-buy index. Not surprising, unemployment is an important driver of consumers' willingness-to-buy. Willingness-to-buy is three times more sensitive to unemployment than overall confidence. Income and consumption growth have some but no strong effect on people's willingness-to-buy. Stock market developments make a relatively small contribution to consumers' willingness-to-buy, but much bigger to overall consumer confidence. The same holds for the yield spread. Trust shocks and political turmoil have a significant downward effect on people's willingness-to-buy; the responsiveness to trust in the financial sector is, however, no longer significant.

Table 4 Estimation results steady state specification willingness-to-buy

Dependent	cc		wtb	
Economic factors	1978m1 2013m1	1986m5 2013m1	1986m5-2013m1	
constant	13.0 (2.8)	11.3 (1.7)	45.8 (8.6)	47.2 (8.2)
unemployment rate	-2.38 (3.6)	-2.29 (2.4)	-6.40 (7.9)	-6.40 (7.9)
growth real income	0.95 (4.0)	0.97 (3.8)	0.25 (2.1)	0.24 (2.1)
growth real private consumption	-	0.40 (0.9)	0.19 (1.9)	0.17 (1.9)
share people experiencing high inflation	-0.54 (8.0)	-0.53 (7.3)	-0.43 (9.4)	-0.45 (10.1)
rise real house price	0.41 (2.5)	0.43 (1.8)	0.47 (3.1)	0.37 (3.1)
stock index Germany (2005=100)	0.20 (7.3)	0.20 (6.2)	0.05 (2.1)	0.05 (2.2)
yield spread Germany	2.55 (3.6)	2.67 (3.6)	1.07 (2.5)	1.22 (3.0)
Trust				
lacktrust$_{pol}$	-0.47 (5.5)	-0.47 (3.5)	-0.58 (7.4)	-0.42 (3.8)
covshort$_{pension}$	-0.97 (3.7)	-0.91 (3.5)	-0.66 (2.6)	-0.52 (2.0)
lacktrust$_{eu}$	-0.33 (3.3)	-0.32 (3.2)	-0.38 (4.2)	-0.35 (4.1)
lackstrust$_{finsec}$	-0.74 (2.4)	-0.70 (2.0)	0.30 (1.1)	-
$\bar{R}^2$	0.85	0.85	0.87	0.87
Unit root test 1)	-5.98 [0.00]	-6.00 [0.00]	-6.34 [0.00]	-6.02 [0.00]
Normality test 2)	2.55 [0.28]	2.51 [0.29]	3.51 [0.17]	5.05 [0.08]

Note: HAC t-statistics in parentheses (absolute values)   Probabilities in brackets
1) t-statistic   2) Jarque-Bera test statistic

Table 5 contains the estimation results for the error-correction specification of equation 2, in which the adjustment towards the steady state level of confidence and the short run dynamics are combined. According to our estimation results, unemployment developments have a significant immediate impact on the consumers' willingness-to-buy. Next to changes in unemployment, dynamics in experienced inflation are an important driver. Not only in the long run but also in the short run, stock market developments have a significant effect on people's willingness-to-buy. This effect is smaller than for the overall index. This is in line with the finding of Jansen and Nahuis (2003) that the stock market-confidence relationship in many European countries is driven by expectations about economy-wide

Table 5 Estimation results error-correction specification

$$\Delta cc_t \, (wtb_t) = \partial_0 + \sum \partial_i \, \Delta X_{t-1,i} + \sum \varpi_j \, \Delta Z_{t-1,j} - \mu \, ecm_{t-1} + \varepsilon_t$$

1986m5-2013m1	Overall index consumer confidence	Willingness to buy
ecm_{t-1}	0.17	0.15
	(6.1)	(5.8)
constant	-0.21	-0.09
	(1.2)	(0.8)
Δ_{t-1} cc resp. Δ_{t-1} wtb	-0.06	-0.17
	(0.1)	(3.4)
Δ_{t-1} stock index Germany	0.22	0.09
	(6.0)	(4.0)
Δ_{t-1} unemployment	-4.09	-3.12
	(2.1)	(2.4)
Δ_{t-1} growth real consumption	-	-3.0
		(0.2)
Δ_t share people experiencing high inflation	-0.29	-0.25
	(4.8)	(6.2)
Δ_{t-1} rise real house price	-0.21	-0.10
	(2.3)	(1.7)
Δ_t lacktrust$_{pol}$	-0.12	-0.14
	(1.8)	(3.3)
$\bar{R}^2$	0.25	0.26
DW	1.98	2.04
Heteroskedasticity test 1)	[0.42]	[0.42]
Normality test 2)	[0.11]	[0.09]

