

Measurement of the unexpected US trade deficit

MARLENE K PUFFER*

*Faculty of Management, University of Toronto, Toronto, Ontario M5S 1V4,
Canada*

Monthly announcements from 1980 through 1992 of the US overall and bilateral balance of trade figures and revisions of previous announcements are examined in detail. The unexpected trade deficit is measured as the difference between the announced overall trade deficit and the median survey measure from Money Market Services. Survey expectations are found to incorporate publicly available information. A surprisingly large trade deficit is associated with expectations of larger future trade deficits. Unexpected bilateral trade balances and revisions of previous overall balances which are released at the same time as the overall trade deficit significantly influence the Canadian dollar and some US stock market indexes. (JEL F10, F30).

Monthly announcements of the US trade deficit command the attention of investors in the US and abroad¹ and there is increasing interest in the reaction of financial markets to trade news. Studies of the influence of trade news on exchange rates include Deravi *et al.* (1988), Hogan *et al.* (1991) and Klein *et al.* (1991). Irwin (1989) and Hardouvelis (1985, 1988) and Dwyer and Hafer (1989) investigate the effect of trade news on US interest rates. Pearce and Roley (1985) look at the US stock market response to several economic announcements, but they do not examine trade news. Aggarwal and Schirm (1992) examine the effect of trade announcements on daily exchange rates, US interest rates, the Dow Jones Industrial Average and the S&P500. Puffer (1993) uses intradaily data to examine the effect of trade news on exchange rates and the Dow, as well as Japanese interest rates and the Japanese and Canadian stock markets. Puffer (1993) also investigates determinants of cross-sectional differences in the response to trade news of various US industries. Mitchell and Netter (1989) find that the trade announcement on October 14, 1987 was not a significant determinant of the sharp decline in stock prices during the week prior to the crash on October 19, 1987. The existing literature finds that trade deficit announcements did not significantly affect financial markets in the early 1980s. From 1985 through 1988 the announcement of a surprisingly large trade deficit is associated with negative

* This paper is based on part of my Ph.D. dissertation at the University of Rochester. I would like to thank Jay Shanken, Gordon Bodnar, and Michael Barclay for helpful comments on earlier drafts. Thanks also to Louis Radovich of Money Market Services for providing access to their files for some of the data.

US stock market returns, a significant depreciation of the US dollar relative to major currencies with the exception of the Canadian dollar, and an increase in US interest rates.

In contrast to studies that use monthly trade and exchange rate data, using announcements of the monthly US trade figures, survey data to determine expectations, and daily financial market data reduces the influence of noise unrelated to unanticipated movements in trade flows. This approach also eliminates problems associated with the lag structure in the relation between trade and exchange rates which is not well understood. The relation between daily asset prices and the unexpected component of the announcement of the US trade deficit each month reflects not only the direct effect of trade flows on exchange rates, but also investors' expectations about the feedback from exchange rate changes to future trade flows and to other economic variables. Accurate measurement of the news associated with trade announcements and an understanding of the properties of the measure are critical when assessing the financial market response to trade news.

The unexpected trade deficit is typically measured as the difference between the announced figure and the median of the Money Markets Services survey or this difference relative to the level of the announced deficit. Previous studies examine the period from 1980 through 1988. The next section provides descriptive statistics on the trade announcement data from 1980 through 1992 and examines the effect of trade news on expectations of future trade deficits. Section II presents the effect of trade news on daily exchange rates, interest rates and some stock indexes that have not been previously investigated. Section III investigates whether the median of the survey expectations accounts for information that is publicly available prior to the announcement such as past trade announcements, past revisions and bilateral trade announcements, and past exchange rate changes. Section IV measures the unexpected component of revisions and bilateral balances and examines the financial market response to these measures of news. Section V concludes.

I. Descriptive statistics of trade deficit announcements and effects on future expectations

I.A. Descriptive statistics

Once each month the US Department of Commerce announces preliminary estimates obtained from the Bureau of the Census of the US merchandise trade balance for the month ending several weeks earlier. Until October 1983 the announcement is at 2:30 pm EST. In November 1983 the announcement is at 9:30 am coincident with the opening of stock trading in New York. From December 1983 through the end of the sample the announcement is at 8:30 am EST, one hour prior to the start of trading on the NYSE. The data are generally seasonally adjusted. However, from February 1986 through June 1988 the Department of Commerce did not release seasonally adjusted figures. During this

period MMS recorded and surveyed the unadjusted figures. The seasonal adjustment factors are known to analysts.

The sample consists of 154 monthly trade announcements from February 1980 through December 1992. The unexpected deficit, *TDU*, is defined as the difference between *TDA*, the announced deficit, and *TDE*, the median forecast of economists and securities traders surveyed by Money Market Services in billions of dollars.² A positive value of *TDU* indicates that the trade deficit is larger than expected. Descriptive statistics are presented in Table 1 and the series are graphed in Figure 1. On average, 34 American economists and securities traders are surveyed the week prior to the trade announcements and their predictions are compiled during the two to five days before the announcement. The average announced deficit for the whole sample is \$8.28 billion, and it ranges from \$0.30 to \$19.20 billion.

TABLE 1. US trade deficit announcements descriptive statistics.

	Mean	Std. dev.	Minimum	Maximum
February, 1980–December, 1992 (154 announcements)				
Announced deficit	8.28	4.28	0.30	19.20
Expected deficit	8.04	3.99	1.50	16.00
Unexpected deficit	0.25	1.72	-3.20	6.30
Number surveyed	34.42	7.94	16.00	58.00
Monday: 5 Tuesday: 25 Wednesday: 35 Thursday: 36 Friday: 53				
February, 1980–September, 1985 (68 announcements)				
Announced deficit	5.87	3.69	0.30	14.10
Expected deficit	5.61	3.58	1.50	13.00
Unexpected deficit	0.26	1.73	-3.20	5.10
Number surveyed	30.48	5.87	16.00	43.00
Monday: 5 Tuesday: 13 Wednesday: 15 Thursday: 11 Friday: 24				
October, 1985–February, 1987 (17 announcements)				
Announced deficit	14.28	2.40	10.70	19.20
Expected deficit	13.35	0.92	12.00	15.40
Unexpected deficit	0.93	2.68	-3.10	6.30
Number surveyed	33.06	5.09	21.00	40.00
Monday: 0 Tuesday: 2 Wednesday: 5 Thursday: 4 Friday: 6				
March, 1987–December, 1992 (69 announcements)				
Announced deficit	9.18	3.30	3.40	17.60
Expected deficit	9.12	2.96	4.50	16.00
Unexpected deficit	0.06	1.36	-2.70	3.00
Number surveyed	43.21	5.56	32.00	58.00
Monday: 0 Tuesday: 10 Wednesday: 15 Thursday: 21 Friday: 23				

Expected monthly US trade deficit is the median of the survey taken by Money Market Services several days before the announcement measured in billions of dollars.

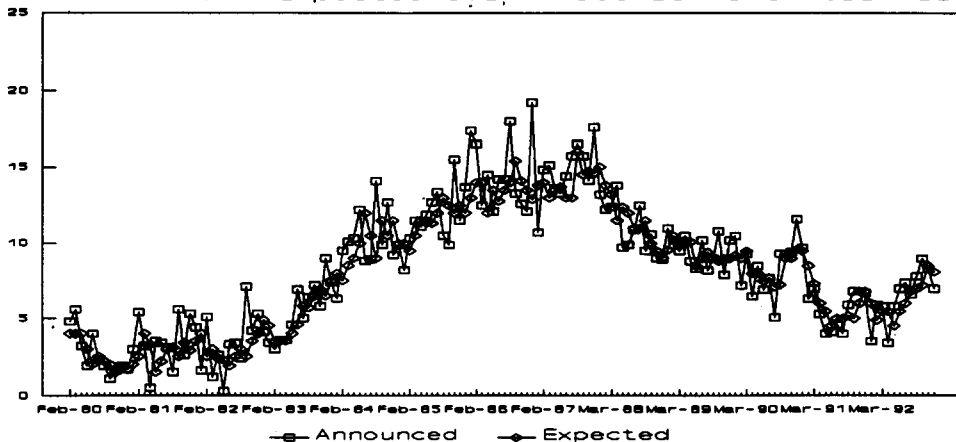
Unexpected deficit is the announced deficit minus the expected trade deficit.

Number surveyed is the number of analysts and economists surveyed by Money Market Services each month. This variable ends in December 1989. MMS declines to reveal the more recent data.

The unexpected deficit ranges from $-\$3.2$ billion (*ie*, a deficit $\$3.2$ billion smaller than expected) to $\$6.3$ billion in December, 1986.

