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The US dollar: Safe haven - Despite rising US current account deficit

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The US dollar: Safe haven

Despite rising US current account deficit

August 6, 2007

Financial investors generally regard the US dollar as a “safe haven”.

In times of international financial market turbulence they frequently reallocate their portfolios into US dollars. The high level of liquidity and diversity of USD financial assets, which offer a certain insurance against excessive exchange rate movements, is an often cited motivation for this behaviour.

The role of the US dollar as a “safe haven” is closely related to the development of the US current account and the net US foreign debt.

Between 1978 and roughly 1988, the US dollar only appreciated during turbulence on financial markets if the US trade account (as a major part of the current account) was at least balanced. If there were trade deficits, financial market turbulence tended to cause a depreciation of the US dollar.

Despite the increasingly rapid growth of the US current account deficit since the mid-1990s, the US dollar also had a safe haven status in the 1989-2006 period. International financial investors have obviously changed their minds and now regard the persistently high US current account deficit as harmless for a stable development of the dollar's exchange rate.

According to our statistical estimates, the threshold for the US trade deficit at which the dollar still tends to appreciate in the case of financial market turbulence rose to 7 % of US GDP in 2006. Possible explanations for this include the changed structure of US dollar investors, the concept of an implicit US-Asian currency peg, and the increased prominence of the US net foreign position, which due to changes in valuation is not as dramatic as the current account deficit.

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Background

Both financial market players and academics ascribe the role of a “safe haven” to certain currencies, in particular the US dollar and the Swiss franc. In times of greater uncertainty on financial markets investors seem to have a particular preference to hold assets in these currencies. Primarily they should seek relatively secure assets like bank deposits or short term treasury notes. But in modern times a large variety of financial instruments, e.g. derivatives, are available to build secure positions in these currencies and to hedge against risks in particular markets. Ultimately, also these rather hidden transactions should have an impact on the prevailing exchange rates. Therefore, instead of disentangling changes in individual asset positions, like for instance the net-long positions of non-commercial traders at the Chicago Mercantile Exchange (CME), the observed exchange rate movements seem to be an appropriate overall indicator for international investors preferences for certain currencies in times of global financial stress.

Studies by Cumby (1988) and Froot and Thaler (1990), for example, suggest that the strong appreciation of the US dollar in the early 1980s was at least partially due to “safe-haven” purchases by international financial investors. In their econometric analyses, Doroodian und Caporale (2000) also find a positive correlation between general uncertainty on the forex markets and the value of the US dollar in the 1973-1996 period. Kaul and Sapp (2006) in turn analyse the uncertainty situation before and after the Y2K conversion, and find clear indications of safe-haven purchases in intra-day €/ \$ exchange rates. Finally, at least at first glance, also the dollar appreciation which was observed simultaneously with the clear correction on the international stock markets in May 2006 suggests a safe-haven effect. From 9 May to 13 June 2006, the stock indexes (e.g. Morgan Stanley Capital International (MSCI) in national currency) lost over 20 % in Asia, over 23 % in Latin America, and around 13 % in Europe, whilst the US dollar appreciated an average of 1.5 % against the currencies of leading industrial countries.

The idea that the US dollar might have acted as a safe haven even in 2006 is remarkable, particularly against the background of the high and continuously rising US current account deficit of the last few years. A study by Clarida, Coretti and Taylor (2006) for the G7 countries shows that an increase in the current account deficit as a percentage of GDP above a critical threshold generally causes an adjustment response in form of a depreciation of the domestic currency. For the US they estimate a threshold value of -2,2% of GDP.¹ Taking this at face value one could expect that the high current account deficit in 2006 would have

¹ Cf. Richard H. Clarida, Gorette, M. and M. P. Taylor (2006). Are There Thresholds of Current Account Adjustment in the G7?, NBER Working Paper 12193

been perceived by financial market players as a risk for the stability of the US dollar leading to the loss of its safe-haven status. Arguing in the same direction, the German Council of Economic Experts regards it as impossible for the US to be able to maintain a current account deficit of more than 6 % of nominal GDP.² Despite the fact that the threshold value of Clarida, Coretti and Taylor has been exceeded since early 2003, and the current account deficit climbed to 7% in late 2005, no significant adjustment of the US current account via exchange rates has taken place, however.