Note: t-statistics in parentheses (absolute values); probability between brackets

1) Breusch-Pagan-Godfrey test   2) Jarque-Bera test

conditions rather than personal finances. We also find a small but significant tendency in the short run behaviour of the willingness-to-buy index to (partly) offset a change in attitude in the month before. Animal spirits cannot be the reason for this as these stem from spontaneous actions. The speed of adjustment towards the steady state is close to that for the overall sentiment index (0.15 versus 0.17).

      The error-correction estimation results can be used to perform a so-called dynamic simulation. The dynamic simulation starts with two successive observed values of the willingness-to-buy index for the Netherlands, in our case May and June 1986. Next, we calculate all successive values of the willingness-to-buy index, replacing observed lagged values of the index by the simulated ones. After a couple months all following values of the willingness-to-buy index are almost entirely determined by

Figure 4a: Dynamic simulation of willingness-to-buy
Index indicates balance of positive and negative responses.
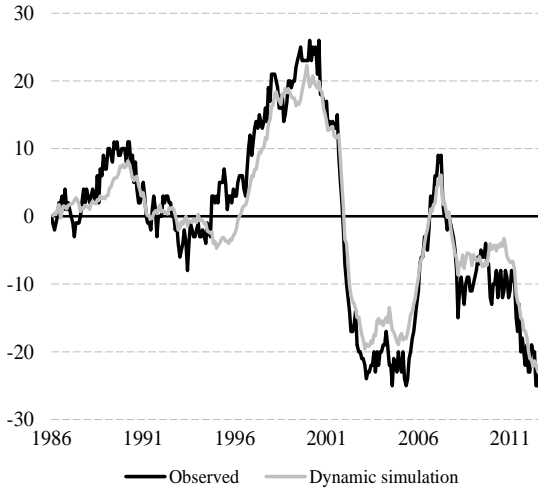
Figure 4b: Dynamic simulation of willingness-to-buy
Difference between observed and simulated outcome.
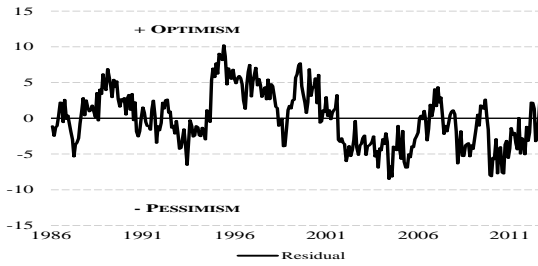
the explanatory variables in the model. A dynamic simulation provides a good measure of the quality of the model. Figure 4a shows that the model delivers a satisfactory description of the willingness-to-buy in the Netherlands over time. The difference between the recorded (wtb) and the simulated values (wtb$_{dyn}$) for willingness-to-buy is depicted in Figure 4b.

The key question now is whether this residual still contains information relevant for the description/explanation of private spending. If so, this might indicate the presence of animal spirits. To investigate this, we regress annual wtb$_{dyn,y}$ and annual (wtb$_y$ -wtb$_{dyn,y}$) on the annual growth rate of real private consumption (see equation 3). Both variables are significant and have the expected sign, suggesting that animal spirits play a role.

$$\text{growth real private consumption}_y = 1.8 + 0.10\ \text{wtb}_{dyn,y} + 0.20\ (\text{wtb}_y - \text{wtb}_{dyn,y}) \qquad (3)$$

$$(8.0) \quad (3.3) \qquad\qquad (2.3)$$

$\bar{R}^2$ =0.61, DW=1.72, sample period: 1986-2012, plim[breakpoint,1998]=0.59
plim[forecast, 2010]=0.36 plim[JB normality]=0.61