Descriptive statistics for three subperiods corresponding to different exchange rate policy regimes are also documented in Table 1. From 1980 through 1985 there was little explicit intervention in the foreign exchange markets. In October 1985 the Plaza Accord set out an international agreement for intervention with the goal of devaluing the US dollar. Part of the motivation for this agreement was to reduce the soaring US trade deficit. In March 1987, the Louvre Accord was signed which aimed to stabilize the nominal value of the dollar. The monthly trade deficit reached its peak during the second subperiod and gradually declined through the last subperiod.³

Announced and Expected U.S. Trade Deficit 1980-1992



Unexpected U.S. Trade Deficit 1980-1992

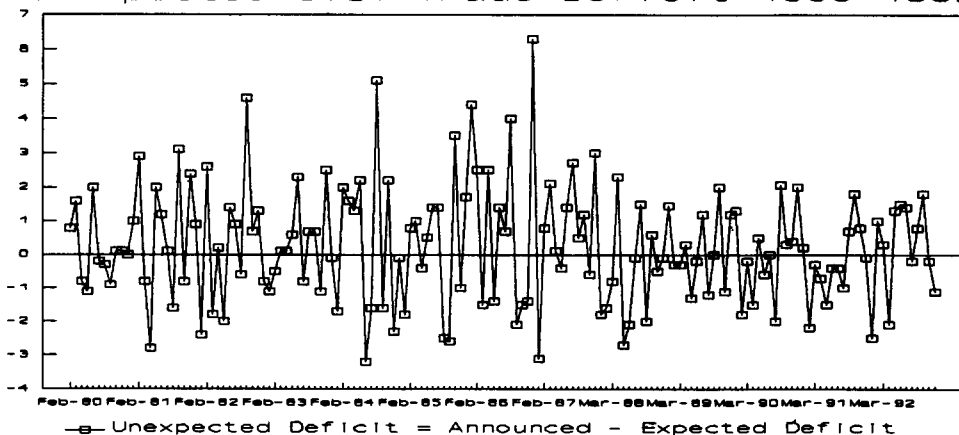


FIGURE 1.

I.B. Trade deficit announcements and expectations of future trade deficits

Since the monthly announcements reflect trade flows that occurred several weeks before the announcements, exchange rates should have already adjusted to the direct effect of the trade flows on demand and supply of dollars in the foreign exchange market. Any financial market reaction on the announcement day must be due to the unexpected component of the trade deficit and its implications for changes in expectations of future current account deficits or due to anticipated policy reactions.

Expectations of future current account deficits have two components: invisibles and the merchandise trade balance. A surprisingly large past trade deficit implies an unexpected increase in investors' assessments of the net foreign debt accumulation and the total future interest payments to be made to foreign countries. This effect alone can be sufficient to influence financial markets on trade announcement days. To show that trade announcements also affect expectations of future merchandise trade balances, ideally we would like to measure expectations of the merchandise trade deficit for future months immediately before and after each announcement. However, survey measures of expectations are only available once each month just prior to each announcement. The following model is estimated to examine the effect of trade announcements on expectations of future deficits:⁴

$$\langle 1 \rangle \quad TDE_{t+1} - TDE_t = a + bTDU_t + \varepsilon_t.$$

For the full sample, the estimate of b of 0.375 in Table 2 implies that a trade deficit \$2 billion dollars greater than anticipated in period t (approximately one standard deviation greater than the mean) leads investors to revise their expectations of the following month's deficit upward by \$750 million. Compared to the average expected deficit of \$8 billion, this is approximately a 9 percent

TABLE 2. Test for effect of trade news on expectations of future deficits assuming constant expectations of future deficits before the announcement at t .

Period	$TDE_{t+1} - TDE_t = a + bTDU_t + \varepsilon_t$		\bar{R}^2	# obs
	a	b		
Feb 1980–Dec 1992	–0.068 (0.047)	0.375** (0.027)	0.555	153
Feb 1980–Sep 1985	0.173 (0.049)	0.435** (0.028)	0.780	68
Oct 1985–Feb 1987	–0.191 (0.186)	0.269** (0.067)	0.481	17
Mar 1987–Dec 1988	–0.101 (0.080)	0.395** (0.059)	0.395	68

TDE_t = expected monthly US trade deficit at t .

TDU_t = announced trade deficit minus expected deficit at t .

Standard errors in parentheses.

* Significant at 5% level, ** significant at 1% level.

change in expectations. Assuming that prior to the announcement at t the expectation of the trade deficit to be announced in months $t + s$, $s \geq 1$ is constant and equal to TDE_t , the effect of news on expectations for s periods ahead can be shown⁵ to be equal to $b(1 - b)^{(s-1)}$. This implies that a \$2 billion trade surprise leads to a revision of expectations two months ahead of \$468 million, 3 months ahead of \$292 million, and 4 months ahead of \$184 million, which is approximately 2 percent of the average expected deficit. This evidence suggests that the financial market response to trade news is not due solely to the effect of the news on invisibles.

II. Financial market response to trade news

Before examining the effect of other news released on trade announcement days, I document the benchmark relation between TDU and financial market returns from 1980 through 1992. Daily log differences in the following exchange rates are used: the Canadian dollar, the Deutsche mark, the British pound, and the Japanese yen. Exchange rates are expressed as foreign currency per US dollar so that a negative log difference indicates a dollar depreciation. A trade-weighted average of these four exchange rates is also used.⁶ Daily returns on five US stock indexes are also examined: the Dow Jones Industrial Average, the CRSP value-weighted and equally-weighted indexes, and the NASDAQ value-weighted and equally-weighted indexes. Finally, log-differences in the yield on 30-year US Treasury bonds are used. The sample extends beyond that used by Aggarwal and Schirm (1992) which ends in 1988. Except for the Dow, the stock indexes used in this paper have not been previously examined. The following models are estimated for the announcement day close to close return on each asset, R_t :

$$\langle 2 \rangle \quad R_t = a + bTDU_t + \varepsilon_t,$$

$$\langle 3 \rangle \quad R_t = a + b_1TDU_tD1_t + b_2TDU_tD2_t + b_3TDU_tD3_t + \varepsilon_t,$$

where the dummy variables are defined as follows:

$D1_t = 1$ from January 1, 1980 through September 1985
(no intervention),

$D2_t = 1$ from October 1985 through February 1987
(Plaza Accord: dollar depreciation),

$D3_t = 1$ from March 1987 through December 1992
(Louvre Accord: dollar stabilization).

In contrast to Aggarwal and Schirm (1992) who include non-announcement days in their sample and model returns as a function of weekday dummy variables, only announcement day returns are included. The advantage is that the R^2 can be interpreted as the variation in announcement day returns explained by trade news.

The predicted market reaction to trade news can be described as follows. Assuming there is no change in the domestic or foreign investment opportunity set and the foreign propensity to save is constant, an unexpectedly large trade

deficit implies that US saving is lower than US domestic investment. Since the USA is a large country, it faces an upward sloping supply of capital. To attract foreign capital in the absence of productivity improvements, US real interest rates must rise. Higher interest rates lead to lower US domestic real capital investment. The US stock market reacts negatively since lower investment implies slower growth and lower future cash flows that are discounted at a higher rate. The net increase in imports implies a dollar depreciation. This depreciation is likely to be larger during the period following the Plaza Accord's agreement to devalue the US dollar to combat the US trade deficit than during the period after the Louvre Accord when there was a coordinated effort to stabilize the nominal value of the dollar. To summarize, if productivity and the foreign propensity to save are unchanged, a surprisingly large US trade deficit implies a dollar depreciation, an increase in US interest rates, and negative US aggregate stock market returns.

Table 3 shows that for the whole sample, the US dollar depreciates significantly in response to a surprisingly large trade deficit (except relative to the Canadian dollar), and there is a significant negative stock market response. Trade news

TABLE 3. Financial market response to trade news 1980–1992.

Return	$R_t = a + bTDU_t + \varepsilon_t$		\bar{R}^2	# obs
	a	b		
Trade weighted dollar	0.095* (0.041)	-0.107** (0.023)	0.118	149
Canadian dollar	0.031 (0.024)	0.001 (0.014)	-0.007	149
Deutsche mark	0.158* (0.071)	-0.183** (0.040)	0.116	149
Pound	0.109 (0.067)	-0.149** (0.038)	0.087	149
Yen	0.115 (0.063)	-0.152** (0.036)	0.101	149
Dow Jones	-0.044 (0.087)	-0.098* (0.050)	0.018	148
CRSP VW	0.008 (0.076)	0.076 (0.044)	0.005	151
CRSP EW	0.029 (0.079)	-0.046 (0.046)	0.002	151
NASDAQ VW	-0.010 (0.079)	-0.061 (0.046)	0.005	151
NASDAQ EW	0.068 (0.063)	-0.063 (0.037)	0.013	151
US Tbond	0.053 (0.075)	0.026 (0.044)	-0.004	148

Coefficient estimates and standard errors multiplied by 100.

