

The Impact of AIDS-Related News on Exchange Rates in South Africa

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Abstract

This paper focuses on the economic impact of AIDS-related news on exchange rates in South Africa. South Africa's HIV/AIDS infection rates are so high that AIDS is now a macroeconomic problem, not just a public health problem. News about the spread of the disease can therefore have significant effects on financial markets. We collect daily data on the number of news stories about AIDS that appear in the Cape Times from 1998-2002, and examine the impact of these news stories on fluctuations in the South African Rand-U.S. Dollar exchange rate. We find that negative news stories about AIDS have a significant negative effect on the value of the rand but that positive news stories have little or no effect. The findings of the paper provide concrete evidence of a channel through which the AIDS pandemic continues to adversely affect macroeconomic conditions in sub-Saharan African countries.

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1 Introduction

The AIDS pandemic is the single largest public health problem that the world faces at the outset of the 21st century. While the spread of HIV infection has been broadly contained in the developed world, HIV/AIDS continues to ravage much of the developing world. For instance, recent concerns have emerged about the extent to which HIV/AIDS is spreading in China and India, the two most populous countries in the world. If these worries are confirmed, the AIDS pandemic will remain a serious public health problem well into this century.

In sub-Saharan Africa, however, the AIDS pandemic is a far more immediate problem. Many sub-Saharan African countries, already the poorest in the world, have been ravaged by the pandemic. The incidence and impact of HIV/AIDS in these countries are staggering. In 2001, according to UNAIDS, there were 26 million people between the ages of 15 and 49 infected with HIV/AIDS. Their numbers are growing by 3.5 million a year. Nearly 2.5 million people die every year from AIDS and 11 million children are orphaned. Approximately 33.7% of adults in Zimbabwe, 21.5% of adults in Zambia, 40% of adults in Botswana and 20.1% of adults in South Africa are infected with HIV. HIV/AIDS is far more than a public health problem in these countries; it is a macroeconomic problem, perhaps the most significant macroeconomic problem facing them.

We are particularly interested in the macroeconomic impact of AIDS in South Africa. South Africa is the third most populous country (behind Nigeria and Ethiopia) in Sub-Saharan Africa, with the second highest per-capita GDP level (behind Botswana) and by far the largest economy. A collapse of the South African economy would have a devastating effect on many sub-Saharan African countries. On the other hand, a booming prosperous South Africa will certainly help alleviate some, but not all, of the problems facing other sub-Saharan African nations.

Trade and foreign investment play a particularly important role in South Africa's macroeconomic fortunes. As the largest economy in the region, blessed with valuable natural resources, South Africa remains a regional magnet for foreign direct investment. Its financial markets are the preferred destination for portfolio investments in Africa, and South African exports have been a boon to the middle classes in other sub-Saharan African countries. The prosperity of the external sector depends largely on reducing uncertainty and maintaining a stable currency – either a sustainable fixed exchange rate or (in South Africa's case) a flexible exchange rate that is not subject to unpredictable volatility.

The AIDS pandemic is likely to have significant effects on the exchange rate in South Africa. The devastating effect AIDS has had on the working age population, in particular among adult males working in mining and manufacturing, will adversely impact the financial health of South African firms. This in turn will reduce output and exports from South Africa as well as

reduce profits and decrease direct and portfolio investment from foreigners concerned about increased uncertainty of long-term business prospects in South Africa. We therefore expect to see a long-term relationship between the exchange rate and the incidence and spread of HIV/AIDS (as well as other macroeconomic variables such as GDP, investment and net exports) in South Africa. Given that AIDS is now a macroeconomic problem, not just a public health problem, news about the spread of the disease can have significant effects on financial markets.

One of the unhappy distinguishing features of AIDS in South Africa has been the response of the South African government. The government of President Mbeki has behaved extremely unpredictably both in acknowledging the extent of the AIDS problem in South Africa and in formulating a coherent plan to stop the spread of the disease and to treat those already afflicted. The unpredictable behavior of the government makes it more likely that information about its ever-changing attitudes, as well as information from non-official sources about the spread of the disease, will significantly affect on financial variables such as asset prices and exchange rates. In this paper, we focus on the economic impact of AIDS-related news on exchange rates in South Africa.

We collect daily data on the number of news stories that appear in the Cape Times from 1998 to 2002, and examine the impact of these news stories on exchange rate fluctuations in the South African Rand-U.S. Dollar exchange rate. We find that negative news stories about AIDS have a significant negative effect on the value of the rand but that positive news stories have little or no effect. The findings of the paper provide concrete evidence of a channel through which the AIDS pandemic continues to adversely affect macroeconomic conditions in South Africa.

The structure of the paper is as follows: Section 2 provides a summary of the relevant literature on news, exchange rates, and the macroeconomic impact of AIDS in South Africa. Section 3 describes the data and the methodology, while Section 4 analyzes the results of our regressions. Section 5 summarizes and concludes.

2 News, Exchange Rates, AIDS and South Africa

The key stylized fact in international economics is the difficulty of predicting short-term movements in exchange rates. The seminal work of Meese and Rogoff (1983) showed that the predictions of a random walk model were superior to the predictions of exchange rate models derived from conventional macroeconomic principles. A decade later, Meese and Rogoff's finding seemed to have become the conventional wisdom (Frankel and Rose (1995)). Simple time series specifications have typically outperformed short-run models in predicting short-run exchange rate behavior when a broader sample of currencies or time periods is used.