What is the story behind the occurrence of animal spirits in the Netherlands? Can they be rationalized by the occurrence of certain events, like Blanchard demonstrated for US confidence and the Kuwait invasion. According to figure 4b, there was a clear wave of optimism among Dutch consumers at the end of the 1980s. Possibly this was triggered by the fall of the Berlin Wall and the ending of the Cold War and the hope that the world (economy) would benefit from this. This wave of optimism was followed by an episode in which consumers became overly pessimistic, possibly as a response to the Gulf War that began in August 1990. A wave of optimism took off during the second half of the 1990s. This was an episode of a booming Dutch housing market, a booming international stock market, price stability and a stable political climate in the Netherlands. Under such favourable conditions, people may easily become overly confident. In the early 2000s, this wave of optimism came to a sudden end, possibly induced by the 9/11 terrorist attacks upon the US in New York and Washington DC in 2001; 9/11 dragged people all over the world into a shock and a state of pessimism. This wave of pessimism was followed by another wave of pessimism which started with the outbreak of the financial crisis.

5. Concluding remarks

The academic literature is mixed about the value added of information on consumer confidence relative to other available broad economic indicators. This contrasts with the great importance influential economists like Keynes, Arrow, Katona, Akerlof and Shiller attach to consumer sentiment for understanding and predicting consumer behaviour.

In our paper, we provide strong evidence that the consumer confidence index contains information that goes beyond the information already contained in general economic indicators. We identify three distinct types of drivers of consumer sentiment: (1) general economic indicators, (2) animal spirits and (3) trust. The consumer sentiment crises of the early 1980s, 1990s and 2000s can largely be explained by a combination of type (1) and type (2) drivers; the current financial crisis by all three. When people lose trust in the financial system or Europe - as with the recent financial crisis - this will have a longer lasting negative impact on consumer confidence and spending according to our analysis. Restoring trust takes time.

Incorporating the confidence channel - and more specifically the trust channel and the animal-spirits channel - in our economic models is one of the major challenges for future research.

APPENDIX A   TABLES

Table A.1 Granger causality tests 1986q2- 2012q4

Probability, F statistics in parentheses

Index consumer confidence *Null hypothesis*	*Overall index*	*Willingness to buy*
Change growth consumption does not Granger cause change in confidence	**0.94 (0.19)**	**0.86 (0.33)**
Change in confidence does not Granger cause change growth consumption	0.02 (3.06)	0.01 (3.88)

Note: grey = null hypothesis rejected

Table A.2   Augmented Dickey-Fuller unit root tests 1978m1 - 2013m1

		Level *t-statistic (p-value)*		**First difference** *t-statistic (p-value)*	
Broad economic indicator (X_i)					
consumer confidence total index		-1.39	(0.59)	-7.98	(0.00)
willingness-to-buy	1)	-0.94	(0.77)	-20.93	(0.00)
unemployment rate		-2.43	(0.13)	-4.11	(0.00)
growth real disposable income	2)	-2.85	(0.05)	-10.79	(0.00)
growth real private consumption	2)	-2.66	(0.08)	-6.39	(0.00)
inflation recorded	2)	-2.06	(0.26)	-19.99	(0.00)
share people experiencing high inflation		-1.68	(0.44)	-15.95	(0.00)
rise real house price	2)	-2.49	(0.12)	-16.19	(0.00)
stock index Netherlands		-1.39	(0.59)	-15.36	(0.00)
stock index Germany		-1.43	(0.57)	-14.59	(0.00)
yield spread Germany		-3.00	(0.04)	-14.87	(0.00)
Trust indicators (Z_i)					
spread long-term interest rate Gr/Ge		-1.16	(0.69)	-4.01	(0.00)
lacktrust$_{eu}$		-2.61	(0.10)	-6.49	(0.00)
covshort$_{pension}$		-2.86	(0.07)	- 4.54	(0.00)
lacktrust$_{finsec}$		-0.61	(0.98)	-11.77	(0.00)
lacktrust$_{pol}$		-2.51	(0.11)	-9.87	(0.00)

Note In most cases, the KPSS unit root test results confirm the DF test results.

With respect to real income growth, the KPSS test rejects stationarity at 10%

significance level.

