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Bank Disclosure and Market Assessment of Financial Fragility: Evidence from Turkish Banks' Equity Prices

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Abstract In this paper we explore whether Turkish banks with worsening indicators of financial fragility were subject to market monitoring during the years leading to the 2000/2001 crisis, and how the quality and timeliness of the disclosure affect market reaction. We find that shareholders reacted negatively to indicators of financial fragility such as increases in maturity mismatches, currency mismatches, and non-performing loans, showing shareholders' concerns about the impact of financial fragility indicators on future profits. We also find that audited statements that show larger reporting lags, are not informative, pointing to the need of improving their timeliness. Finally, our study suggests that the finding that securities prices react to financial fragility indicators should not be taken as sufficient evidence of banks' safety and soundness.

Keywords Market discipline · Event studies · Financial fragility · Maturity mismatch · Bank disclosure

JEL codes G14 · G21 · G28 · H63 · M41

1 Introduction

The third generation crisis literature emphasizes financial fragility as an important factor in turning a crisis into a major one (Corsetti et al. 1999; Radelet and Sachs 1998; Kaminsky and Reinhart 1999). In particular this literature points out that balance sheet problems in the banking and/or corporate sector work to increase the prospect of insolvency and can be a

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trigger for domestic and external investors to reassess their willingness to finance a country. Dornbusch (2001) emphasizes three sources of vulnerability: a substantially misaligned exchange rate, balance sheet problems in the form of nonperforming loans and balance sheet problems in the form of mismatched exposures. The last of these sources includes maturity mismatches as well as currency mismatches. These misalignments or mismatches become explosive when there is a perception that the current exchange rate is not sustainable or that debtors will not be able to meet their liabilities.

In this paper we investigate whether Turkish banks with worsening indicators of financial fragility were subject to market monitoring during the years leading to the 2000 crisis. In November 2000 Turkey went through a liquidity squeeze that ended in a currency crisis in February 2001. This was the worst crisis Turkey experienced in its post-war history (Özkan 2005). While a weak external and fiscal position were at the root of the crisis, most analysts point to the fragility of the banking sector, in terms of maturity and currency mismatches, as a factor that increased the magnitude of the crisis. Specifically, we address the following questions. Did the stock market react to changes in indicators of financial fragility at the time of disclosure of banks' financial statements? And did the quality and timeliness of the disclosure affect market reaction? Finding answers to these questions will help us understand which disclosure practices improve the ability of the market to assess the banks' financial condition. It will also allow us to contribute to a recent policy debate on whether the existence of market monitoring translates into actual market discipline, that is, whether market monitoring is sufficient to guarantee that the actions of bank managers are actually influenced by banks' security holders, contributing in this way to the safety and soundness of the banking system.¹

The case of Turkey presents several characteristics that make it ideal for our purposes. First, before November 2000, the Turkish banking system presented clear signs of financial fragility. Turkish banks were borrowing heavily in foreign currency, while lending to the government in local currency. In addition to the increased currency risk, banks' combined liquidity-interest rate risk from domestic funding also rose, because the longer-term local currency lending to the government was mostly at fixed rates and at relatively longer maturities, which was partly financed in the daily repo market.² Second, 12 Turkish banks that constitute our sample were publicly traded in the Istanbul Stock Exchange during our whole sample period (1995–2001), allowing us to test for market monitoring. They represent 37% of the assets of the industry in the year 2000. Finally, disclosure policy was enhanced at the beginning of the period. In 1995 the Turkish Capital Markets Board required publicly traded firms to disclose additional information with their financial statements that allowed investors (and researchers) to calculate more precise measures of maturity gaps and currency mismatches. This allows us to measure the mismatch variables more precisely, in a way that would not be possible in a cross-country study. To the best of our knowledge this is the first paper that investigates market's reaction to changes in currency and maturity mismatches in an emerging economy.³

¹ Bliss and Flannery (2002) emphasize that effective market discipline has two different components. The first one is investors' ability to accurately assess the condition of a firm (market monitoring). The second one is investors' ability to actually affect managerial actions (influencing). Our empirical tests address the first component of market discipline, monitoring.

² Table 1 and 2 describe the structure of assets and liabilities in the Turkish banking sector before the year 2001.

³ Beaver et al. (1989), Flannery and James (1984a, b) and Schrand (1997) have studied how variation in U.S. banks' stock prices is related to disclosed information on default risk and interest rate risk.