There have been several different strands of research responding to the challenge posed by

the Meese/Rogoff findings. Mark (1995) is one of several important papers that used more sophisticated econometric techniques to identify predictable components of the long-run behavior of nominal exchange rates. However, more recent work by Faust, Rogers and Wright (2003) shows that the predictability of exchange rates identified in the work of Mark (1995) is dependent on the vintage of data being used: outside of a two-year window of data around the time of Mark's (1995) research, the out of sample forecasting power of Mark's model is limited. Faust et al's (2003) work raises the possibility that researchers working on exchange rate models now are back to square one again, struggling to build fundamentals-based models that can outperform simple time-series specifications of nominal exchange rate behavior.

Another strand of literature, however, takes on the challenge posed by Meese and Rogoff (1983) by appealing to simpler specifications of exchange rate behavior. For example, Blomberg and Hess (1997) provide evidence that the poor performance of standard exchange rate models in out of sample forecasting can be attributed to the omission of political variables. By including variables that capture changes in the political party in power, the proximity of elections and the popularity of the government, Blomberg and Hess are able to show that their model outperforms the random walk model for the trade-weighted pound, dollar and mark exchange rates. Similarly, Blomberg (2001) shows that using narrative monetary policy variables such as those used in Romer and Romer (1989) in a standard monetary model of exchange rate behavior can improve out of sample forecastability so that the standard monetary model outperforms the random walk model.

Even though a generally accepted model of exchange rate behavior over different time periods has not yet emerged, the findings of Blomberg and Hess (1997) and Blomberg (2001) open up the possibility that for certain countries, one can improve the performance of conventional exchange rate models by including unconventional, yet potentially relevant variables. It is in this spirit that we decided to study the impact of AIDS on exchange rate behavior in South Africa. Even though the rate of AIDS incidence is not typically used as a macroeconomic variable, we believe that the extent of the AIDS pandemic makes it potentially a more important indicator of South Africa's economic future than other, more conventional, macroeconomic variables. Since reliable time series data on AIDS incidence in South Africa is not readily available, particularly at the high frequencies needed to study short-term exchange rate behavior, we instead study the impact of AIDS-related news on exchange rate behavior. Because detailed information about AIDS incidence is not available to financial markets, they are also likely to react to news stories about AIDS. Our use of AIDS-related news instead of detailed AIDS incidence data may be appropriate in such a setting.

There is a substantial body of research that examines the impact of economic news on asset prices, including exchange rates. This strand of the literature dates back to Dornbusch (1980) and Frenkel (1981) and essentially postulates that new information about macroeconomic fundamentals has predictive power for the behavior of exchange rates. Studies done in the 1980s

focused mostly on news about interest rate behavior. These studies have been complemented by more recent work by Edison (1997), which finds mixed evidence of the effect of news on exchange rate behavior: news about real macroeconomic variables seems to systematically influence dollar exchange rates while news about inflation does not. Evans (2002) studies the impact of news at a more detailed level by focusing on the distinction between common knowledge news (public news simultaneously available to all market participants) and non-common knowledge news (private news such as customer orders) in determining exchange rate behavior. Analyzing high frequency (essentially continuous) exchange rate data, he finds that private news is more important than public news in driving trading patterns and thus equilibrium prices in the foreign exchange market.

The news-exchange rate link has also been studied for a number of other countries. Fornari, Monticelli, Pericoli and Tivegna (2002) examine the impact of scheduled and unscheduled macroeconomic news on the daily value of the lira. They measure unscheduled macroeconomic news by referencing headlines from the Financial Times, an approach similar to that we undertake in this paper. They find evidence that supports the hypothesis that news can have a significant effect on short-term movements in nominal exchange rates. Moosa (2002) provides an overview of the evidence supporting the hypothesis that news is a significant determinant of exchange rate behavior. Moosa's study covers six exchange rates over the time period 1975 to 2000 using VAR residuals to proxy for news. Moosa concludes that news has "no effect on exchange rate behavior" but qualifies this statement by noting that one explanation for the lack of significant results maybe the attempt to "proxy news by residuals from time series models." Instead, Moosa argues, the ideal analysis would consider announcements, which is the approach we take in our work. Finally, work by Jo and Willett (2000) examines how foreign exchange markets in East Asia responded to news during the East Asian crisis. The methodology we use is similar to their methodology in that they categorize news stories (from a wider variety of sources but over a shorter time period) into "good" news and "bad" news categories and examine the impact of these stories on daily exchange rate behavior.

In summary, this paper builds on a rich tradition of research that examines the relationship between news and exchange rate fluctuations. It can also be viewed as complementing a more recent line of literature that seeks to use unconventional macroeconomic variables to improve the performance of fundamentals-based models of exchange rate behavior vis-à-vis random walk specifications. Like Blomberg and Hess (1997) we use unconventional macroeconomic variables to improve model performance. Our paper provides evidence to support the idea that the AIDS rate is effectively an unconventional macroeconomic variable of great importance in sub-Saharan African countries like South Africa. However, the variables that Blomberg and Hess (1997) use, such as the proximity of elections and the popularity of the government, are known *ex ante* and can be used to improve exchange rate forecasts. Since AIDS-related news, by definition, cannot be known in advance, we cannot claim that including

AIDS incidence rates can improve the forecasts of a short-run model of exchange rates in sub-Saharan Africa. We do, however, demonstrate that bad news about AIDS has significant negative impact on exchange rate behavior. As a result, it provides one more piece of evidence that the South African government needs to take into account the serious macroeconomic threat posed by AIDS.