1) 1986m5 – 2013m1   2) annual growth rate

Table A.3 Further estimation results steady state

specification consumer confidence

	1978m1 - 2005m1	1978m1-2013m1	
Economic factors	(1)	(2)	(3)
	OLS	OLS	IV
constant	6.84	13.0	15.4
	(1.1)	(2.8)	(2.9)
unemployment rate	-2.75	-2.38	-2.04
	(3.3)	(3.6)	(2.5)
growth real income	1.05	0.95	0.98
	(4.9)	(4.0)	(3.8)
share public experiencing high inflation	-0.71	-0.54	-0.64
	(9.3)	(8.0)	(8.7)
rise real house price	0.38	0.41	0.38
	(2.2)	(2.5)	(2.1)
stock index Germany	0.14	0.20	-
	(3.5)	(7.3)	
yield spread Germany	2.75	2.55	-
	(3.9)	(3.6)	
stock index Netherlands	-	-	0.18
			(6.3)
yield spread Netherlands	-	-	2.30
			(2.5)
Trust			
$lacktrust_{pol}$	-	-0.47	-0.35
		(5.5)	(4.1)
$covshort_{pension}$	-	-0.97	-1.00
		(3.7)	(3.6)
$lacktrust_{eu}$	-	-0.33	-0.33
		(3.3)	(1.8)
$lacktrust_{finsec}$	-	-0.74	-0.64
		(2.4)	(3.1)
$\bar{R}^2$	0.82	0.85	0.83
Unit root 1)	-4.52	-5.98	-5.67
	[0.00]	[0.00]	[0.00]
Normality 2)	1.37	2.55	0.47
	[0.50]	[0.28]	[0.79]

Note: HAC t-statistics in parentheses (abs values); probabilities

between brackets

1) t-statistic   2) Jarque Bera test statistic

APPENDIX B   FIGURES

Figure B1: Consumer confidence
Consumer confidence index and growth of private consumption between 1978 and 2012.
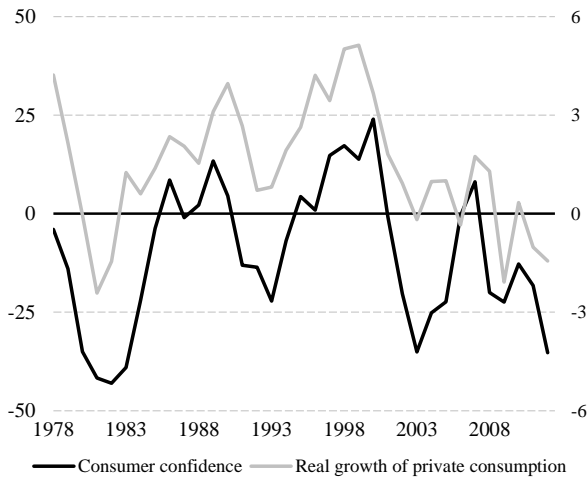
Source: Netherlands Statistics

Figure B2: Consumer confidence
Consumer confidence index for different consumer characteristics
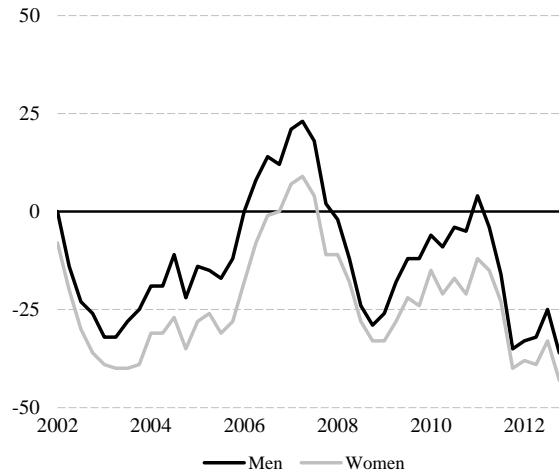
Source: Netherlands Statistics

Figure B2: Consumer confidence
Consumer confidence index for different consumer characteristics
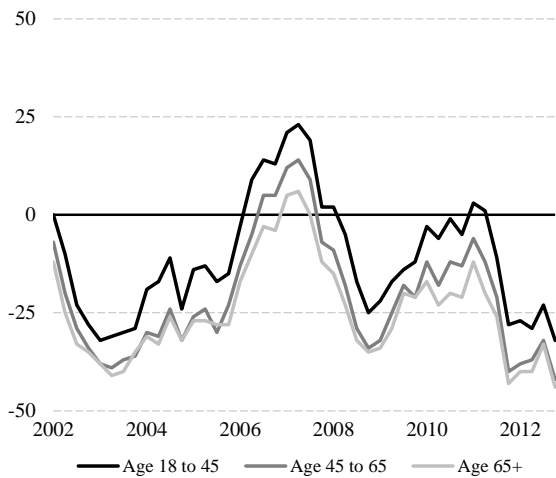
Source: Netherlands Statistics