Not least the somewhat surprising dollar appreciation in May 2006 provides a motivation to investigate in greater depth the influence exerted by the US current account deficit on the safe-haven status of the US dollar. In the meantime, the Deutsche Bank (2006) has already taken up this issue in a brief analysis, and this present study builds substantially on their approach.³ The Deutsche Bank analysis indicates that the US dollar has not always enjoyed safe-haven status during financial market turbulence over the last 30 years. This finding is derived by calculating correlations between the external value of the US dollar and the volatility of US stock prices – each measured over 3-year periods. The external value of the US dollar used in the Deutsche Bank study and the following analyses is the trade-weighted exchange rate of the US currency against 17 trading partners. The external value rises when the US dollar appreciates against one or several other currencies. The volatility of the US stock market serves as a rough yardstick for the general uncertainty on the international financial markets, e.g. due to political crises, financial market scandals, abrupt switches in economic policies, and other unpredicted events. Whilst this measure suggests a very close positive correlation between volatility and the external value of the US dollar in the 1996-2006 period – according to which the US dollar had a safe-haven role – the correlation between the two variables recorded by the Deutsche Bank in the preceding 20 years was only slightly positive and in some cases even negative. It is particularly interesting to observe that, up to the mid-1990s, the correlation fluctuated greatly in line with the development of the US current account deficit. For example, the US dollar typically weakened in the case of financial market turbulence coupled with US current account deficits. The authors conclude from this that the safe-haven effect of 1978-1988 only existed when the US current account registered a small deficit or when it was in surplus. The fact that the correlation and thus the safe-haven effect was apparently particularly significant in the 1996-2006 period, even though the US current account deficit and the US foreign debt kept increasing, is not fully

² Cf. Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung (2006), Jahresgutachten 2006/2007, p. 109.

³ See Deutsche Bank (2006). “Financial Market Volatility and the US-Dollar: Eroding Safe-Haven Effect”, Exchange Rate Perspectives, July 2006.

investigated by the authors, however. They merely suppose that investors shift their investments into US stocks and bonds less because they are in search of a safe currency but rather because they are in search of a liquid and less volatile market. The appreciation would thus be a secondary effect of this investment decision, in which the risk of a depreciation due to unsustainable foreign debt would play a subordinate role.

In this paper we undertake a deeper econometric study of the interrelationships highlighted by Deutsche Bank. Following Clarida, Coretti and Taylor (2006), the analysis is focused on the question whether the safe-haven effect is only observed when the current account deficit remains below a critical threshold. In the light of the observations since the mid-1990s in particular, it is also investigated whether the threshold may have changed over time. In addition to this extension of the substance of the Deutsche Bank study, the methodological approach is also refined somewhat here:

- 1.) The uncertainty on the international financial markets is measured not in terms of the volatility of the US stock markets, but on the basis of a common volatility factor of the stock markets in the US, Japan and Europe.
- 2.) In order to examine the relationship between the US current account deficit and the safe-haven role of the US dollar, OLS estimations are carried out for a reduced-form equation for the external value of the US dollar.
- 3.) Changes in the relationship between safe-haven effects and the US current account over time are built into the reduced-form equation using a time-variable threshold value.

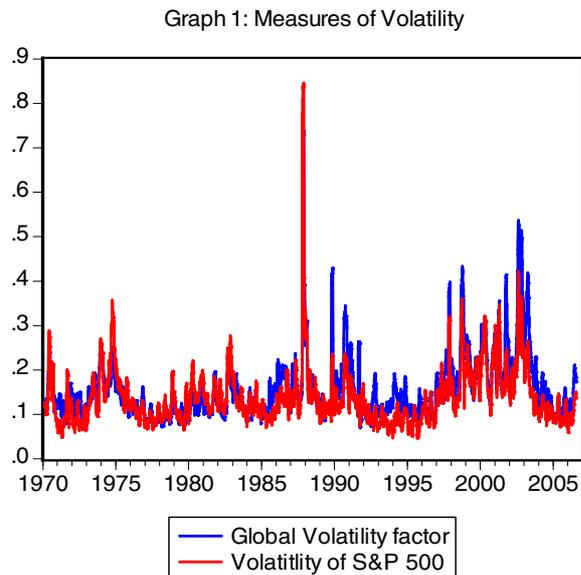
a) Relationship between financial market uncertainty and the US dollar exchange rate