*Significant at 5% level, ** significant at 1% level.

(Standard errors in parentheses).

explains more than 8 percent of the variation in the mark, pound, and yen exchange rates, but less than 2 percent of the variation in the stock indexes on announcement days for the whole sample. Interest rates do not reach significantly to trade news for the whole sample.

The adjusted R^2 for equation (3) in Table 4 shows that the dummy variable model explains approximately 15 percent of the variation in the value of the dollar against the yen, the mark, and the pound on trade announcement days. There are significant differences in the effect of trade news on financial markets in each subperiod. The estimates of b_1 are consistent with previous studies and indicate little response to trade figures before October 1985. The coefficient estimates for each currency except the Canadian dollar for the last two periods are striking. The estimates of b_2 are approximately -0.16 for close to close log differences in each of these currencies (as well as the trade-weighted average) which means that the dollar depreciates 0.58 percent in one day in response to a trade surprise of \$3.61 billion (from Table 1, one standard deviation greater than expected during the period of the Plaza Accord). The estimates of b_3 are twice the magnitude of the estimates of b_2 . However, in contrast to the interpretation of Aggarwal and Schirm (1992), since trade news is less variable during this period, this does not necessarily imply greater changes in the exchange rate on announcement days during this period. The estimates of approximately -0.3 imply a depreciation of the dollar of 0.43 percent in response to an unexpected trade deficit of \$1.42 billion (again from Table 1, this is a trade announcement one standard error greater than expected during the last subperiod). Although the test statistics are not reported in the table, the hypothesis that b_2 and b_3 are equal is soundly rejected for every currency. Since the policy during the last period was aimed at stabilizing the value of the dollar, the significant depreciation in response to a surprisingly large trade deficit suggests investors anticipated a shift in the target zone for the value of the dollar.

There is no significant response of the Canadian dollar to US overall trade announcements. This is surprising in light of the large volume of trade between the USA and Canada. One possible explanation is that the unexpected overall US trade deficit is not highly correlated with unexpected bilateral deficits with Canada. This hypothesis is investigated in Section IV.

US stock indexes generally have a significantly negative reaction to trade news after the Louvre Accord. The estimate of b_3 of -0.272 implies that the Dow drops 0.39 percent from close to close in response to a trade surprise of \$1.42 billion which is one standard deviation larger than the mean for the last subperiod. Trade news has less effect on the other stock indexes which consist of relatively smaller firms and fewer multinationals.

III. Do survey expectations incorporate past information?

The unexpected trade deficit should be uncorrelated with information available prior to the announcements. If not, the measure of expected trade deficits should be redefined to incorporate this additional information. This section examines

TABLE 4. Financial market response to trade news 1980–1992 subperiods.

Return	$R_t = a + b_1TDU_tD1_t + b_2TDU_tD2_t + b_3TDU_tD3_t + \varepsilon_t$			\bar{R}^2	# obs	
	a	b_1	b_2			
Trade weighted dollar	0.091* (0.040)	-0.041 (0.053)	-0.115** (0.042)	-0.200** (0.043)	0.155	149
Canadian dollar	0.032 (0.024)	-0.005 (0.021)	-0.014 (0.026)	0.027 (0.026)	-0.11	149
Deutsche mark	0.151* (0.070)	-0.097 (0.060)	-0.157* (0.073)	-0.345** (0.076)	0.143	149
Pound	0.102 (0.066)	-0.045 (0.057)	-0.178** (0.069)	-0.280** (0.071)	0.117	149
Yen	0.107* (0.061)	-0.038 (0.053)	-0.170** (0.064)	-0.309** (0.066)	0.149	149
Dow Jones	-0.051 (0.086)	0.033 (0.074)	-0.134 (0.092)	-0.272** (0.095)	0.049	148
CRSP VW	0.003 (0.075)	0.045 (0.065)	-0.090 (0.081)	-0.198* (0.083)	0.028	151
CRSP EW	0.023 (0.068)	-0.007 (0.059)	0.017 (0.074)	-0.173* (0.075)	0.015	151
NASDAQ VW	-0.013 (0.079)	-0.030 (0.069)	-0.046 (0.085)	-0.126 (0.087)	-0.003	151
NASDAQ EW	0.064 (0.063)	-0.068 (0.055)	0.024 (0.068)	-0.145* (0.069)	0.019	151
US Tbond	0.059 (0.074)	-0.089 (0.064)	0.033 (0.079)	0.203* (0.081)	0.035	148

Coefficient estimates and standard errors multiplied by 100.

* Significant at 5% level, ** significant at 1% level.

(Standard errors in parentheses) [p-values in square brackets].

TABLE 5. Bilateral trade deficits descriptive statistics and relation to overall trade deficit 1980–1992.

	Mean	Std. dev.	Minimum	Maximum	# obs
Japan	3.262	1.447	−0.549	6.741	154
Canada	1.063	0.612	−0.531	2.902	154
Germany	0.650	0.461	−0.408	1.718	146
UK	0.052	0.329	−0.768	0.708	146

	Japan	Correlations Canada	Germany	UK
TDA	0.840**	0.599**	0.904**	0.478**
Japan		0.326**	0.828**	0.194**
Canada			0.513**	0.620**
Germany				0.395**

Japan = announced bilateral trade deficit with Japan.

Canada = announced bilateral trade deficit with Canada.

Germany = announced bilateral trade deficit with Germany.

UK = announced bilateral trade deficit with UK.

Data for Germany and the UK are unavailable for the period June 1988 through February 1989. These figures were not revealed separately during this period.

* Significant at 5% level, ** significant at 1% level.

the effect of past overall and bilateral trade announcements, past revisions, and past exchange rate changes on *TDU*.

III.A. Past US overall and bilateral trade announcements

The bilateral announced deficits with Japan, Canada, Germany, and the UK are graphed in Figure 2. Descriptive statistics are in Table 5. The average bilateral trade deficit with Japan for the whole sample is \$3.262 billion, and the average bilateral deficits with the other three countries are all below \$1.1 billion. The correlation between the overall announced trade deficit and the bilateral deficits for Japan and Germany are greater than 0.8 while the correlation with Canada is 0.599 and with the United Kingdom is 0.478.

The efficiency of the measure of the unexpected deficit with respect to past overall and bilateral deficits is tested using the following model:

$$\langle 4 \rangle \quad TDU_t = a + \sum_{s=1}^{3,12} b_s TDABIL_{t-s}^i + \sum_{s=1}^{3,12} c_s TDA_{t-s} + \varepsilon_t,$$

where $TDABIL^i$ is the announced bilateral deficit with country i . Table 6 suggests that past overall trade announcements are unrelated to TDU .⁷ However, controlling for past overall announced deficits, past bilateral trade deficits with Canada affect the current unexpected overall deficit. The joint hypothesis that $b_s = 0$, $s = 1, 2, 3, 12$ is rejected at the 10 percent level for the whole sample and