Figure B2: Consumer confidence
Consumer confidence index for different consumer characteristics
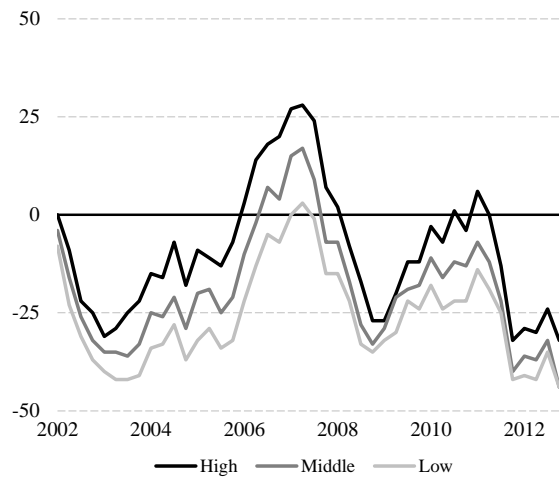
Source: Netherlands Statistics

Figure B3: Consumer confidence - overall
Index indicates balance of positive and negative responses
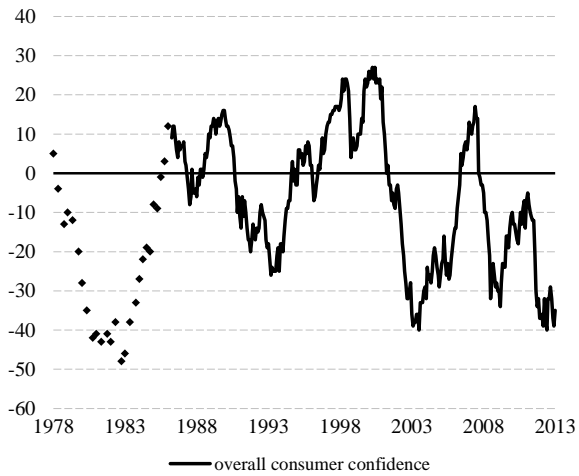
Source: Netherlands Statistics

Figure B3: Unemployment rate
Rate in percent.
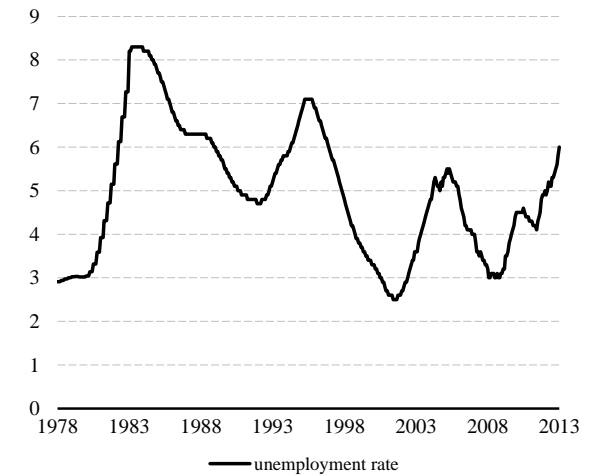
Source: Netherlands Statistics

Figure B3: Change of real disposable income
Rate in percent, 12 month difference.
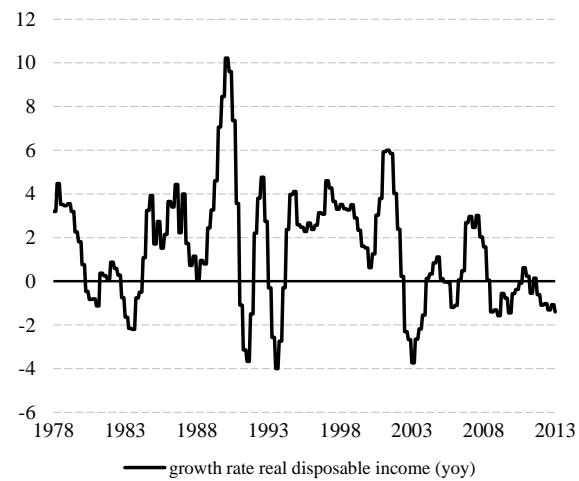
Source: Netherlands Statistics