In order to obtain an indicator for international financial market turbulence, statistical procedures (principal component analysis)⁴ are used to filter a **common factor** from the volatility of the DAX 30, the Japanese TOPIX 225 and the STANDARD and POORS 500. The three indices are chosen because they should be partly driven by distinct regional shocks, which in turn raises the likelihood that the common statistical component truly represents global volatility.⁵ When the common factor is compared with the volatility on the US stock market (Graph 1), one finds that in the 1970-1990 period global volatility was smaller than the volatility of the US market, whilst it was comparatively greater in the following

⁴ Cf. Backhaus et al.: *Multivariate Analysemethoden*, 11th edition, Springer, Berlin 2006.

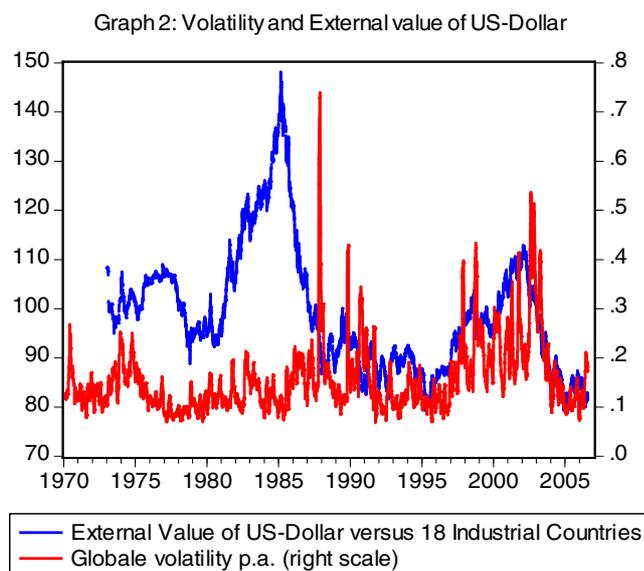
⁵ Some global shocks can be assumed to have their origin in the US, like for instance the LTCM crisis in 1998. In this case the safe haven effect on the US dollar might be somewhat weaker. Nevertheless, since volatility rises on a global scale, making assets in certain countries particularly vulnerable to price fluctuations, the safe haven argument for the US dollar still applies. Accordingly, the scope of the financial crises should drive safe haven US dollar purchases, not its origin. While it is possible that the impact on the US dollar might vary with the origin of volatility, the particular case of US driven global crises should be the rare exception in our sample. Therefore, we do not expect a bias in subsequent results we obtain for the relationship between volatility and the US dollar exchange rate.

period. Nevertheless, the relationship between the two variables is very close, with a correlation of 84 %.

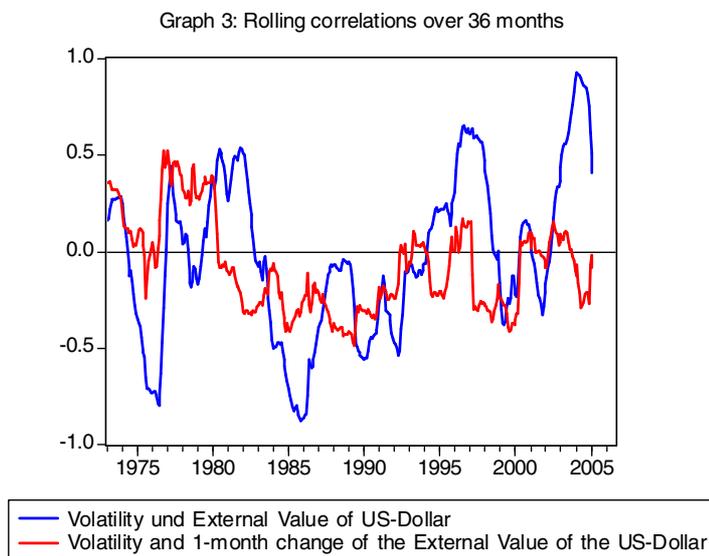


The volatility is calculated as a moving standard deviation from the daily changes in the closing prices over 30 days. To achieve comparability, the standard deviation is extrapolated for the year, assuming that the daily yields follow a random walk, i.e. that their value in a period consists of the value in the preceding period plus a stochastic component (average value: zero).