Table 1 Foreign exchange position of commercial banks. The table displays the ratio of foreign exchange position to shareholders' equity for commercial banks in the Turkish banking sector, including 43 Turkish banks and 18 foreign banks. Fx Position is defined as foreign exchange liabilities minus foreign exchange assets

	Fx position/shareholders' equity (%)
1995	76.80
1996	55.30
1997	91.90
1998	138.80
1999	476.60
2000	259.50

The Banks Association of Turkey

Our findings provide strong evidence that during the years leading to the crisis, stock market participants monitored the banking system. We find significant negative reactions to most indicators of financial fragility. Specifically, the impact of a positive maturity gap, when interest rates are expected to rise, is negative and significant (abnormal returns fall on average 37 basis points with a 1-month increase in maturity gap). An increase in non-performing loans also significantly reduces abnormal returns. Though the evidence is weaker for currency mismatch (probably due to less availability of consistent data for this variable), results suggest that an increase of 1% in currency mismatch, measured as the change with respect to the previous quarter in the percentage of net foreign exchange liabilities on total assets, drives abnormal returns down by 25 basis points.

As expected, and consistent with previous literature on earnings announcements (La Porta et al. (1997); Sivakumar and Waymire (1993)), we find a positive relationship between abnormal returns and changes in earnings. Interestingly, the positive reaction to earnings depends negatively on the magnitude of the maturity mismatch. Overall, our results indicate that while shareholders react positively to news about increases in current

Table 2 Ratios in Turkish banking sector

(%)	1995	1996	1997	1998	1999	2000	2001/9
Nonperforming loans							
Nonperforming loans/total loans	2.8	2.2	2.4	7.2	10.7	11.6	18.6
Currency mismatch							
FX liabilities- FX assets (billion \$)							
Excluding off-the-balance sheet	3.0	2.5	5.0	8.4	13.2	17.4	12.4
Including off-the-balance sheet	0.6	1.2	1.9	2.9	2.9	5.5	0.7
Maturity mismatch							
Liquid assets/(deposits + non-deposit funds)	46.7	44.0	41.1	39.9	42.6	37.9	51.4
Assets/liabilities (with 3 months or shorter maturities)	n/a	n/a	45.8	45.7	46.3	39.9	43.9
Share of deposits							
with 6 months or greater maturity in total deposits	26.1	26.6	24.7	22.9	28.2	15.1	11.6
Repos/(liabilities + repos)	5.1	8.1	12.8	10.4	9.6	11.3	6.1

Central Bank and the Banks Association of Turkey (Özatat and Sak 2002)

profits, they are also concerned about the negative impact that the mismatches could have on future profits.

We are also interested in how the quality and timeliness of the disclosure affect market reaction. We find that it is only after the passage of the Banks Act in 1999 that introduced considerable improvements in the way non-performing loans had to be reported, that the ratio of non-performing loans became informative. We are also concerned about the reporting lag (days between the end of the quarter and disclosure date) and how this affects the usefulness of financial statements. In fact, accounting principles such as the ones developed by the Financial Accounting Standards Board (FASB), require that financial statements be both reliable and relevant. In particular we notice that for the second and fourth quarters when the financial statements are audited the lag is larger (on average 47 days as opposed to 31 days). We find that only the statements corresponding to the non-audit quarters (the ones with shorter reporting lag) are informative, showing that there is a tradeoff between accuracy and relevance, and indicating the need of improving the timeliness of audited statements.

The remainder of the paper is organized as follows. In Section 2, we review the literature on bank disclosure and market discipline and discuss how our paper is related to this literature. In Section 3, we describe the data and the methodology. We present the main estimation results in Section 4, followed with robustness checks in Section 5. Section 6 concludes.

2 Bank disclosure and market discipline

Our paper is related to the recent literature on bank disclosure and market discipline. It is argued that increased transparency should reduce the magnitude and frequency of bank problems, as long as enhanced disclosure allows market participants to impose market discipline earlier and more effectively. In fact there is empirical evidence in this direction. Tadesse (2006) finds that banking crises are less likely in countries with regulatory regimes that require extensive bank disclosure and stringent auditing. Also, Nier and Baumann (2006) in a cross-country study find that greater information disclosure and uninsured liabilities induce banks to hold larger capital buffers leading to lower default risk. However, they also find that an extensive government safety net and lower levels of interbank competition weaken the efficacy of market forces. Other papers also warn about relying only on market forces. Jordan et al. (2000) provide evidence that market participants find supervisory information important in the pricing of US bank securities, especially for banks that were not fully informing their true condition in their prior disclosures.⁴ In this same spirit Bliss and Flannery (2002) in their study of US banks find it hard to conclude that market forces encourage bank management to adopt safer bank practices. While Nier and Baumann (2006) stress that the effectiveness of market discipline depends on the regulatory environment, both Jordan et al. (2000) and Bliss and Flannery (2002) point to the need of supervisors retaining the responsibility for influencing managerial actions. Our paper seems to also point in this direction. Even if we find evidence of stock market monitoring of Turkish private banks, and given the magnitude of the crisis that unfolded afterwards, we cannot claim that this translated into market discipline. For example, three banks in our