3 Data and Methodology

Description of Data

Our approach was very simple: before collecting exchange rate data we examined daily issues of the Cape Times, one of two major newspapers in South Africa.¹ News stories about AIDS were collected daily from January 1st, 1998 through December 31st, 2002. The news stories were separated into three categories: good news, bad news and neutral news. Good news included stories that documented a slowing of the spread of AIDS, stories that reported a decision by the government to allow for broader accessibility of patients to drugs, or stories that suggested that the government acknowledged AIDS as a serious threat. Bad news included events such as an unexpected increase in the spread of HIV/AIDS, rapid increases in the number of estimated AIDS orphans, or periodic announcements by the government that indicated that higher-ups in the health ministry seemed to be refusing to acknowledge the severity of AIDS in South Africa. Neutral stories were ones that were not obviously categorizable in the first two groups, such as a news story about the increase in AIDS in India, or a story about a new play dramatizing the impact of AIDS on families in South Africa.

Daily Rand/Dollar exchange rate data was obtained from the Board of Governors of the Federal Reserve. These rates are the “noon buying rates in New York for cable transfers” according to the description provided by the Federal Reserve. We also used data from the Federal Reserve for indexes of the value of the dollar against major currencies as well as against a broad weighted basket of currencies. Daily short-term United States interest rates (3-month and 6-month bond yields) were obtained from the Federal Reserve and daily short-term interest rates for South Africa (91-day Treasury Bill rates) were obtained from Datastream & the Reserve Bank of South Africa. We also use oil price data from Datastream and use daily changes in the Reuters CRB Commodity Index as a measure of commodity price changes.

Table 1 summarizes the information on the number of news stories (good, bad and neutral) that appeared over the entire sample period. On average there were close to two stories per week that were categorized as “good” news and about three stories per week that were categorized as “bad” news. Neutral stories averaged about one and a half per week. These stories were distributed fairly evenly over the week, as can be seen in the breakdown by day of the week

¹We used the Cape Times instead of the Johannesburg Star because it was available for a longer period.

in Table 1. Never more than three stories appeared on a single day.

Figure 1 plots the time path of the Rand/Dollar exchange rate over the sample period. Note that the rand tends to depreciate over the sample period. There are occasional minor fluctuations in the Rand/Dollar exchange rate around this trend for most of the sample period but the volatility of the exchange rate is much more amplified towards the end of our sample. If we were to run regressions with the level of the Rand/Dollar exchange rate we would have to be concerned about the non-stationarity of the exchange rate. However, most of our regressions will use as a dependent variable the depreciation of the rand, rather than the exchange rate level. Figure 2 plots the day-to-day depreciation of the rand. Because there is no obvious trend in the depreciation rates, we need not be overly concerned about non-stationarity issues associated with trends.²

Table 2 summarizes the day-to-day depreciation of the Rand/Dollar exchange rate over the sample period.³ The rand depreciates an average of 0.035% vis-à-vis the dollar each day (an annualized rate of approximately 13%). The largest one-day depreciation of the rand is 9% and the largest appreciation is 8%. There is a lot of variation in the depreciation of the rand; the standard deviation of a daily fluctuation is about 1%. There is also substantial variation from year to year in the daily movements of the rand, with the latter parts of the sample showing greater volatility. There is, however, no obvious trend in the magnitude of daily depreciation.

Methodology

In order to test our hypothesis that news about AIDS has a significant impact on exchange rates in South Africa, we need to determine the appropriate timing. Does a news story that appears in the Tuesday newspaper affect the value of the exchange rate on Tuesday, on Wednesday or even on Monday? Newspapers can either reflect news or generate news; it is ex ante very difficult to identify how much of a surprise a news story really is. A story that appears in the Tuesday morning Cape Times may have already been broadcast the day before on radio and television (and hence would be incorporated in the Monday-to-Tuesday change in the exchange rate) or may come as a surprise (in which case it would affect the Tuesday-to-Wednesday exchange rate). Because the exchange rates are midday rates, if one evening's broadcast media reports and the next morning's newspaper reports affect trading throughout the day, then the effect will be captured in that day's exchange rate and the following day's exchange rate. In the initial approach we consider three possibilities. Specifically, we examine the impact that a news story appearing on day N has on

²A simple regression fitting a time-trend to the depreciation series confirms this claim.

³The depreciation rate is calculated as $\ln(e_{n+1}) - \ln(e_n)$ where e_n is the noon Rand/Dollar exchange rate on day n . Using the natural log of the exchange rate also helps us avoid the Siegel Paradox, whereby the percentage depreciation or appreciation of a bilateral exchange rate depends on which currency we use as the numeraire.

1. The change in the exchange rate from day N to day $N+1$.
2. The change in the exchange rate from day $N-1$ to day N .
3. The change in the exchange rate from day $N-1$ to day $N+1$.

We also examine alternative specifications in which we aggregate the number of news stories for each week and analyze the relationship between week-to-week fluctuations in the Rand/Dollar exchange rate and the number of news stories that appear during the week. By using weekly exchange rate fluctuations, we are able to minimize the impact of timing subtleties. On the other hand, the weakness of this approach is that we run the risk of diluting the impact of news on exchange rate behavior by choosing a weekly frequency instead of a daily frequency. Exchange rates may react much more sharply in the day of or the day following a news story release and may not be influenced very much over the rest of the week. Our measure may therefore identify a weaker effect of AIDS-related news on exchange rates than there really is. Ultimately, however, the results based on weekly data prove to be consistent with those based on daily data.