If, like Deutsche Bank (2006), one contrasts the indicator for global financial market uncertainty with the development of the external value of the US dollar (Graph 2), the correlation is indeed comparatively small between 1970 and 1995, and very strong in the subsequent period.



Correlations between these time series, however, are not very meaningful, since they have very different statistical characteristics. The degree of volatility has a constant mean with a finite variance, whereas the external value, at least over the 1970-2006 period, follows a non-stationary stochastic process with an – in strict terms – infinite variance. The latter statistical characteristic makes it necessary in turn to study a correlation between the two time series on the basis of the rate of change of the exchange rate.



The value of the correlation function illustrated here describes, for a point in time t , the correlation of the respective time series over the period $t-17$ to $t+18$ (36 months). The threshold from which the correlations can be regarded as significant in the case of stationary variables (given an error probability of 5 %) stands at ± 0.32 in the specific case.

These different correlation analyses are contrasted in Graph 3. Here, it becomes clear that, in contrast to the findings in the cited study, a weakly significant correlation between financial market volatility and the US dollar exchange rate can only be assumed in 1972-1973 and 1975-1981 (cf. red curve and explanations below the graph).

A simple regression between the natural logarithm of the external value of the US dollar (LW) and the degree of volatility (VOLA) allows a more precise study of the correlation. The problem of non-stationarity of the exchange-rate time series was addressed by employing the change in the external value within a month $\Delta LW = LW(t) - LW(t-1)$ as a dependent variable. As additional explanatory variables, values of these differences for up to two months previously ($\Delta LW(-1)$ and $\Delta LW(-2)$) are included. The estimate was deliberately undertaken for reference periods of varying length, in order to uncover structural changes to the relationship over time. The findings of the preceding correlation analysis can be confirmed. It is also possible to ascertain a positive correlation between financial market volatility and the external value of the US dollar only for the period of April 1973 to January

1981. The specific result arrived at in Table 1 suggests that, within the reference period, an increase in volatility of 10 percentage points resulted on average in an appreciation of the US dollar of 0.6 % against the currencies of leading trading partners. But this finding also involves a comparatively great degree of uncertainty, since the estimated coefficient for this interaction is not particularly different from zero (only assuming a 10 % error probability).

Table 1:

Dependent variable: ΔLW Reference period: April 1973 – January 1981 No. of observations: 94				
Variable	Coefficient	Standard error	t-statistic	Error probability
$\Delta LW(-1)$	0.25	0.10	2.43	0.02
$\Delta LW(-2)$	-0.19	0.09	-1.94	0.06
Constant	-0.007	0.004	1.65	0.10
VOLA	0.06	0.03	1.64	0.10
Adjusted coefficient of determination		0.08		
Durbin-Watson statistic		1.94		

ΔLW means to the first difference in the natural logarithm of the external value of the US dollar, VOLA the volatility index.

A repetition of the estimation for the entire period from 1973-2006, however, reveals that there is overall a significantly contrary effect due to changes in financial market volatility. Viewed over the entire period, a rise in volatility resulted on average even in a slight depreciation in the US dollar (cf. Table 2).⁶

Table 2:

Dependent variable: ΔLW Reference period: April 1973 – August 2006 No. of observations: 401				
Variable	Coefficient	Standard error	t-statistic	Error probability
$\Delta LW(-1)$	0.33	0.05	6.80	0.00
$\Delta LW(-2)$	-0.12	0.05	-2.41	0.00
Constant	0.004	0.002	1.85	0.06
VOLA	-0.03	0.01	-2.23	0.03
Adjusted coefficient of determination		0.15		
Durbin-Watson statistic		1.97		

⁶ The results of the estimation for the 1981-2006 period show as expected an even clearer negative correlation between volatility and the external value of the US dollar.