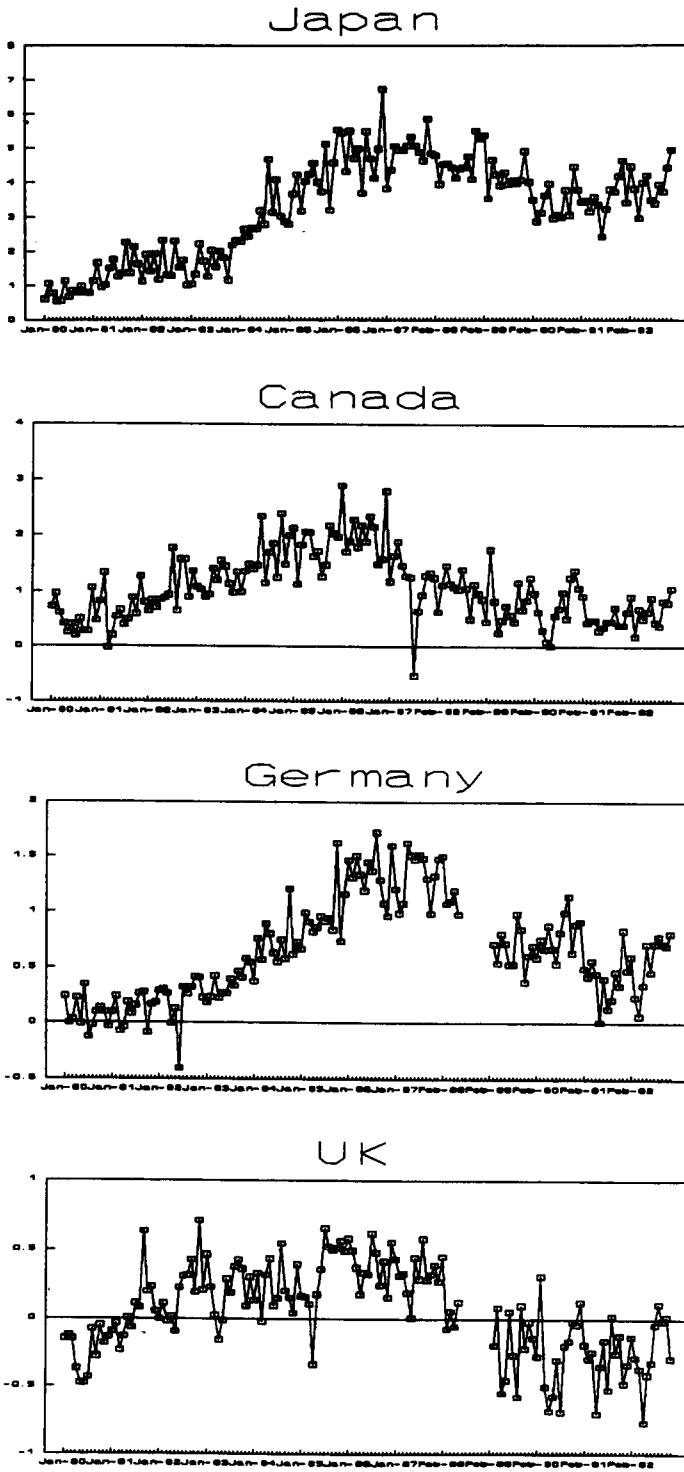


FIGURE 2. Bilateral trade deficit announcements.

TABLE 6. Test for effect of past bilateral announcements on unexpected US trade deficit.

Period	Bilateral	$TDU_t = a + \sum_{s=1}^{3,12} b_s TDABIL_{t-s} + \sum_{s=1}^{3,12} c_s TDA_{t-s} + \varepsilon_t$												\bar{R}^2	$H_0: b_i = 0$
		b_1	b_2	b_3	b_{12}	c_1	c_2	c_3	c_{12}						
Feb 1980	Japan	-0.329 (0.324)	-0.191 (0.335)	0.309 (0.319)	0.015 (0.259)	-0.104 (0.102)	0.060 (0.106)	0.068 (0.106)	0.007 (0.087)	0.003	0.546 [0.702]				
Dec 1992	Canada	0.143 (0.381)	-0.623 (0.383)	0.823* (0.376)	0.494 (0.363)	-0.207* (0.086)	0.063 (0.082)	0.033 (0.085)	0.004 (0.062)	0.052	2.290* [0.063]				
	Germany	-0.068 (0.955)	0.617 (0.956)	0.461 (0.920)	-0.546 (0.881)	-0.155 (0.101)	-0.006 (0.101)	0.068 (0.105)	0.020 (0.108)	-0.025	0.294 [0.881]				
	UK	-0.227 (0.867)	0.370 (0.879)	0.265 (0.836)	0.777 (0.758)	-0.167 (0.091)	0.000 (0.900)	0.098 (0.091)	0.000 (0.079)	-0.011	0.693 [0.599]				
Feb 1980	Japan	-0.378 (0.713)	-0.132 (0.752)	0.076 (0.760)	0.309 (0.637)	-0.191 (0.206)	0.009 (0.225)	0.097 (0.215)	-0.016 (0.184)	-0.053	0.136 [0.968]				
Sep 1985	Canada	0.108 (0.770)	-0.465 (0.794)	0.829 (0.772)	1.059 (0.846)	-0.297 (0.163)	0.049 (0.152)	0.003 (0.169)	-0.019 (0.146)	0.011	0.900 [0.472]				
	Germany	0.894 (1.847)	-0.346 (1.828)	-1.424 (1.789)	-0.718 (1.804)	-0.299* (0.168)	0.095 (0.174)	0.182 (0.186)	0.052 (0.160)	-0.043	0.241 [0.914]				
	UK	-1.886 (2.049)	-0.715 (2.105)	-0.246 (1.815)	2.466 (1.475)	-0.238 (0.203)	-0.010 (0.224)	0.148 (0.228)	-0.060 (0.207)	0.030	1.141 [0.349]				

Oct 1985	Japan	0.125	-0.408	-0.430	2.768	-0.819	-0.137	-0.034	-1.094	0.021	0.345
		(1.981)	(2.010)	(1.715)	(2.846)	(0.609)	(0.591)	(0.608)	(1.033)		[0.841]
Feb 1987	Canada	-0.118	0.737	5.966	0.320	-0.604	-0.481	-0.980	-0.052	0.375	1.671
		(2.213)	(2.627)	(2.617)	(1.825)	(0.370)	(0.453)	(0.450)	(0.288)		[0.248]
	Germany	-1.029	-5.005	0.327	4.922	-0.569	0.232	-0.159	-0.733	0.183	0.810
		(3.753)	(3.746)	(3.508)	(4.777)	(0.396)	(0.421)	(0.434)	(0.510)		[0.552]
	UK	0.344	0.442	-5.594	-2.486	-0.593	-0.229	-0.184	-0.225	-0.024	0.242
		(6.476)	(6.117)	(5.943)	(3.767)	(0.279)	(0.308)	(0.366)	(0.369)		[0.907]
Mar 1987	Japan	0.050	-0.290	0.253	0.036	-0.033	-0.052	0.076	-0.005	-0.077	0.238
		(0.368)	(0.367)	(0.352)	(0.333)	(0.120)	(0.117)	(0.115)	(0.090)		[0.916]
Dec 1992	Canada	0.209	-0.779	0.391	0.210	-0.049	-0.062	0.095	-0.009	-0.037	0.829
		(0.460)	(0.472)	(0.424)	(0.408)	(0.111)	(0.103)	(0.099)	(0.074)		[0.512]
	Germany	-0.803	1.992	0.014	-0.384	0.103	-0.188	0.005	-0.005	-0.055	1.018
		(1.128)	(1.164)	(1.144)	(1.015)	(0.154)	(0.134)	(0.122)	(0.142)		[0.409]
	UK	-0.229	0.648	0.193	0.824	0.071	-0.159	0.037	-0.066	-0.133	0.222
		(1.051)	(1.067)	(1.057)	(1.116)	(0.150)	(0.133)	(0.125)	(0.117)		[0.924]

TDU = announced minus expected trade deficit.

TDABILⁱ = announced bilateral deficit with country *i*.

* Significant at 5% level, ** significant at 1% level.

(Standard errors in parentheses), [p-values in square brackets].

the adjusted R^2 is 0.052. This suggests that analysts are not fully incorporating this information in their measure of the expected overall deficit. The effect on financial markets of a measure of the unexpected deficit that accounts for this effect is of interest. To conserve space the results are not reported, but measuring trade news as the residuals from equation <4> with $TDABIL$ equal to the Canadian bilateral deficit does not substantially alter estimates of the financial market response to trade news presented in Tables 3 and 4.

III.B. Past revisions

Each month the press release, Commerce News, containing the overall trade announcement also contains figures for previous months, some of which may have been revised, generally to correct for the late arrival of data at the Bureau of the Census. Until November 1988 revisions of the previous twelve months' announcements were generally announced once each year either in February or in July on the same day as a monthly announcement. The timing of these revision announcements was generally known to market participants. Beginning at the end of 1988 each month's announcement consisted of the current month's new figures and a revision of the previous month's announcement.⁸ This change in policy was revealed to market analysts.

For purposes of this study, the revision announced in period t , $REVA_t$, is defined as the revised trade deficit minus the previously announced deficit.⁹ A positive value means that the deficit was revised to be bigger than originally announced. If the revisions announced in period t refer to more than one previous month, these differences are summed over all months to yield a cumulative upward or downward revision of previous deficits.

TABLE 7. Descriptive statistics of revisions of US trade deficit announcements.