4 Regression Results

Table 3 presents the main results of our analysis. The dependent variable is the percent depreciation of the rand between noon on day n and noon on day $n + 1$ (i.e. $(\ln(e_{n+1}) - \ln(e_n)) * 100$). This is regressed against the number of good, bad and neutral news stories that appear on day n . The results are presented in Column I. The important results from Column I are that bad news stories have a statistically significant positive effect on the Rand/Dollar exchange rate (i.e. cause the rand to depreciate). The magnitude of this effect is both reasonable and large enough to be economically significant: one extra “bad” news story causes the rand to depreciate by 0.11 percentage points. On the other hand, “good” news stories or “neutral” news stories about AIDS do not have any statistically significant effect on the value of the rand.

This asymmetry between good and bad news is not particularly surprising given the nature of HIV/AIDS. Since there is no known cure for AIDS, it is unlikely that good news would imply a significant amelioration of the AIDS crisis. Bad news, on the other hand, could imply a significant worsening of the crisis with potentially negative consequences for the economy. For example, a news story that states that the spread of HIV/AIDS in South Africa or Botswana has been slowed would count as a good news story but will not change the reality on the ground that a significant portion of the working age population continue to be infected with no hope of being cured, only having hope of containment. We speculate without having data that if we were to study the link between exchange rates in East Asia and news stories related to the latest public health scare there, SARS, we would find a more symmetric effect. This would, of course, be

because people with SARS can be cured so any good news about containment and cure of the disease would be identified with a return to the status quo. There will never be a return to the pre-AIDS status quo in sub-Saharan Africa for the current generation.

The asymmetry in the impacts of good and bad news mirrors the findings in Womack's (1996) work that examines the impact of recommendations by stock analysts on stock prices. Womack shows that "sell" recommendations have an effect on stock prices that is four times larger than the effect of "buy" recommendations. "Sell" recommendations are likely to be issued only when the analyst is very sure about the negative information, given the desire to avoid disrupting the relationships between the companies being rated and the other business areas of the analyst's firm. "Buy" recommendations contain much less useful information and hence don't move stock prices very much. There is a clear parallel with our analysis of the impact of AIDS news, where "good" news about AIDS has relatively low information value given the nature of the disease, but "bad" news may imply potentially long-lasting unexpected negative consequences.

To take into account the relatively low overall explanatory power of these regression results, and the possibility that the Rand/Dollar exchange rate may be moved by events in the United States instead of AIDS-related events occurring in South Africa, we run the same set of regressions but this time add the appreciation of the dollar against a broad basket of currencies (see Column II) as well as a basket of major currencies (see Column III) as explanatory variables. As expected, fluctuations in the dollar against other currencies prove to be highly significant, with a regression coefficient close to 0.9 for the broad index and 0.45 for the major currencies index. In other words, a 1 percentage point appreciation of the dollar against a broad basket of currencies (2 percentage point appreciation against a basket of major currencies) is correlated with about a 0.9 percentage point appreciation of the dollar against the rand. However, the basic story from Column (I) is unchanged in Columns (II) and (III). "Bad" news stories continue to have a statistically significant impact on the value of the rand, and the magnitude of the impact is virtually unchanged; each additional story is associated with a 0.11 percentage point depreciation of the rand.⁴

We also want to control for changes in other financial variables that can influence exchange rates. In Column (IV) we control for fluctuations in interest rates by taking the difference between daily short-term U.S. interest rates and daily short-term South African interest rates. Our results are fairly robust to the inclusion of this variable; each additional story is now associated with about a 0.1 percentage point depreciation of the rand. The statistical significance of the results weakens slightly but the results remain significant at about the 7% level. The interest rate differential does not turn out to be significant, an unsurprising result given the general inability of fluctuations in macroeconomic variables to explain exchange rate fluctuations.

In Column (V), we add daily changes in oil prices and commodity prices to the regression.

⁴For each of the regressions, we also provide the results from a Durbin-Watson test for serial correlation.

Since South Africa imports most of its oil requirements and is a prominent exporter of precious metals, we would expect that daily fluctuations in these variables would affect exchange rates.⁵ The magnitude of the news coefficients does not change very much but the statistical significance weakens somewhat; although the results remain significant at the 7% level. As expected, both oil price changes and commodity price changes have a significant impact. The impact is also in the direction we would expect, with higher oil prices causing a depreciation in the value of the rand and higher commodity prices leading to an appreciation of the rand.

Finally, in Column (VI), we control for other unobservable trends by including a time trend and dummy variables for each day of the week. Once again the coefficients on the news variables are robust to the inclusion of these variables, with the bad news variable remaining significant at the 7% level.

Alternative Timing Possibilities

In the main regression results considered above, we used the percent depreciation of the rand between noon on day n and noon on day $n + 1$ (i.e. $(\ln(e_{n+1}) - \ln(e_n)) * 100$). Given our earlier discussion about the possibility of alternative timelines for the impact of news on exchange rate movements, we also consider two variants of the dependent variable. Table 4 presents the results of the same regressions using the percent depreciation of the rand between noon on day $n - 1$ and noon on day n . The results for the “bad” news variable remain statistically significant although the magnitude falls: each additional “bad” news story causes the rand to depreciate by 0.08 percentage points (as opposed to 0.11 percentage points). This result is stable across model specifications; including the change in the value of the dollar against major currencies, interest differentials, changes in commodity prices and oil prices, time trends or daily fixed effects has little impact.⁶ One interesting (and important) change here is that the “good” news variable becomes statistically significant as well. An additional “good” news story causes the rand to appreciate against the dollar by about the same magnitude as an additional “bad” news story causes the rand to depreciate.