At first glance, the tentative regression results from above seem to contradict the findings of the cited study, i.e. that there has been a particularly close correlation since the mid-1990s between financial market volatility and the external value of the US dollar. However, it is necessary to stress that financial market volatility was investigated here as a single independent explanatory factor for the exchange rate development. This is a potential weakness of the previous analysis, since the effect of financial market volatility on the US dollar should mainly depend on whether the other macroeconomic factors fostered a stable dollar rate or not. This thought is taken up in the following section. It will become clear that changes in the macroeconomic situation are a crucial element in the explanation of the inconstancy of the safe-haven function of the US dollar.

b) Safe-haven role of the US dollar and the US balance of trade

When looking for relevant macroeconomic conditions for a stable US dollar, the focus turns particularly to the development of the US current account. Repeated periodical deficits cumulate in a growing net US foreign debt. Analogous to the problem of growing public-sector debt, the question ultimately arises as to whether the private and public debtors in the US will in future be able to generate sufficiently high incomes to meet their interest payments and perhaps also their repayments of principal. In other words, rising debt levels – or permanent current account deficits – imply an increasing risk of default after a certain point in time. International investors would offset this increased risk with a call for a higher risk premium for US dollar investments, which in turn would cause the US dollar to lose ground against other currencies. In view of this potential chain of events, the role of the US dollar as a safe haven should be related to the current account trend. More precisely, in the case of trade surpluses, a safe-haven effect should be more marked, and in the case of deficits, it might even disappear entirely. However, this correlation might be diminished by a greater willingness of international investors to tolerate even a long-term current account deficit, e.g. in view of the US dollar's increasing significance as a reserve medium in some countries. Accordingly, in case of financial market turbulence they might still seek the US dollar as safe-haven.

In the following, the interaction between a safe-haven effect and the current account is investigated by a regression equation for the external value of the US dollar. The US balance of trade in goods and services is chosen as a proxy for the current account since it offers the key advantage to employ monthly data. This should not lead to less precise results in terms of the above considerations. Both balances move almost identically over time with a correlation coefficient close to one. The interaction of the US balance of trade (in relation to

GDP) and volatility is taken into account by the multiplication of the two variables ($VOLA*HB(-1)$). As additional variables both isolated financial market volatility and the isolated trade balance are included The later variable should capture that long-lasting US trade surpluses (deficits) can result in an additional demand for (supply of) dollars, which is then reflected in an exchange rate movement. Finally, the interest-rate for 10-year government bonds is included in the estimation as a further influencing macroeconomic variable.⁷

It is important to note, however, that the interest-rate and balance-of-trade variables cannot be regarded as exogenous in the equation. They both themselves depend on exchange-rate movements. Exchange-rate movements impact on the price competitiveness of the USA and thus on exports and imports. An appreciation or depreciation of the US dollar can alter the attractiveness of US bonds and cause interest rate responses. In order to avoid biased estimates due to endogeneity, values with a one-month lag are used, as they can be regarded as exogenous with respect to the current exchange rate.

When checking the regression equation, alternative reference periods were used, in order to discount the possibility that the correlation between the variables over the period might reflect structural changes.

However, this initially showed that, even across diverse variations of reference periods, there was an isolated influence neither of financial market volatility nor of the balance of trade.⁸ Interestingly, however (cf. Table 3), it appears that there was a significant correlation between the existence of a safe-haven effect and the balance of trade between 1973 and the end of 1999. In line with the previous considerations, an increase in financial market volatility in this period tended to result in an appreciation of the dollar in the case of trade surpluses, and in a depreciation in the case of trade deficits. As expected, a rise in the interest rate for US government bonds results per se in an appreciation of the US dollar.

⁷ Test regressions carried out in advance showed that the difference between US interest rates and alternatively rates for the Euro, Yen, Sterling or Swiss franc, or weighted non-dollar interest rates, were insignificant in terms of explaining the external value.

⁸ The isolated effect of the balance of trade was no longer estimated for the results of Table 3. In contrast, the isolated effect of volatility was considered, so that Equation 1 could subsequently be formulated.