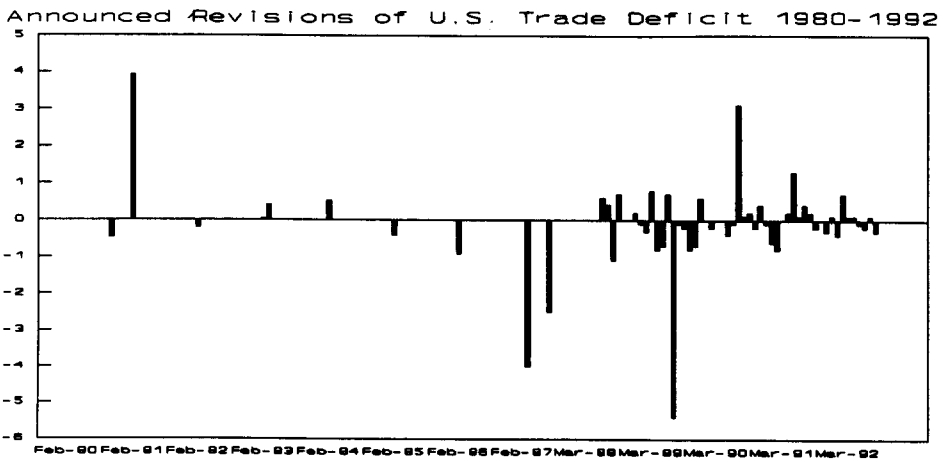
Period		Mean	Std. dev.	Minimum	Maximum	# obs
Feb 1980–	REV	-0.043	0.760	-5.400	3.920	154
Dec 1992	REV	0.251	0.718	0.000	5.400	154
	REV / TDA	0.032	0.091	0.000	0.726	154
Feb 1980–	REV	0.057	0.493	-0.480	3.920	68
Sept 1985	REV	0.089	0.488	0.000	3.920	68
	REV / TDA	0.019	0.096	0.000	0.726	67
Oct 1985–	REV	-0.054	0.223	-0.920	0.000	17
Feb 1987	REV	0.054	0.223	0.000	0.920	17
	REV / TDA	0.003	0.014	0.000	0.056	17
Mar 1987–	REV	-0.136	1.009	-5.400	3.100	69
Dec 1992	REV	0.453	0.910	0.000	5.400	69
	REV / TDA	0.052	0.093	0.000	0.529	69

REV_t = difference between revised trade deficit announcement and previous announcement summed over all revisions announced in period t .

The level of revisions and the absolute value of revisions relative to the announced deficits are graphed in Figure 3. Descriptive statistics are in Table 7. The average announced revision is -\$0.043 billion with a standard deviation of 0.760. The revisions range from -5.40 to 3.92 billion. Although the average revision including months with no revision is only 3.2 percent as large as the announced deficit, the average non-zero revision is approximately 10 percent of the magnitude of the announced deficit.

The effect of previously announced revisions of monthly trade figures on the unexpected trade deficit in month t is estimated as follows:

$$\langle 5 \rangle \quad TDU_t = a + \sum_{s=1}^6 b_s REVA_{t-s} + b_{12} REVA_{t-12} + \varepsilon_t$$



Absolute Revision relative to Absolute Trade Deficit Announcement



FIGURE 3.

TABLE 8. Test for effect of past revisions on unexpected US trade deficit.

Period	$TDU_t = a + \sum_{s=1}^6 b_s REVA_{t-s} + b_{12} REVA_{t-12} + \varepsilon_t$											\bar{R}^2	$H_c \cdot b_i = 0$	
	b_1	b_2	b_3	b_4	b_5	b_6	b_{12}							
Feb 1980-	0.054	-0.135	0.015	-0.020	0.016	-0.076	0.043							0.127
Dec 1992	(0.195)	(0.194)	(0.194)	(0.194)	(0.194)	(0.194)	(0.193)							[0.996]
Feb 1980-	-0.244	-0.721	0.555	-0.035	-0.130	-0.200	0.662							0.873
Sept 1985	(0.478)	(0.478)	(0.474)	(0.469)	(0.474)	(0.474)	(0.473)							[0.535]
Oct 1985-	2.545	-1.802	2.437	-0.607	0.154	-3.433	-0.632							0.338
Feb 1987	(3.632)	(3.632)	(3.632)	(3.632)	(3.632)	(3.632)	(3.436)							[0.917]
Mar 1987-	0.094	-0.024	-0.156	-0.060	0.002	-0.037	-0.105							0.235
Dec 1992	(0.172)	(0.172)	(0.171)	(0.171)	(0.172)	(0.171)	(0.170)							[0.975]

REVA = announced revision of previous deficit announcements.

TDU = announced minus expected trade deficit.

* Significant at 5% level, ** significant at 1% level. (Standard errors in parentheses), [p-values in square brackets].

Table 8 shows that analysts incorporate past revisions in their assessment of the expected trade deficit each month since the individual and joint hypotheses that $b_i = 0$ cannot be rejected and the adjusted R^2 are all negative.

III.C. Past exchange rate changes

Survey expectations of the trade deficit should incorporate the J-curve effect. If demand for imports and exports is inelastic in the short run, the value of imports can increase measured in dollars following a dollar depreciation while the value of exports measured in dollars is constant so the deficit increases. In the long run, trading volume and prices adjust to improve the trade deficit.¹⁰ To test whether expectations incorporate the J-curve, the unexpected trade deficit is regressed on recent changes in the value of the dollar:

$$\langle 6 \rangle \quad TDU_t = a + b_1 X_{1t} + b_2 X_{2t} + b_3 X_{3t} + \varepsilon_t,$$

where

X_{it} = log difference in the trade-weighted exchange rate measured as foreign currency per dollar at the close of trading the day before the announcement in period t relative to the close of trading the day after the announcement in period $t - i$, $i = 1, \dots, 3$.

Negative values of X_i indicate a dollar depreciation over the previous i months. Table 9 shows that changes in the value of the dollar over 1, 2, or 3 months prior to the trade announcement do not help to predict the difference between

TABLE 9. Test for J-curve effect on unexpected US trade deficit.

Period	a	$TDU_t = a + b_1 X_{1t} + b_2 X_{2t} + b_3 X_{3t} + \varepsilon_t$			\bar{R}^2	$H_0: b_i = 0$
		b_1	b_2	b_3		
Feb 1980–	0.200	−6.601	10.723	−10.754	0.005	1.262
Dec 1992	(0.141)	(9.610)	(9.773)	(6.797)		[0.290]
Feb 1980–	0.309	−10.636	25.267	−19.745	−0.001	0.971
Sep 1985	(0.215)	(17.210)	(17.323)	(11.711)		[0.097]
Oct 1985–	−0.735	−7.015	1.296	−29.892	−0.062	0.710
Feb 1987	(1.157)	(35.883)	(36.223)	(33.775)		[0.564]
Mar 1987–	0.028	−6.587	9.587	−10.610	0.006	1.143
Dec 1992	(0.164)	(10.799)	(11.027)	(7.864)		[0.339]

TDU = announced minus expected trade deficit.

X_1 = log difference in the trade-weighted exchange rate over one month prior to the announcement.

X_2 = log difference in the trade-weighted exchange rate over two months prior to the announcement.

X_3 = log difference in the trade-weighted exchange rate over three months prior to the announcement.

Trade-weighted value of the dollar is expressed as foreign currency per dollar.

* Significant at 5% level, ** significant at 1% level.

(Standard errors in parentheses), [p-values in square brackets].

the trade announcement and the survey expectations. In every period the individual and joint hypotheses that $b_i = 0, i = 1, \dots, 3$ cannot be rejected. Estimating equation <6> using individual exchange rates leads to the same conclusion.

IV. The financial market response to other news revealed on trade announcement days: unexpected revisions and bilateral balances

The focus of past studies of the financial market response to trade news and of Section II above is on the simple regression of announcement day asset returns on the unexpected component of the overall trade announcement, TDU . The parameter of interest is really the coefficient on TDU in the regression of

TABLE 10. Estimating unexpected revisions of US trade deficit announcements.

$$REVA_t = a_0 D_t + a_1 (1 - D_t) + b REVA_{t-12} (1 - D_t) + c_0 TDA_{t-1} D_t + c_1 TDA_{t-1} (1 - D_t) + REVU_t$$

$D_t = 1$ February 1980–November 1988 when revisions announced annually

	a_0	a_1	b_0	c_0	c_1	\bar{R}^2
	0.272	0.868*	-0.414**	-0.032*	-0.126*	0.115
	(0.168)	(0.401)	(0.108)	(0.016)	(0.051)	

Period		Mean	Std. dev.	Minimum	Maximum	# obs
Feb 1980–	REVU	0.000	0.732	-5.055	3.745	142
Dec 1992	REVU	0.336	0.649	0.001	5.055	142
	REVU / TDU	0.483	0.965	0.001	5.954	140
Correlation ($REVU, TDU$) = -0.103 [0.220]						
Feb 1980–	REVU	0.010	0.536	-0.420	3.745	55
Sep 1985	REVU	0.202	0.496	0.012	3.745	55
	REVU / TDU	0.246	0.448	0.003	2.238	55
Correlation ($REVU, TDU$) = 0.141 [0.304]						
Oct 1985–	REVU	0.125	0.211	-0.630	0.348	17
Feb 1987	REVU	0.199	0.137	0.048	0.630	17
	REVU / TDU	0.109	0.081	0.014	0.266	17
Correlation ($REVU, TDU$) = -0.332 [0.192]						
Mar 1987–	REVU	-0.039	0.924	-5.055	1.333	69
Dec 1992	REVU	0.475	0.791	0.001	5.055	69
	REVU / TDU	0.768	1.266	0.001	5.954	67
Correlation ($REVU, TDU$) = -0.288* [0.016]						

TDA_t = trade deficit announced in month t .