Table 5 presents the results of the same regressions using the percent depreciation of the rand between noon on day $n - 1$ and noon on day $n + 1$. This is a more general case that allows for the possibility that news stories that appear on day n may incorporate news that appears on television and radio on day $n - 1$ in addition to other stories that are genuine news to the market. Since the dependent variable is the percent depreciation of the rand between noon on day $n - 1$ and noon on day $n + 1$ (i.e. $(\ln(e_{n+1}) - \ln(e_{n-1})) * 100$) there will be first order serial correlation. The results in Table 5 correct for this serial correlation using the Prais-Winsten estimator. The magnitude of the bad news coefficient remains identical but the results are only significant at

⁵We thank the editor and an anonymous referee for suggesting this robustness check.

⁶Changes in the value of the dollar, commodity and oil prices, and interest rate differentials are adjusted so that they cover the same time period as the new dependent variable.

about a 15% level. The transformed Durbin-Watson statistic is still below the critical value, indicating that some serial correlation persists even after the Prais-Winsten method has been used. The impact of “good” news and “neutral” news remains insignificant.

Overall our results indicate that “bad” news about AIDS has a significant impact on day-to-day movements in the rand versus the dollar. Each additional “bad” news story causes about a 0.10 percentage point depreciation in the rand. The magnitude of this impact is robust to the inclusion of variables such as short-term interest rates, commodity prices, oil prices, the value of the dollar against major currencies, time fixed effects and trends. The impact of “bad” news on the exchange rate movements is fairly robust across model specifications based on alternative theories about the timing of news story effects on foreign exchange rate markets. There is some evidence that “good” news about AIDS makes the rand stronger, but this result is much less robust and depends critically on timing assumptions.

Weekly Data

Since some of the above results are sensitive to the timing convention chosen, one interesting alternative is to aggregate the daily news stories up to a weekly frequency. Specifically, we examine the impact of the number of good, bad and neutral news stories that appear between Monday and Friday of a given week n on the fluctuations in the exchange rate over that week, defined as the percentage change in the exchange rate from noon on Monday of week n to noon on Monday of week $n + 1$. Table 6 presents the main results of the analysis using weekly data. The weekly results resemble the daily results. “Bad” news stories have a statistically significant positive effect on the Rand/Dollar exchange rate (i.e. cause the rand to depreciate). Furthermore, the magnitude of the weekly effect is similar to the magnitude of the daily effect: one extra “bad” news story a week causes the rand to depreciate by 0.14 percentage points over a week. On the other hand, “good” news stories or “neutral” news stories about AIDS do not have any significant effect on the value of the rand. These results are robust to the inclusion of several other potential explanatory variables as shown in the remaining columns of Table 6.

5 Conclusion

Using daily data on the number of AIDS-related news stories gathered from the Cape Times, we demonstrate that “bad” news about AIDS has a detrimental impact on the value of the rand; each additional bad news story causes about a 0.10 percentage point depreciation of the rand against the dollar. Our results are robust to the inclusion of other macroeconomic variables that can influence the Rand-Dollar exchange rate. We also consider different timing conventions for the link between news and exchange rates, and aggregate our data to a weekly frequency so that we can eliminate some of the timing uncertainties. The results continue to hold at a weekly

frequency as well, with each additional “bad” news story resulting in about a 0.15 percentage point depreciation of the rand against the dollar. Our model suggests that good news about AIDS causes the rand to appreciate but this finding is not very robust. The lack of a “good” news impact is not particularly surprising given the incurable nature of HIV/AIDS.⁷

Our results provide evidence to support the broad hypothesis that the spread of HIV/AIDS in sub-Saharan Africa is as much a macroeconomic problem as it is a public health problem. This is admittedly a broad claim given that our study is restricted to one country (South Africa), one macroeconomic variable (the nominal exchange rate) and a specialized set of data (news stories about HIV/AIDS appearing in one South African newspaper). However, given that a consistent panel data set on the spread of HIV/AIDS in sub-Saharan Africa is very difficult to construct,⁸ our study provides empirical support to the considerable anecdotal evidence about the impact of AIDS on sub-Saharan Africa. The lack of a consistent data series on the spread of HIV/AIDS, combined with uncertainty about how long it takes for HIV/AIDS to have large scale macroeconomic impacts, makes it very difficult to empirically link HIV/AIDS to broad macroeconomic conditions. Our small-scale project is an attempt to establish such a link.

Our study is also an interesting extension of two rich strands of literature in International Finance: the impact of news on exchange rate fluctuations and the use of non-conventional variables to explain exchange rate fluctuations. Even though news is by definition unpredictable, thus limiting our model’s forecasting power, we are able to demonstrate that bad news about AIDS has significant negative impacts on exchange rate behavior. The South African government’s attitude towards AIDS and the publicity its actions and attitude generate can have far-reaching implications for the value of the rand and for the macroeconomic stability of South Africa.

⁷An anonymous referee pointed out that the impact of news should decline over time, as the market internalizes more of the surprises. We find that the impact of bad news does indeed decline over time, but the estimated annual decline is statistically insignificant. For this reason, the results of this analysis are not reported in the tables.