Table 3:

Dependent variable: ΔLW				
Reference period: April 1973 – December 1999				
No. of observations: 321				
Variable	Coefficient	Standard error	t-statistic	Error probability
Constant	-0.002	0.005	-0.38	0.71
$\Delta LW(-1)$	0.31	0.06	5.55	0.00
$\Delta LW(-2)$	-0.13	0.05	-2.39	0.02
$VOLA*HB(-1)$	1.67	0.55	2.43	0.02
VOLA	0.006	0.02	0.32	0.75
$I_{US}(-1)$	0,00	0.00	1.22	0.22
Adjusted coefficient of determination		0.14		
Durbin-Watson statistic		1.96		

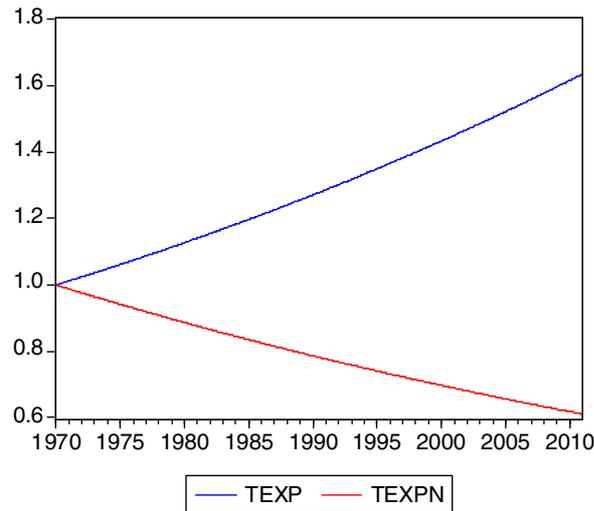
The correlation between the safe-haven effect and a positive or negative balance of trade is easier to perceive if the estimated equation is reformulated as follows:

$$(1) \quad \Delta LW = 0,3*\Delta LW(-1) - 0,1*\Delta LW(-2) + \mathbf{1,67*VOLA*[HB(-1) - 0,0]}.$$

The isolated influence of volatility, which was estimated using a coefficient of close to 0.00, comes in second place in the parenthesised expression in bold print. The parenthesised expression can thus be interpreted as a deviation of the balance of trade from a threshold for the manifestation of the safe-haven effect; in the specific case, the threshold is a balanced trade account. Accordingly, at least during the 1973-1999 reference period, it is the case that a safe-haven status pertained when the balance of trade was positive, and that the US dollar tended to lose this role if the balance of trade was negative.

However, if the reference period is extended beyond 1999 for the equation above, the influence of the volatility variable on the exchange rate becomes insignificant. If one estimates the equation only for the 2000-2006 period, one again obtains significant results, with the isolated volatility also having a significant positive effect on the exchange rate. This result suggests that there may have been a safe-haven effect dependent on the balance of trade in this period too, in which the threshold for a positive effect in recent years may have been lower than a balanced trade account. In order to test this hypothesis, an extended equation for the entire reference period was estimated, in which trend changes in the threshold (S) were allowed. Here, TEXP and TEXPN refer to positive and negative exponential trend variables, and are presented in Graph 5. Using these trend variables, the time variation of the threshold can follow very flexible curves.

Graph 5: Trend variables



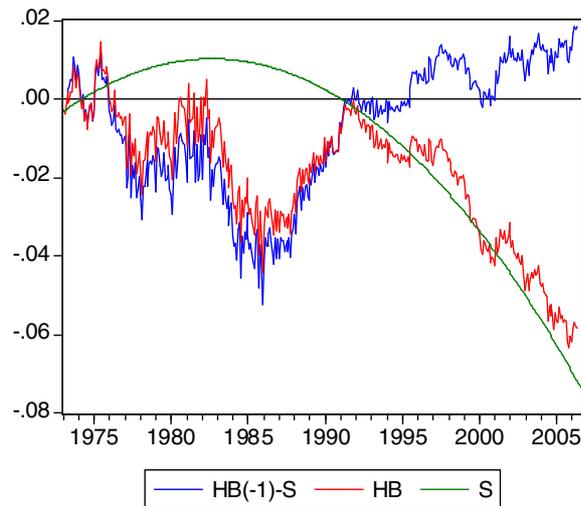
The estimated equation for the 1973-2006 period for this extended model is as follows (standard error of the coefficients in brackets):