Figure B3: Change of real private consumption
Rate in percent. 12 month difference.
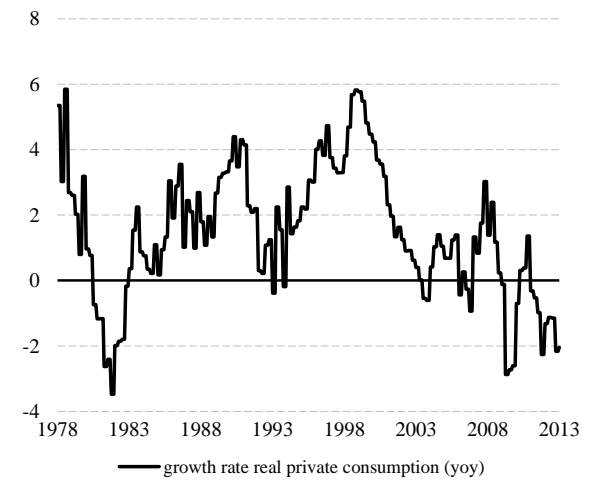
Source: Netherlands Statistics

Figure B3: Change of average house prices
Rate in percent. 12 month difference.

rise real house price (yoy)
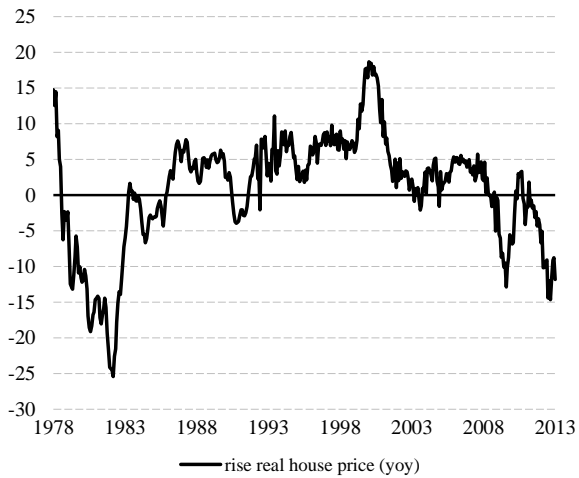
Source: Netherlands Statistics

Figure B3: German and Dutch stock index
2005 = 100

stock index GE   stock index NE
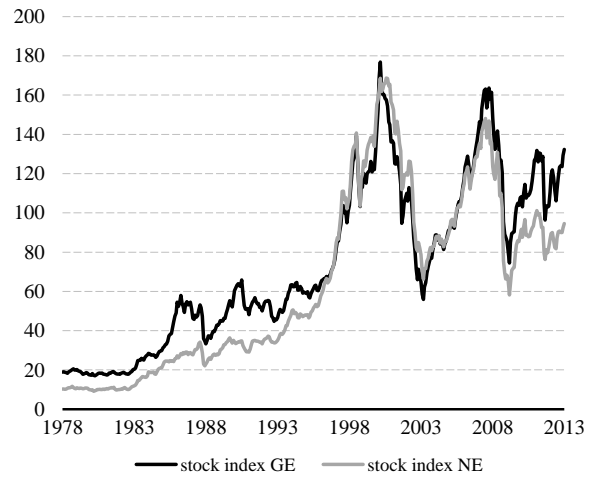
Source: OECD

Figure B3: Level of inflation
Level in percent
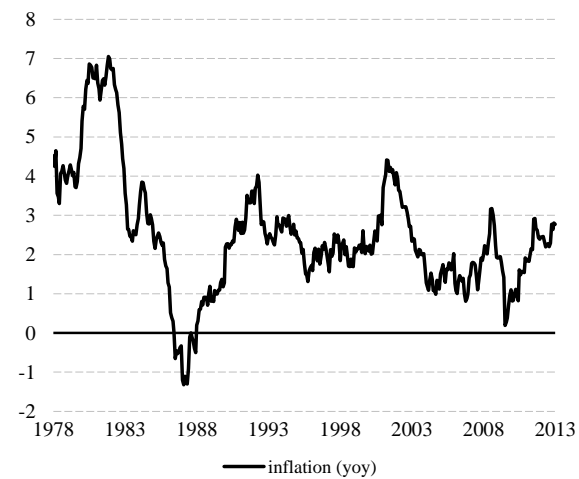
inflation (yoy)