⁸At best we can assemble annual data for a few countries for about 10 years, fewer than one hundred observations.

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FIGURE 1: The Rand/\$ Exchange Rate (1998-2002)



FIGURE 2: Daily Depreciation of Rand/\$ Exchange Rate (1998-2002)

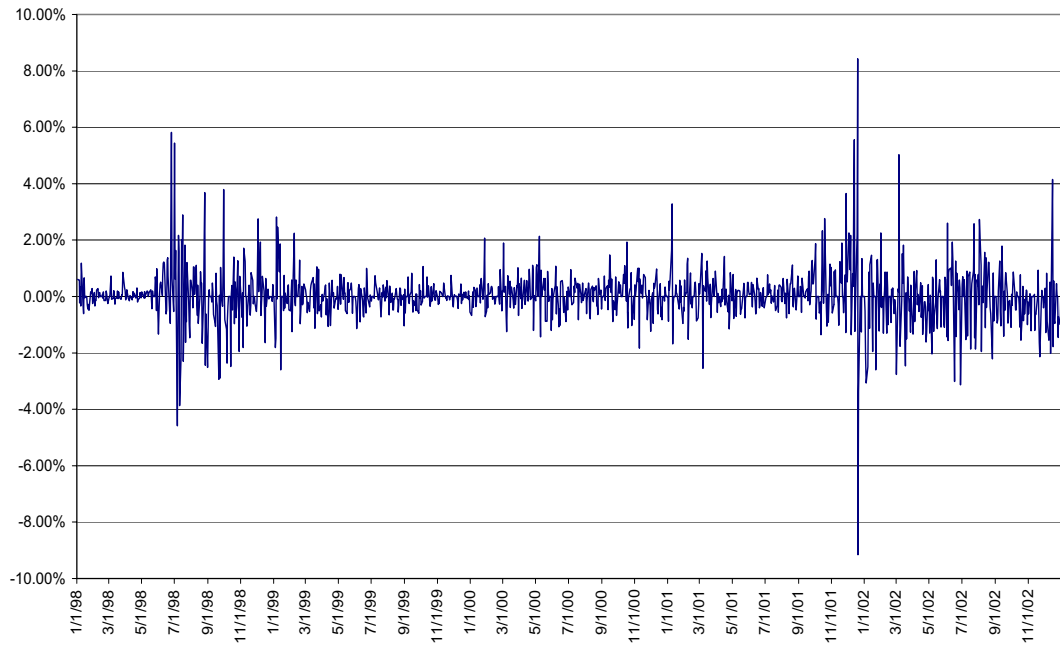


Table 1: News Stories About AIDS

DAY	NEWS TYPE	$N = 0$	$N = 1$	$N > 1$	Mean	Median	Std.Dev	Min	Max
ALL	Good News	877	360	67	0.38	0	0.58	0	3
	Bad News	710	499	95	0.54	0	0.66	0	3
	Neutral News	873	431	0	0.33	0	0.47	0	1
Monday	Good News	172	79	10	0.38	0	0.56	0	2
	Bad News	127	112	22	0.61	1	0.66	0	3
	Neutral News	183	78	0	0.30	0	0.46	0	1
Tuesday	Good News	175	70	16	0.39	0	0.60	0	2
	Bad News	154	88	19	0.49	0	0.67	0	3
	Neutral News	171	90	0	0.34	0	0.48	0	1
Wednesday	Good News	167	77	16	0.42	0	0.62	0	3
	Bad News	136	106	18	0.56	0	0.67	0	3
	Neutral News	184	76	0	0.29	0	0.46	0	1
Thursday	Good News	190	58	13	0.32	0	0.56	0	2
	Bad News	154	88	19	0.49	0	0.64	0	3
	Neutral News	159	102	0	0.39	0	0.49	0	1
Friday	Good News	173	76	12	0.38	0	0.57	0	2
	Bad News	139	105	17	0.54	0	0.64	0	3
	Neutral News	176	85	0	0.32	0	0.47	0	1

Notes: Data collected by authors using daily (weekday) editions of the Cape Times from Jan 1 1998-Dec 31 2002. The third, fourth and fifth columns show the number of days in which zero, one, and more than one story, respectively, were reported. Columns six through ten report descriptive statistics on the number of news stories of the specified type that appear on the specified day of the week.

Table 2: Fluctuations in the Rand/Dollar Exchange Rate

Year	N	Mean	Median	Std.Dev	Min	Max
ALL (1998-2002)	1210	0.035%	0.035%	0.97%	-9.1%	8.4%
1998	243	0.06%	0.01%	1.13%	-4.5%	5.8%
1999	244	0.01%	-0.02%	0.57%	-2.6%	2.8%
2000	243	0.08%	0.13%	0.59%	-1.8%	2.1%
2001	239	0.17%	0.12%	1.21%	-9.1%	8.4%
2002	52	-0.14%	-0.16%	1.13%	-3.1%	5.0%

Notes: The depreciation rate is calculated as $\ln(e_{n+1}) - \ln(e_n)$ where e_n is the Rand/Dollar exchange rate at noon on day n .