$$\begin{aligned}
 (2a) \quad \Delta LW &= -0,008 + \mathbf{1,82*VOLA*[HB(-1) - S]} \\
 &\quad (0,004) \quad (0,46) \\
 &+ 0,001*I_US(-1) + 0,30*\Delta LW(-1) - 0,17*\Delta LW(-2) \\
 &\quad (0,0005) \quad (0,05) \quad (0,05) \\
 (2b) \quad S &= 1,55 - 0,68*TEXP - 0,88*TEXPN \\
 &\quad (0,50) \quad (0,20) \quad (0,31)
 \end{aligned}$$

Adj. R² = 0,16 ; D.W.-Stat. = 1,97

Up to the mid-1990s, the estimated threshold (S) is only slightly above or below a balanced trade account. But from 1995, it declines rapidly, reaching -7 % in 2006. The consequence of this is that the expression in brackets [HB(-1) - S] becomes positive in this period and that the dollar thus assumes a safe-haven function despite a growing trade deficit. (Graph 6).

Graph 6: Threshold for US trade balance for a Safe-Haven-Effect



An objection to the estimate of a time-variable threshold is that this itself helps the influence of the combination of volatility and balance of trade to become a significant explanation for the exchange-rate development. However, this type of spurious correlation can be largely excluded here, in that the prescribed course of the trend variables *TEXP* and *TEXPN* is very smooth. Furthermore, statistical tests show that, without the combined influence of volatility and balance of trade, and also with the isolated volatility alone, the description of the exchange rate development is much less satisfactory than when the explanatory variables on the right side of Equation 2a are used.⁹

c) Conclusions

The results of Equations 2a and 2b basically indicate that, over the entire period, a significant interaction existed between the safe-haven effect and the US balance of trade. Merely the critical threshold for the balance of trade up to which safe-haven status existed moved over the course of time. In particular, the existence of safe-haven effects from the mid-1990s amid a growing US current account deficit over the same period can be explained by a parallel rise in the threshold value. *Prima facie* this implies that in this period the perception of financial market participants about the sustainability of the US current account deficit shifted in favour of a higher US foreign debt potential. According to this, the very high level of the US trade deficit in 2006 was still regarded as sustainable by the international financial investors. Even in May 2006, they still preferred to turn to the US dollar as a safe haven in a time of financial market turbulence.

⁹ In order to ensure the validity of the time-variable threshold in statistical terms, the explanatory content of Equation 2a is contrasted both with that of an equation without the combined effect of volatility and balance of trade and with a that of an equation in which the expression in square brackets $(HB(-1) - S)$ is equal to one. Both on the basis of a Wald and a likelihood-ratio test, these simpler models are rejected with an error probability of only 1 %.

The causes of the shift in the threshold value cannot be finally resolved in this paper. Suggestions discussed in the literature include positive valuation effects for foreign claims and liabilities in the case of a depreciation of the US dollar,¹⁰ an increased accumulation of US dollar reserves in Asia following the 1997 Asian monetary crisis,¹¹ the existence of an implicit Asian currency association linked to the US dollar,¹² and a shift in the structure of investors away from private investors towards official national bodies which particularly focus on their exchange rate compared with the US dollar.¹³ Overall, the findings of this investigation suggest that on the one hand the financial markets can cope even with the unusually high US current account deficit, and that on the other historical yardsticks to assess the sustainability of current account balances can lose significance.

¹⁰ Cf. Gourinchas, P.-O. and H. Rey (2005). From World Banker to World Venture Capitalist: US External Adjustment and the Exorbitant Privilege, NBER Working Paper 11563

¹¹ Gruber, J.W. und S.B. Kamin (2005). Explaining the Global Pattern of Current Account Imbalances, Federal Reserve Board International Finance Discussion Paper No. 846

¹² Cf. Dooley, M. P., Folkerts-Landau, D. and P. Garber (2003). An Essay on the revived Bretton Woods System, NBER Working Paper 971

¹³ Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung (2006). Widerstreitende Interessen – Ungenutzte Chancen, Jahresgutachten 2006/2007 (p. 129)

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