⁴ Specifically, they analyze the information content of adverse supervisory evaluation of banks (also known as formal actions) that reveal to the public that the bank is deeply troubled, and that require the bank to take remedial actions.

sample failed in 1999–2000. Two of these banks reported the highest average levels of maturity and currency mismatch respectively during the sample period. The lack of discipline could be partly explained by conflicts between bank management and shareholders, or more probably between large owners and minority shareholders that were exacerbated by poor regulation and supervision. In fact, there were important weaknesses in the Turkish institutional framework. Özkan (2005) gives a detailed account. The existence of full deposit insurance eliminated the incentives of depositors to monitor banks' actions. Moreover, while banks were holders of large amounts of government securities, the Central Bank, the Capital Markets Board and the Treasury, were all involved in supervising agents in the financial sector creating large conflicts of interest.⁵ We should also mention however that the percentage of bank failures was higher for privately-owned banks (from 1998 to 2002, 14 banks out of 27 privately owned commercial banks failed), which could suggest that publicly traded banks were exposed to relatively more discipline. Although we do not test the influence of the market on managerial actions, overall our study seems to indicate that the finding of reaction of securities prices to financial fragility indicators should not be considered as sufficient evidence of market discipline.

3 Data and methodology

3.1 Data source and sample selection

Our study uses quarterly accounting information and stock price information for 12 commercial Turkish banks listed on the Istanbul Stock Exchange between 1995 and 2001. From the total of 16 banks publicly listed in Turkey, we exclude two development banks that do not collect deposits, and two commercial banks due to non-availability of data. The 12 banks represent 37% of the assets of the industry in the year 2000. The sample is an unbalanced panel since two banks went public after 1995, and three banks were delisted, two in 1999 and another one in 2000. We exclude disclosure events after the third quarter of 2001 because, starting in December 2001 the Capital Markets Board required financial statements to be reported on an inflation-adjusted basis⁶ which prevents comparability with the previous statements.

We obtain quarterly accounting information for the banks, their disclosure dates, the daily bank stock prices, and the market index (ISE National-100), directly from the Istanbul Stock Exchange. Stock prices of banks are daily closing prices, and we adjust returns for dividends and stock splits. We eliminate 28 observations that experience confounding events such as dividend payments and stock splits, and three quarters and two observations where the date of disclosure is not available. For three of our main explanatory variables there is only detailed information since 1995.⁷ Therefore our main sample consists of 199 bank-quarter observations. We report however a first specification with fewer explanatory variables for the period 1992–2001, involving 333 bank-quarter observations. We give detailed information on the data availability for each bank in Table A1, and a list of all disclosure dates for the 12 banks for the period 1995–2001 in Table A2 in the “Appendix”.

⁵ Before the formation of the Banking Regulation and Supervision Agency (BRSA) in June 1999, both the Treasury and the Central Bank conducted regulatory and supervisory actions on the banking sector.

⁶ Capital Markets Board Regulation, Serial: XI, No:20, 28/11/2001.

⁷ We explain this in detail in Section 3.3.

3.2 Methodology

Our main objective is to test whether abnormal returns of Turkish banks at disclosure can be explained by changes in financial fragility variables, controlling for changes in traditional variables such as earnings.⁸ To compute the abnormal returns, we use the market-adjusted-return model, which can be viewed as a restricted market model with α_i constrained to be 0 and β_i constrained to be 1 (Campbell et al. (1997)):

$$AR_{it} = R_{it} - R_{mt} \quad (1)$$

where:

AR_{it} = abnormal return on security i on day t

R_{it} = the return on security i on day t

R_{mt} = the return on a market portfolio of stocks on day t

The reason why we choose this more restrictive model as our baseline instead of the market model is that the estimation periods necessary for the market model are not “clean” of events in our empirical exercises. A reasonable estimation period of 250 trading days always overlaps with the three previous events (the disclosure of the accounting reports of the previous quarters). However, we recognize that the market-adjusted return model makes strong assumptions and therefore has its own drawbacks. That is why in the robustness section we also report our results with the market model, which are robust to the results using the market-adjusted return model.