Table 3: The Impact of AIDS-Related News on the Rand

[Dependent Variable= $(\ln(e_{n+1}) - \ln(e_n)) * 100$]

Variable	(I)	(II)	(III)	(IV)	(V)	(VI)
<i>Const</i>	-0.052 (0.067)	-0.044 (0.065)	-0.046 (0.065)	-0.006 (0.095)	0.004 (0.096)	70.22 (44.15)
<i>Good</i>	0.039 (0.053)	0.035 (0.051)	0.036 (0.052)	0.030 (0.051)	0.028 (0.052)	0.032 (0.051)
<i>Bad</i>	0.112 ^b (0.058)	0.111 ^b (0.056)	0.112 ^b (0.057)	0.101 ^c (0.056)	0.102 ^c (0.056)	0.104 ^c (0.056)
<i>Neutral</i>	0.037 (0.087)	0.010 (0.085)	0.023 (0.085)	0.004 (0.085)	0.009 (0.086)	0.021 (0.085)
<i>BDolApp</i>		0.894 ^a (0.130)		0.890 ^a (0.132)	0.844 ^a (0.134)	0.855 ^a (0.135)
<i>MDolApp</i>			0.446 ^a (0.065)			
<i>i_{Diff}</i>				0.004 (0.010)	0.005 (0.010)	0.010 (0.010)
<i>OilChange</i>					0.033 ^a (0.011)	0.033 ^a (0.011)
<i>CommChange</i>					-0.086 ^c (0.049)	-0.084 ^c (0.049)
<i>Year</i>						-0.035 (0.022)
<i>DayFixed</i>	<i>No</i>	<i>No</i>	<i>No</i>	<i>No</i>	<i>No</i>	<i>Yes</i>
<i>R²</i>	0.01	0.08	0.04	0.06	0.07	0.07
<i>DW - Stat</i>	1.912	1.936	1.932	1.905	1.878	1.879
<i>N</i>	1210	1206	1206	1199	1179	1179

Notes: Robust standard errors are presented in parentheses. ^a, ^b and ^c represent statistical significance at the .01, .05 and .10 levels, respectively. *Good*, *Bad* and *Neutral* are the number of stories appearing on day *n* that were classified as ‘good news’, ‘bad news’ and ‘neutral news’, respectively. *BDolApp* is the appreciation of the dollar against a broad basket of currencies. *MDolApp* is the appreciation of the dollar against a basket of major currencies. *OilChange* and *CommChange* are changes in oil prices and commodity prices. All four of the above changes are measured over the same period as the change in the dependent variable. *i_{Diff}* is the difference between daily short-term U.S. interest rates (3-month gov’t bond yields) and daily short-term South African interest rates (91-day T-Bill rates). *Year* is the year of the observation and *DayFixed* signifies whether or not dummy variables for the day of the week were included. *DW-Stat* is the Durbin-Watson statistic.

Table 4: Alternative Timing for News Effects: Part I

[Dependent Variable= $(\ln(e_n) - \ln(e_{n-1})) * 100$]

Variable	(I)	(II)	(III)	(IV)	(V)	(VI)
<i>Const</i>	0.037 (0.058)	0.014 (0.057)	0.028 (0.057)	0.150 (0.088)	0.085 (0.092)	63.530 (44.290)
<i>Good</i>	-0.088 ^c (0.050)	-0.078 ^c (0.049)	-0.081 ^c (0.050)	-0.081 (0.051)	-0.092 ^c (0.050)	-0.084 (0.050)
<i>Bad</i>	0.079 ^c (0.047)	0.083 ^c (0.046)	0.079 ^c (0.045)	0.078 ^c (0.046)	0.077 ^c (0.046)	0.085 ^c (0.045)
<i>Neutral</i>	-0.032 (0.082)	0.009 (0.082)	-0.005 (0.082)	0.006 (0.082)	-0.004 (0.082)	-0.002 (0.082)
<i>BDolApp</i>		0.880 ^a (0.133)		0.881 ^a (0.134)	0.828 ^a (0.138)	0.841 ^a (0.138)
<i>MDolApp</i>			0.439 ^a (0.089)			
<i>i_{Diff}</i>				0.005 (0.010)		
<i>OilChange</i>					0.035 ^a (0.011)	0.035 ^a (0.011)
<i>CommChange</i>					-0.082 ^c (0.049)	-0.080 ^c (0.049)
<i>Year</i>						-0.032 (0.022)
<i>DayFixed</i>	<i>No</i>	<i>No</i>	<i>No</i>	<i>No</i>	<i>No</i>	<i>Yes</i>
<i>R²</i>	0.01	0.06	0.06	0.06	0.07	0.08
<i>DW - Stat</i>	1.909	1.935	1.93	1.916	1.871	1.872
<i>N</i>	1210	1206	1206	1200	1179	1179

Notes: Robust standard errors are presented in parentheses. ^a, ^b and ^c represent statistical significance at the .01, .05 and .10 levels, respectively. *Good*, *Bad* and *Neutral* are the number of stories appearing on day *n* that were classified as ‘good news’, ‘bad news’ and ‘neutral news’, respectively. *BDolApp* is the appreciation of the dollar against a broad basket of currencies. *MDolApp* is the appreciation of the dollar against a basket of major currencies. *OilChange* and *CommChange* are changes in oil prices and commodity prices. All four of the above changes are measured over the same period as the change in the dependent variable. *i_{Diff}* is the difference between daily short-term U.S. interest rates (3-month gov’t bond yields) and daily short-term South African interest rates (91-day T-Bill rates). *Year* is the year of the observation and *DayFixed* signifies whether or not dummy variables for the day of the week were included. *DW-Stat* is the Durbin-Watson statistic.