Source: Netherlands Statistics

Figure B3: Spread in long term and short term interest rates

spread long-term/short-term interest rate GE

spread long-term/short-term interest rate NE
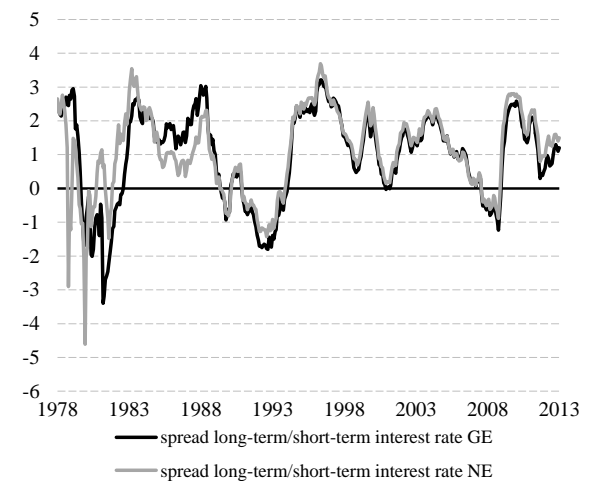
Source: OECD

Figure B4: Perceived inflation
Percentage that indicates to expercience "high inflation".

Share Dutch public experiencing high inflation
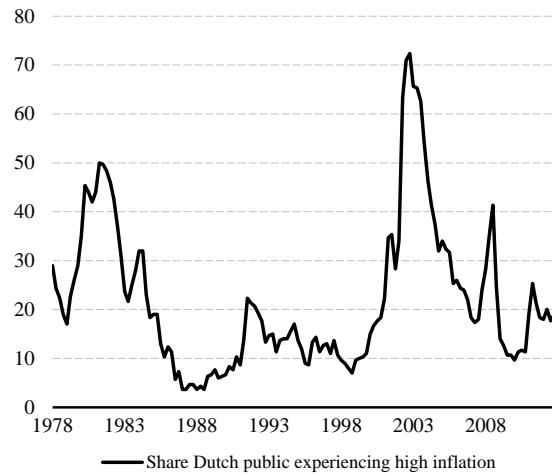
Source: Statistics Netherlands

Figure B4: Financial sector instability
Percentage that indicates to have low trust in the financial sector..

Share Dutch people lacking trust in financial sector

Coverage index pension funds below critical value of 105%
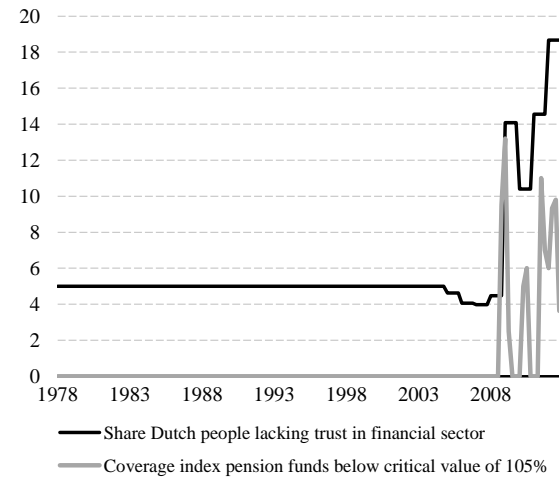
Source: DNB

Figure B4: Instability in Europe

Spread long-term yield rates on Greek and German sovereign bonds

Share Dutch public lacking trust in Europe
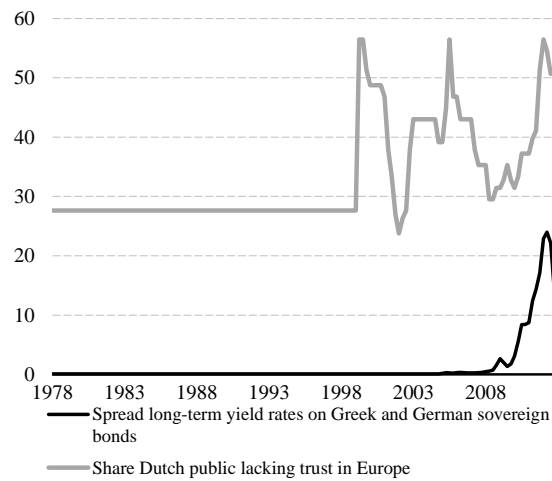
Source: OECD, EC public opinions

Figure B4: Political instability

Parliament seats excluding four centre parties (VVD, PvdA, CDA, D66)