REV_t = difference between revised trade deficit announcement and previous announcement.

* Significant at 5% level, ** significant at 1% level.

(Standard errors in parentheses), [p-values in square brackets].

announcement day asset returns on *all* news revealed on the announcement day. If other news revealed on those days is correlated with *TDU*, then the estimated coefficient on *TDU* in the regression of asset returns on *TDU* alone is a biased estimate of the coefficient on *TDU* in the model that includes other news. Even if the other information is uncorrelated with *TDU*, the financial market response to this other information is of interest. This section develops measures of unexpected revisions and bilateral trade balances and examines the financial market response to these measures of news.

IV.A. Unexpected revisions

The top panel of Table 10 presents estimates of the following model of expected revisions:¹¹

$$\langle 7 \rangle \quad REVA_t = a_0 D_t + a_1 (1 - D_t) + b REVA_{t-12} (1 - D_t) \\ + C_0 TDA_{t-1} + C_1 TDA_{t-1} (1 - D_t) + REVU_t$$

TABLE 11. Financial market response to trade news and unexpected revisions 1980-1982.

Return	$R_t = a + bTDU_t + cREVU_t + \varepsilon_t$			\bar{R}^2	# obs
	<i>a</i>	<i>b</i>	<i>c</i>		
Trade weighted dollar	0.094* (0.043)	-0.109** (0.024)	0.037 (0.058)	0.125	138
Canadian dollar	0.029 (0.025)	-0.002 (0.014)	-0.104** (0.033)	0.053	138
Deutsche mark	0.139 (0.075)	-0.184** (0.042)	0.097 (0.102)	0.121	138
Pound	0.112 (0.071)	-0.144** (0.040)	0.130 (0.096)	0.092	138
Yen	0.124* (0.063)	-0.156** (0.035)	0.112 (0.085)	0.132	138
Dow Jones	-0.028 (0.092)	-0.095 (0.052)	0.123 (0.124)	0.019	137
CRSP VW	0.031 (0.079)	-0.051 (0.045)	0.200 (0.107)	0.023	139
CRSP EW	0.073 (0.061)	-0.028 (0.035)	0.177* (0.082)	0.026	139
NASDAQ VW	0.030 (0.072)	-0.039 (0.041)	0.191* (0.098)	0.023	139
NASDAQ EW	0.106* (0.051)	-0.042 (0.029)	0.142* (0.069)	0.035	139
US Tbond	0.027 (0.073)	0.036 (0.041)	-0.124 (0.098)	0.005	137

Coefficient estimates and standard errors multiplied by 100.

* Significant at 5% level, ** significant at 1% level.

(Standard errors in parentheses), [p-values in square brackets].

where $D_t = 1$ from the beginning of the sample through November 1988 when revisions were announced annually. This model explains 11.5 percent of the variation in revisions. The residuals provide a measure of the unexpected revision.

The correlation between the unexpected revision and TDU is significantly negative for the last subperiod, but it is insignificantly different from zero at the 5 percent level for the other periods. However, the standard deviation of unexpected revisions for the whole sample is 0.649 compared to the standard deviation of TDU which is 1.72. This suggests that except for the last subperiod, including the unexpected revisions in the model is unlikely to affect the estimates of the market reaction to the overall deficit, but unexpected revisions could be important determinants of asset returns on trade announcement days.

An unexpected upward revision of a previous deficit should have the same effect on financial markets as a surprisingly large trade deficit. A dollar depreciation, negative stock market returns, and an increase in US interest rates are predicted in response to an unexpected positive revision of previous deficits. Table 11 presents estimates of the following equation for each financial asset:

$$\langle 8 \rangle \quad R_t = a + bTDU_t + cREVU_t + \varepsilon_t$$

where $REVU_t$ is the estimated residual from equation $\langle 7 \rangle$. Note that observations for 1980 are eliminated due to the 12 lags required to estimate the unexpected revisions. Table 12 presents estimates of the following model for the subperiods:

$$\langle 9 \rangle \quad R_t = a + b_1TDU_tD1_t + b_2TDU_tD2_t + b_3TDU_tD3_t \\ + c_1REVU_tD1_t + c_2REVU_tD2_t + c_3REVU_tD3_t + \varepsilon_t$$

where $D1$ through $D3$ are defined as in equation $\langle 3 \rangle$.

Comparing Tables 11 and 12 to Tables 3 and 4, unexpected revisions do not substantially affect the estimates of b , which is not surprising given the low correlation between $REVU$ and TDU . Unexpected revisions have no significant effect on the yen, mark, or the pound, or on US interest rates for the whole sample. However, the dollar depreciates significantly relative to the pound in response to an unexpected upward revision of previous deficits during the third subperiod.

The most interesting result is that the US dollar depreciates significantly relative to the Canadian dollar in response to an unexpected positive revision of previous deficits, but this exchange rate does not respond to the overall trade deficit. The estimate of c is -0.104 (standard error 0.033) and the adjusted R^2 for the Canadian dollar is 0.053 for the whole sample for this model compared to -0.007 in Table 3. The effect of unexpected revisions on the Canadian dollar is concentrated in the second subperiod during the Plaza Accord.

The unexpected revisions significantly influence the CRSP and NASDAQ stock indexes for the whole sample, but an unexpected increase in previous deficits is associated with a positive stock price response. This is contrary to the negative stock price response to a surprisingly large trade deficit for the Dow in Table 4. This effect is not evident for the subperiods.

TABLE 12. Financial market response to trade news and unexpected revisions 1980-1992 subperiods.

$$R_t = a + b_1 TDU_t D_{1t} + b_2 TDU_t D_{2t} + b_3 TDU_t D_{3t} + c_1 REVU_t D_{1t} + c_2 REVU_t D_{2t} + c_3 REVU_t D_{3t} + \varepsilon_t$$

$$D_{1t} = 1 \text{ Feb } 1980\text{--}Sept \text{ } 1985$$

$$D_{2t} = 1 \text{ Oct } 1985\text{--}Feb \text{ } 1987, D_{3t} = 1 \text{ Mar } 1987\text{--}Dec \text{ } 1992$$

Return	b_1	b_2	b_3	c_1	c_2	c_3	$H_0: c_i = 0$	\bar{R}^2
Trade weighted dollar	-0.048 (0.037)	-0.120** (0.043)	-0.201** (0.046)	0.037 (0.127)	-0.451 (0.515)	-0.002 (0.067)	0.284 [0.837]	0.148
Canadian dollar	-0.001 (0.022)	-0.020 (0.025)	0.005 (0.027)	-0.041 (0.074)	-0.489 (0.302)	-0.111 (0.394)	3.651* [0.014]	0.044
Deutsche mark	-0.108 (0.065)	-0.158* (0.076)	-0.335** (0.082)	0.039 (0.225)	-0.249 (0.913)	0.045 (0.119)	0.082 [0.970]	0.128
Pound	-0.052 (0.060)	-0.200** (0.071)	-0.268** (0.076)	0.240 (0.208)	-1.668* (0.847)	0.066 (0.110)	1.850 [0.141]	0.133
Yen	-0.055 (0.054)	-0.174** (0.063)	-0.298** (0.067)	0.064 (0.185)	-0.267 (0.751)	0.057 (0.098)	0.195 [0.900]	0.159
Dow Jones	0.028 (0.079)	-0.128 (0.096)	-0.274** (0.103)	0.219 (0.273)	0.616 (1.111)	-0.004 (0.145)	0.316 [0.814]	0.035
CRSP VW	0.045 (0.069)	-0.089 (0.083)	-0.175* (0.088)	0.250 (0.237)	0.267 (0.966)	0.119 (0.126)	0.695 [0.556]	0.026
CRSP EW	0.015 (0.053)	0.014 (0.064)	-0.155* (0.067)	0.247 (0.182)	0.189 (0.740)	0.100 (0.097)	0.996 [0.397]	0.033
NASDAQ VW	-0.003 (0.063)	-0.044 (0.076)	-0.101 (0.081)	0.279 (0.218)	0.531 (0.889)	0.132 (0.116)	1.095 [0.354]	0.004
NASDAQ EW	-0.038 (0.044)	0.024 (0.054)	-0.130* (0.057)	0.226 (0.153)	0.340 (0.622)	0.081 (0.081)	1.159 [0.328]	0.037
US Tbond	0.074 (0.062)	0.026 (0.075)	0.194* (0.080)	-0.066 (0.215)	-0.817 (0.873)	-0.050 (0.114)	0.386 [0.763]	0.026

Coefficients and standard errors multiplied by 100.