Table 5: Alternative Timing for News Effects: Part II[Dependent Variable= $(\ln(e_{n+1}) - \ln(e_{n-1})) * 100$]

Variable	(I)	(II)	(III)	(IV)	(V)	(VI)
<i>Const</i>	0.068 (0.100)	0.057 (0.096)	0.074 (0.098)	0.107 (0.190)	0.139 (0.188)	167.324 (102.41)
<i>Good</i>	-0.027 (0.063)	-0.036 (0.061)	-0.040 (0.062)	-0.042 (0.062)	-0.046 (0.062)	-0.040 (0.063)
<i>Bad</i>	0.104 (0.074)	0.099 (0.071)	0.100 (0.072)	0.089 (0.073)	0.098 (0.073)	0.101 (0.073)
<i>Neutral</i>	-0.095 (0.097)	-0.088 (0.094)	-0.097 (0.095)	-0.089 (0.098)	-0.081 (0.098)	-0.074 (0.097)
<i>BDolApp</i>		0.949 ^a (0.133)		0.970 ^a (0.131)	0.900 ^a (0.133)	0.899 ^a (0.133)
<i>MDolApp</i>			0.478 ^a (0.087)			
<i>iDiff</i>				0.007 (0.024)	0.011 (0.024)	0.025 (0.024)
<i>OilChange</i>					0.039 ^a (0.011)	0.039 ^a (0.011)
<i>CommChange</i>					-0.112 ^a (0.049)	-0.110 ^b (0.049)
<i>Year</i>						-0.083 (0.051)
<i>DayFixed</i>	<i>No</i>	<i>No</i>	<i>No</i>	<i>No</i>	<i>No</i>	<i>No</i>
R^2	0.01	0.07	0.04	0.07	0.08	0.08
ρ	0.479	0.476	0.473	0.485	0.470	0.470
$DW - Stat^*$	1.460	1.456	1.454	1.480	1.467	1.471
N	1209	1205	1205	1153	1126	1126

Notes: Robust standard errors are presented in parentheses. ^a, ^b and ^c represent statistical significance at the .01, .05 and .10 levels, respectively. *Good*, *Bad* and *Neutral* are the number of stories appearing on day n that were classified as ‘good news’, ‘bad news’ and ‘neutral news’, respectively. *BDolApp* is the appreciation of the dollar against a broad basket of currencies. *MDolApp* is the appreciation of the dollar against a basket of major currencies. *OilChange* and *CommChange* are changes in oil prices and commodity prices. All four of the above changes are measured over the same period as the change in the dependent variable. *iDiff* is the difference between daily short-term U.S. interest rates (3-month gov’t bond yields) and daily short-term South African interest rates (91-day T-Bill rates). *Year* is the year of the observation and *DayFixed* signifies whether or not dummy variables for the day of the week were included. $DW - Stat^*$ is the Durbin-Watson statistic after the Prais-Winsten transformation.

Table 6: Results Using Weekly Aggregates of News

[Dependent Variable=Weekly Depreciation of Rand vs. the Dollar]

Variable	(I)	(II)	(III)	(IV)	(V)	(VI)
<i>Const</i>	-0.139 (0.100)	-0.263 (0.096)	-0.240 (0.343)	0.164 (0.409)	0.170 (0.412)	335.2 (186.6)
<i>Good</i>	-0.068 (0.094)	-0.029 (0.088)	-0.046 (0.090)	-0.036 (0.087)	-0.038 (0.087)	-0.018 (0.088)
<i>Bad</i>	0.141 ^b (0.069)	0.138 ^b (0.070)	0.141 ^b (0.071)	0.137 ^b (0.070)	0.137 ^b (0.071)	0.147 ^b (0.071)
<i>Neutral</i>	0.069 (0.128)	0.088 (0.116)	0.103 (0.120)	0.124 (0.117)	0.117 (0.120)	0.136 (0.119)
<i>BDolApp</i>		0.940 ^a (0.203)		0.900 ^a (0.200)	0.907 ^a (0.209)	0.907 ^a (0.204)
<i>MDolApp</i>			0.575 ^a (0.087)			
<i>i_{Diff}</i>				0.060 (0.040)	0.059 (0.040)	0.079 (0.037)
<i>OilChange</i>					-0.002 (0.025)	-0.003 (0.025)
<i>CommChange</i>					0.029 (0.072)	0.035 (0.074)
<i>Year</i>						-0.168 (0.093)
R^2	0.01	0.10	0.08	0.11	0.11	0.12
<i>DW - Stat</i>	1.788	1.823	1.820	1.838	1.84	1.865
<i>N</i>	259	259	259	259	258	258

Notes: Robust standard errors are presented in parentheses. ^a and ^b represent statistical significance at the .01 and .05 levels, respectively. *Good*, *Bad* and *Neutral* are the number of stories appearing on day n that were classified as ‘good news’, ‘bad news’ and ‘neutral news’, respectively. *BDolApp* is the appreciation of the dollar against a broad basket of currencies. *MDolApp* is the appreciation of the dollar against a basket of major currencies. *OilChange* and *CommChange* are changes in oil prices and commodity prices. All four of the above changes are measured over the same period as the change in the dependent variable. i_{Diff} is the difference between end of the week short-term U.S. interest rates (3-month gov’t bond yields) and end of the week short-term South African interest rates. *Year* is the year of the observation. *DW-Stat* is the Durbin-Watson statistic.