As the market portfolio, we use the Istanbul Stock Exchange National-100 index (ISE National-100) that includes 100 companies with the highest market values and the highest daily average trading volumes. As the next step, Cumulative Abnormal Returns (CAR) are calculated over a number of days, $[t_1, t_2]$ for n securities.

$$CAR_{[t_1, t_2]} = \sum_{t_1}^{t_2} \frac{1}{n} \sum_{i=1}^n AR_{it} \quad (2)$$

We first examine the event window $(-1, 0)$. Since the financial statements are disclosed on day zero in the morning, the new information should be reflected in the stock prices immediately on the event day.⁹

We also need to correct for potential cross-correlation of abnormal returns, given that disclosure dates are the same for some banks for some quarters (see Table A2).¹⁰ To handle the clustering problem in cross-sectional regressions, we follow Petersen (2006). He shows that in the presence of a time effect (correlation across firms), “standard errors clustered by time” produce unbiased standard errors.¹¹ In our analysis we apply a pooled OLS with

⁸ La Porta et al. (1997), Sivakumar and Waymire (1993) among others, show that surprises in earnings announcements have a significant impact on abnormal returns.

⁹ We also allow for a broader event window that includes 5 trading days before the event day but we do not find any evidence of information leakage leading to an earlier market reaction for that particular event window.

¹⁰ The average number of banks disclosing on the same calendar date is 2.6.

¹¹ Clustering by time is an appropriate method only when there are a sufficient number of clusters. The bias in the clustered standard error estimates declines with the number of clusters, dropping from 27% when there are five clusters to 1% when there are 100 clusters. The number of clusters in our main regressions ranges from 246 to 107. Because it is higher than 100 we are confident that underestimation of true standard errors is not a problem in our regressions.

White standard errors, which are also robust to within cluster correlation (clustered or Rogers standard errors).

3.3 Variable definitions

When explaining the abnormal returns of Turkish banks at disclosure by changes in financial fragility variables, we would ideally build measures of unexpected changes in the explanatory variables. However, unfortunately there are no data available that can proxy for the expected values of the explanatory variables, such as analysts' quarterly forecasts of profits of Turkish banks, or quarterly forecasts of bank specific measures of maturity or currency mismatches. As a second best, we take quarterly changes in variables (for earnings, yearly changes in quarterly earnings). We take quarterly changes, because Turkish banks disclose financial information quarterly. Specifically, our explanatory variables for financial fragility are the quarterly changes in non-performing loans, and in measures of maturity and currency mismatch. The data for maturity and currency mismatch are hand-collected from the footnotes of financial statements. We also control for changes in profitability and in banks' lending behaviour (e.g. investing in government bonds instead of lending to corporations).

Non-performing loans changes (NPL) is defined as the change with respect to the previous quarter in the percentage of non-performing loans on total loans. We expect *NPL* to have a negative effect on abnormal returns.

Maturity mismatch changes (Maturity) is measured as quarterly changes in maturity gaps. We follow Saunders and Cornett (2003, p177) to compute the gaps. Letting M_A be the weighted average maturity of a bank's assets and M_L the weighted average maturity of a bank's liabilities, the maturity gap is calculated as the difference between M_A and M_L . Such that:

$$M_i = w_{i1}M_{i1} + w_{i2}M_{i2} + \dots + w_{in}M_{in} \quad (3)$$

where

M_i = the weighted average maturity of a bank's assets (liabilities), $i=A$ or L

w_{ij} = the importance of each asset (liability) in the asset (liability) portfolio as measured by the book value of that asset (liability) position relative to the book value of all assets (liabilities)

M_{ij} = the maturity of the j th asset (liability), $j=1, \dots, n$.

This measure of interest-rate risk accounts both for an income effect and a market value effect of interest rate changes on assets and liabilities.¹² We obtain the data for *Maturity* from the footnotes of the financial statements, available after 1995. The data are classified as assets and liabilities with maturities shorter than 3 months, 3 months to 1 year, and longer than 1 year.

The sign of the impact of maturity mismatch on abnormal returns depends on whether interest rates are expected to increase or decrease. We expect *Maturity* to negatively affect abnormal returns when interest rates are expected to increase, while affecting them positively when interest rates are expected to fall. To capture this, we interact *Maturity* with two dummy variables: *DI_mat* equal to 1 if interest rates are expected to increase, 0

¹² A duration gap, by also accounting for the timing of the arrival of cash flows of assets and liabilities, would be a more precise measure. However it is not possible to construct it with the data from the financial statements.

otherwise; and DD_mat equal to 1 if interest rates are expected to decrease, 0 otherwise. As a proxy for the sign of the expected change in interest rates, we take the sign of the ex-post 3-month change in the deposit interest rate (we subtract the interest rate of the disclosure date from the interest rate 3 months later).¹³ We recognize that the ex-post change of the interest rate may be an imperfect proxy of what investors expected. It is for that reason that we decided not to take the magnitude of the difference between the ex-post interest rate and the interest rate at disclosure as our proxy. Instead we simply consider the sign of that difference and assume that the investor correctly predicts whether the interest rates will go up or down. This is a weaker assumption than assuming that the investor correctly predicts the magnitude of the change.