* Significant at 5% level, ** significant at 1% level.

(Standard errors in parentheses) [p-values in square brackets].

TABLE 13. Expectations of bilateral trade deficits.

<i>i</i>	$TDABIL_i = a + bTDE_i + \sum_{s=1}^4 c_s TDABIL_{i-s} + c_{12} TDABIL_{i-12} + dTA_{i-1} + TDUBIL_i$									
	<i>a</i>	<i>b</i>	<i>c</i> ₁	<i>c</i> ₂	<i>c</i> ₃	<i>c</i> ₄	<i>c</i> ₁₂	<i>d</i>	\bar{R}^2	$H_0 \cdot AR(1)$
Japan	-0.263* (0.126)	-0.198** (0.056)	0.396** (0.098)	0.183* (0.084)	0.228** (0.079)			-0.143** (0.050)	0.823	-0.044 (0.232)
Canada	-0.166* (0.075)		0.290** (0.077)	0.215** (0.079)	0.344** (0.077)				0.548	0.103 (0.241)
Germany	-0.153** (0.038)	0.101** (0.004)							0.794	0.112 (0.098)
UK	0.019 (0.021)	0.326** (0.090)	0.299** (0.086)				0.256** (0.081)		0.558	-0.153 (0.250)

	Correlations		
	$TDUBIL_{Japan}$	$TDUBIL_{Canada}$	$TDUBIL_{UK}$
TDU_{Japan}	0.581**	0.396**	0.477**
$TDUBIL_{Canada}$		0.116	0.399**
$TDUBIL_{Germany}$			0.139
			0.226*
			0.131

$TDABIL_i$ = announced bilateral trade deficit between the US and country *i*.
 $TDUBIL$ = announced monthly overall US trade balance—expected overall US trade balance.
 $TDUBIL^i$ = unexpected bilateral deficit with country *i*.
 $H_0 \cdot AR(1)$ reports the estimate of the coefficients on $TDUBIL_{i-1}$ in the regression of $TDABIL_i$ on the independent variables in the model estimating $TDABIL_i$ and $TDUBIL_{i-1}$. See Judge *et al.* (1985, p. 326).
 * Significant at 5% level, ** significant at 1% level.
 (Standard errors in parentheses).

IV.B. Unexpected bilateral trade deficits

An unexpectedly large overall trade deficit could consist of a surprisingly large deficit with some trading partners and a surprisingly small deficit (or surplus) with other countries.¹² Since MMS does not survey expectations of bilateral balances, expectations of the bilateral balances must be estimated. The following model represents the general specification:

$$\langle 10 \rangle \quad TDABIL_t^i = a^i + b^i TDE_t + \sum_{s=1}^{4,12} c_s^i TDABIL_{t-s}^i + d TDA_{t-1} + TDUBIL_t^i,$$

where $TDABIL^i$ is the announced bilateral trade deficit with country i . For each bilateral deficit, the restricted version of equation $\langle 10 \rangle$ with the smallest mean squared error is used and estimates are reported in Table 13. The models explain approximately 80 percent of the variation in the bilateral balances with Germany and Japan, but only 55 percent of the variation for Canada and the UK. Residuals from these regressions are used to estimate unexpected bilateral deficits.

The second panel of Table 13 shows that for the whole sample the simple correlations between these residuals and the overall unexpected trade deficit are

TABLE 14. Financial market response to trade news and unexpected bilateral deficits 1980–1992.

Return	Bilateral i	$R_t = a + bTDU_t^i + cTDUBIL_t^i + \varepsilon_t$			\bar{R}^2	# obs
		a	b	c		
Canadian dollar	Canada	0.030 (0.024)	0.015 (0.015)	-0.127* (0.066)	0.012	147
Deutsche mark	Germany	0.159* (0.072)	-0.206** (0.046)	0.358 (0.387)	0.124	142
Pound	UK	0.091 (0.078)	-0.134** (0.045)	-0.329 (0.386)	0.086	121
Yen	Japan	0.111 (0.064)	-0.123** (0.045)	-0.162 (0.132)	0.108	146
Dow Jones	UK	-0.031 (0.101)	-0.135* (0.059)	0.680 (0.501)	0.028	119
CRSP VW	Germany	0.003 (0.079)	-0.088 (0.051)	0.426 (0.425)	0.021	143
CRSP EW	Germany	0.028 (0.072)	-0.080 (0.046)	0.576 (0.384)	0.011	143
NASDAQ VW	Germany	-0.008 (0.082)	-0.104* (0.053)	0.704 (0.442)	0.017	143
NASDAQ EW	Germany	0.077 (0.066)	-0.100* (0.042)	0.629 (0.353)	0.029	143
US Tbond	Japan	0.079 (0.072)	0.037 (0.050)	-0.021 (0.148)	-0.009	145

Coefficient estimates and standard errors multiplied by 100.

* Significant at 5% level, ** significant at 1% level.

(Standard errors in parentheses).

TABLE 15. Financial market response to trade news and unexpected bilateral deficits 1980–1992 subperiods.

$$R_t = a + b_1 TDU_t D1_t + b_2 TDU_t D2_t + b_3 TDU_t D3_t + c_1 TDUBIL_t D1_t + c_2 TDUBIL_t D2_t + c_3 TDUBIL_t D3_t + \varepsilon_t$$

$D1_t = 1$ Feb 1980–Sept 1985
 $D2_t = 1$ Oct 1985–Feb 1987, $D3_t = 1$ Mar 1987–Dec 1992

Return	Bilateral	b_1	b_2	b_3	c_1	c_2	c_3	$H_0: c_i = 0$	\bar{R}^2
Canadian dollar	Canada	0.019 (0.024)	-0.016 (0.039)	0.031 (0.026)	-0.194 (0.118)	0.011 (0.219)	-0.094 (0.089)	1.269 [0.287]	-0.00
Deutsche mark	Germany	-0.112 (0.067)	-0.305* (0.122)	-0.367** (0.079)	0.327 (0.628)	1.794 (1.205)	-0.069 (0.545)	0.843 [0.473]	0.15
Pound	UK	0.014 (0.067)	-0.227** (0.082)	-0.308** (0.086)	-1.063** (0.608)	1.950 (1.630)	-0.042 (0.511)	1.511 [0.215]	0.139
Yen	Japan	0.027 (0.073)	-0.255* (0.121)	-0.280** (0.070)	-0.383 (0.268)	0.318 (0.381)	-0.212 (0.164)	1.493 [0.219]	0.158
Dow Jones	UK	0.047 (0.087)	-0.203 (0.113)	-0.407** (0.115)	-0.241 (0.786)	2.289 (2.181)	1.214 (0.662)	1.539 [0.208]	0.081
CRSP VW	Germany	0.022 (0.075)	-0.077 (0.137)	-0.244** (0.089)	0.491 (0.697)	-0.154 (1.350)	0.437 (0.603)	0.349 [0.790]	0.025
CRSP EW	Germany	-0.067 (0.068)	0.032 (0.124)	-0.201* (0.081)	1.197 (0.631)	-0.218 (1.223)	0.067 (0.546)	1.215 [0.307]	0.027
NASDAQ VW	Germany	-0.095 (0.079)	-0.033 (0.144)	-0.163 (0.085)	1.292 (0.736)	-0.202 (1.427)	0.385 (0.637)	1.163 [0.326]	0.004
NASDAQ EW	Germany	-0.132* (0.063)	0.034 (0.114)	-0.167* (0.075)	1.259* (0.581)	-0.171 (1.126)	0.118 (0.503)	1.593 [0.194]	0.036
US Tbond	Japan	0.014 (0.070)	0.016 (0.121)	0.178* (0.078)	-0.461 (0.341)	0.066 (0.656)	0.193 (0.257)	1.182 [0.319]	0.021

Coefficients and standard errors multiplied by 100.
 * Significant at 5% level, ** significant at 10% level.
 (Standard errors in parentheses), [p-values in square brackets].

all between 0.37 and 0.59 and are significantly different from zero. If these correlations were all equal to one the bilateral news would be of no interest since bilateral deficits would not convey information beyond that conveyed in the overall deficit figure. The significant correlations imply that including the bilateral trade news in the regression of financial returns on *TDU* will affect the coefficient on *TDU*. The question addressed next is whether the bilateral trade news has an effect on the financial markets in addition to the influence of the overall balance.

Table 14 provides estimates of the following model:

$$\langle 11 \rangle \quad R_t = a + bTDU_t + cTDUBIL_t^i + \varepsilon_t$$

where

$TDUBIL_t^i$ = unexpected bilateral deficit with country *i*
= residual from equation $\langle 10 \rangle$.