Poll seats Leefbaar, Lijst Fortuyn, Trots and PVV
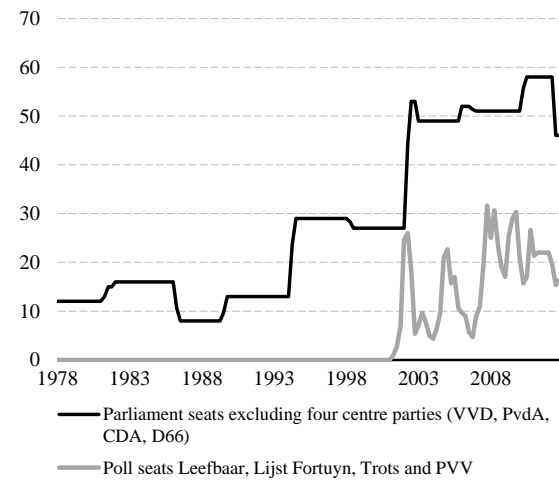
Source: TNS Nipo

References

Akerlof, G. A., and R.J. Shiller. (2010). Animal spirits: How human psychology drives the economy, and why it matters for global capitalism. Princeton University Press.

Arrow K (1972), Gifts and exchanges, Philosophy and Public Affairs, 1, 343-62

Barsky, R. E. Sims (2012). Information, animal spirits, and the meaning of innovations in consumer confidence, American Economic Review, 102, 1343-1377.

Blanchard, O. (1993). What caused the last recession? American Economic Review, vol. 83 no 2, 270-274.

Cavaliere, G. and F. Xu (2013), Testing for unit roots in bounded time series. Journal of Econometrics (forthcoming)

Camerer, C. F., G. Loewenstein and M. Rabin (2004). Advances in behavioral economics, Princeton University Press, 33-51.

DNB (2004). The Dutch consumer: from shopaholic to enthusiastic saver, Quarterly Bulletin, 58-64.

DNB (2005). Confidence, happiness and the financial situation of households, Quarterly Bulletin.

ECB (2013), Confidence indicators and economic developments, ECB Monthly Bulletin, 45-57.

Engle, R.F., Hendry, D.F. and J.F. Richard (1983), Exogeneity, Econometrica 51, 277-304.

Eppright, D.R., Arguea, N. M. and W.L. Huth (1998). Aggregate consumer expectation indexes as indicators of future consumer expenditures. Journal of Economic Psychology, 19(2), 215-235.

Fuhrer, J.C. (1993). What role does consumer sentiment play in the U.S. macroeconomy, New England Economic Review 43, 32-44.

Garner, C.A. (1991), Forecasting consumer spending: Should economists pay attention to consumer confidence surveys?, Economic Review 57-71.

Hall, R.E. (1978), Stochastic implications of the life cycle/permanent income hypothesis: Theory and evidence, Journal of Political Economy 96, 971-987.

Jansen, W.J. and N.J. Nahuis (2003). The stock market and consumer confidence: European evidence, Economics Letters 79, pp. 89-98.

Katona, G. (1951), Psychological analysis of economic behavior. First edition. McGraw-Hill Book Company Inc., New York

Keynes, J.M. (1936). The General Theory of Employment, Interest and Money. London. Macmillan. 161-162.

Klomp, J. and J. de Haan (2009). Political institutions and economic volatility, European Journal of Political Economy 25, 311–326

Koppl, R. (1991). Retrospectives: Animal spirits. Journal of Economic Perspectives, Vol 5, No 3, Pp. 203-210

Ludvigson, S.C. (2004). Consumer confidence and consumer spending, Journal of Economic Perspectives 18(2), 29-50.

Melberg, H.O. (2005). A note on Keynes' animal spirits. Observation, February 14, 1999, 92

Mercer (2012). Melbourne Mercer Global Pension Index, October 2012

Mosch, R.H.J., Prast, H.M. (2008). Confidence and trust: empirical investigations for the Netherlands and the financial sector, DNB Occasional Studies (6).

Stock, J.H. and M.W. Watson (1993). A simple estimator of cointegrating vectors in higher order integrated systems, Econometrica 61, 783-820.

Throop, A.W. (1992). Consumer sentiment: Its causes and effects, Federal Reserve Bank of San Francisco Economic Review 1, 35–59.

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