For each exchange rate, only the corresponding unexpected bilateral deficit is included in the model. For example, for the yen the unexpected bilateral trade deficit between the US and Japan is used. For the US stock market indexes and interest rates, the bilateral balances that are not reported have no significant effect. Table 15 reports estimates of the model including subperiod dummies.

In general including bilateral news does not substantially alter the estimates of *b* compared to Tables 3 and 4. For the whole sample bilateral news significantly influences the Canadian dollar but not the other currencies. The estimate of *c* of -0.127 (standard error 0.066) indicates that controlling for news about the overall trade deficit (which does not significantly affect the Canadian dollar), a bilateral deficit with Canada that is larger than expected is associated with a significant depreciation of the US dollar relative to the Canadian dollar. However, the effect of bilateral trade news on the Canadian dollar is only significant at the 10 percent level for the first subperiod and insignificant for the other subperiods.

Bilateral trade news with Germany influences the NASDAQ indexes but not the other stock indexes. The influence of the German bilateral deficits on the NASDAQ stock indexes is concentrated in the first period up to September 1985 and the CRSP equally weighted index also reacts to news of the bilateral German deficit. Otherwise, individual bilateral balances do not contain important information beyond what is reflected in the overall trade surprise.

V. Summary

Survey expectations of the monthly US trade deficit incorporate information contained in past trade announcements including past revisions, bilateral deficits and the J-curve effect of exchange rate changes. A surprisingly large trade deficit announcement yields expectations of larger trade deficits in future months. Financial markets therefore respond significantly to trade announcements since they affect expectations of future current account deficits through the higher future trade deficits as well as through higher future interest payments on foreign debt. A surprisingly large trade deficit is associated with a depreciation of the US dollar with respect to the Deutsche mark, the yen and the pound but not

with respect to the Canadian dollar. However, there is a depreciation of the US dollar relative to the Canadian dollar in response to an unexpected upward revision of previous months' trade deficits. An unexpectedly large bilateral trade deficit with Canada is also associated with a depreciation of the US dollar relative to the Canadian dollar for the whole sample.

Notes

1. See, for example, 'As Trade Report Looms, Investors Seem to Think About Little Else,' *Wall Street Journal*, January 14, 1988 as well as 'World Stock Markets,' *Wall Street Journal*, January 14, 1988, p. 34 and April 15, 1988, p. 4 and 'Abreast of the Market,' *Wall Street Journal*, June 15, 1988.
2. The unexpected component of the trade deficit has also been measured relative to the announced deficit. All models in this paper were reestimated using this relative measure with little effect on the conclusions. Differences in results are noted where applicable.
3. Hardouvelis (1985, 1988) tests for the unbiasedness of the MMS survey expectations data from October 1979 through August 1984. He also tests for efficiency of the survey expectations by regressing the unexpected deficit on its own lags and determines that the survey expectations have better forecasting ability than an autoregressive model. These properties are confirmed but not reported for the period from 1980 through 1992 used in this paper.
4. Including the unexpected revision announced in period t as an explanatory variable in this model does not alter the results.
5. I would like to thank an anonymous referee for pointing this out.
6. The weighted average is calculated as a function of the log differences in the exchange rates as follows: 0.34* Canadian dollar, + 0.22* Deutsche mark + 0.36* yen + 0.08* British pound. These weights are adapted from the description of the IMF data used by Jorion (1990).
7. The model was also estimated including lagged overall announcements and lagged bilateral announcements separately. For the overall sample and the first and third subperiods the hypothesis that $c_1 = 0$ is rejected at the 5% level when only lagged TDA are included. For the first period the adjusted R^2 is only 0.014. For the third period the adjusted R^2 is 0.292. However, measuring the unexpected trade deficit as the residuals from a regression of TDU on lagged TDA does not substantially affect the estimates of the market response to trade news.
8. The revisions data were collected from the monthly issues of the Commerce Department publications Commerce News and Economic Indicators which publish the original data collected by MMS and indicate revisions of previous months' figures. Prior to March 1983, revisions were not clearly indicated in the tables in these publications, and a close comparison of the numbers in the current month's publication to numbers published the previous month was required to note any revisions. Later in the sample the revisions were clearly indicated in the tables each month. This suggests that in the early part of the sample the effect of announcements of revisions on financial markets is likely to be small and that it is more likely that analysts did not incorporate this information in their expectations.
9. Note that some figures are revised more than once, and the announced revision is measured each time relative to the most recently announced figure, whether it is the original announcement or a past revision.
10. The trade deficit will improve in the long run in response to a currency depreciation if the Marshall-Lerner condition holds, *ie* the sum of import and export demand elasticities exceeds one in absolute value. Goldstein and Khan (1984) survey empirical estimates of price elasticities of trade that support the existence of J-curve effects lasting approximately two years. Golub (1986, pp. 21-28) provides additional evidence. Rose and Yellen (1989) find no evidence of a J-curve in the USA from 1960 through 1985.

11. Using equation <7> to estimate the unexpected revision assumes that investors know the parameters of equation <7> throughout the sample. Using one-step ahead forecasts from this model to generate unexpected revisions using only information available prior to the announcement each month does not alter any results. This specification has the smallest RMSE compared to other models that include additional lags of *REVA* and *TDA*.
12. Note that when revisions of the overall trade balance are announced, the bilateral figures are not generally revised at the same time. For the purposes of this paper, announced revisions of bilateral balances are assumed to be zero.

References

- AGGARWAL, RAJ AND DAVID C. SCHIRM, 'Balance of Trade Announcements and Asset Prices: Influence on Equity Prices, Exchange Rates, and Interest Rates,' *Journal of International Money and Finance*, February 1992, **11**: 80–95.
- DERAVI, KEIVAN, PHILIP GREGOROWICZ AND CHARLES E. HEGJI, 'Balance of Trade Announcements and Movements in Exchange Rates,' *Southern Economic Journal*, October 1988, **55**: 279–287.
- DWYER, GERALD P. JR. AND RICK W. HAFER, 'Interest Rates and Economic Announcements,' *Federal Reserve Bank of St. Louis Review*, March/April 1989, **71**: 34–46.
- GOLDSTEIN, M. AND M.S. KAHN, 'Income and Price Effects in Foreign Trade,' in Ronald Jones and Peter B. Kenen, eds, *Handbook of International Economics*, Vol. 1, Amsterdam: North-Holland, 1984.
- GOLUB, S.S., 'The Current-Account Balance and the Dollar, 1977–78 and 1983–84,' *Princeton Studies in International Finance*, no. 57, 1986.
- HARDOUVELIS, GIKAS A., 'Economic News, Exchange Rates and Interest Rates,' First Boston Working Paper FB-86-12, Graduate School of Business, Columbia University, 1985.
- HARDOUVELIS, GIKAS S., 'Economic News, Exchange Rates and Interest Rates,' *Journal of International Money and Finance*, March 1988, **7**: 23–35.
- HOGAN, KED, MICHAEL MELVIN AND DAN J. ROBERTS, 'Trade Balance News and Exchange Rates: Is There a Policy Signal?' *Journal of International Money and Finance*, March Supplement 1991, **10**: S90–S99.
- IRWIN, DOUGLAS A., 'Trade Deficit Announcements, Intervention, and the Dollar,' *Economics Letters*, December 1989, **31**: 257–262.
- JORION, PHILIPPE, 'The Exchange-Rate Exposure of U.S. Multinationals,' *Journal of Business*, July 1990, **63**: 331–345.
- JUDGE, GEORGE G., W.E. GRIFFITHS, R. CARTER HILL, HELMUT LUTKEPOHL, TSOUNG-CHAO LEE, *The Theory and Practice of Econometrics*, 2nd ed, John Wiley and Sons, 1985.
- KLEIN, MICHAEL, BRUCE MIZRACH AND ROBERT G. MURPHY, 'Managing the Dollar: Has the Plaza Agreement Mattered?' *Journal of Money, Credit and Banking*, November 1991, **23**: 742–751.
- MITCHELL, MARK L. AND JEFFRY M. NETTER, 'Triggering the 1987 Stock Market Crash: Antitakeover Provisions in the Proposed House Ways and Means Tax Bill,' *Journal of Financial Economics*, September 1989, **24**: 37–68.
- PEARCE, DOUGLAS K. AND V. VANCE ROLEY, 'Stock Prices and Economic News,' *Journal of Business*, January 1985, **58**: 49–67.
- PUFFER, MARLENE K., 'The International Reaction to U.S. Trade Deficit Announcements and Exchange Rate Exposure: A Market-Wide and Cross-Sectional Analysis,' Ph.D. dissertation, University of Rochester, 1993.
- ROSE, ANDREW K. AND JANET L. YELLEN, 'Is There a J-curve?' *Journal of Monetary Economics*, July 1989, **24**: 53–68.