We measure *currency mismatch changes* (*Currency*) as the change with respect to the previous quarter in the percentage of net foreign exchange liabilities (foreign exchange liabilities minus foreign exchange assets) on total assets. Before the second quarter of 2000 there are reporting differences across banks.¹⁴ While some banks provide additional information on forward agreements when reporting their assets and liabilities in foreign currency, others only report on-balance sheet information. Considering that including forward agreements gives a more realistic picture about banks' foreign currency risk, for the analysis of currency mismatch we run our regressions with only eight banks that were consistent in reporting both on balance sheet and off balance sheet information during the whole period.

The sign of the impact of currency mismatch on abnormal returns depends on whether the lira is expected to depreciate or appreciate against the dollar. To capture this, we interact *Currency* with two dummy variables: DI_curr equal to 1 if the Turkish lira is expected to depreciate against the dollar, 0 otherwise; and DD_curr equal to 1 if Turkish lira is expected to appreciate, 0 otherwise. We follow the same procedure as for interest rates and, as a proxy for the sign of the expected change in the value of the lira, we take the sign of the ex-post 3-month change in the exchange rate (we subtract the exchange rate of the disclosure date from the exchange rate 3 months later). We should note however that the lira shows a trend of depreciation in nominal terms during our entire sample period (for only two quarters DI_curr is equal to 0). Therefore we expect *Currency* to have a negative impact on abnormal equity returns when the lira is expected to depreciate, and not to show an effect when the lira is expected to appreciate, as there is no statistical power to identify such an effect.

Government securities changes (*GS*) is the change with respect to the previous quarter, in the percentage of government security holdings on total assets. Government security holdings are reported under the items "Securities" and "Affiliated Securities" on the balance sheet. We construct *GS* with the help of the information obtained from the footnotes on these items. The impact of *GS* on abnormal returns may be positive or negative. We expect the sign of the variable to be positive if an increase in government securities creates an expectation of regulatory forbearance.¹⁵ On the other hand, increases in government

¹³ We choose the 3-month ex-post change because the median maturity of liabilities in our sample is 3 months, indicating that on average liabilities were repriced in the next 3 months following disclosure. Interest rate information, defined as average monthly deposit rates of the banking industry, is provided by the Central Bank of Turkey.

¹⁴ Starting in the second quarter of 2000, all banks had to include both on-and off-balance sheet information when reporting their assets and liabilities in foreign currency.

¹⁵ The Treasury was empowered to inspect banks financial standing. Özkan (2005) argues that given the Treasury's need to finance the public sector, the Treasury had less incentive to be strict in regulating banks that held large amounts of government securities.

securities could be perceived as related to maturity and currency mismatch. Therefore, if the variable is capturing a part of the effect of maturity and currency mismatch, we expect a negative impact on abnormal returns.

Earnings changes (Earnings) is the change with respect to the same quarter of the previous year, in the percentage of quarterly earnings (before extraordinary items) over market value of equity. Following the accounting literature and for seasonality reasons, we employ yearly changes rather than quarterly changes. We recognize that a better variable would be one calculated using analysts forecasts of bank profits as a measure of expected earnings, and subtracting each quarter earnings forecast from the current quarter earnings. However that information is not available.

Table 3 presents the descriptive statistics for all variables including *CARs* for the event window $(-1, 0)$.

4 Results

The cross-sectional analysis allows us to test the sensitivity of stock prices to each of the financial indicators. Table 4 reports the estimation results for different specifications for the event window $(-1, 0)$. All regressions are pooled OLS, with standard errors that are robust to heteroskedasticity and within cluster correlation.¹⁶

Specification 1 covers the time period 1992–2001 and includes only Government Securities (*GS*) and *Earnings* since the data for other variables are not available before 1995. *Earnings* has a positive and statistically significant effect, implying that a 1% increase in the *Earnings* ratio is expected to cause an abnormal stock return of 10.4 basis points, *ceteris paribus*. *GS* does not have an impact on abnormal returns. These results are robust to the inclusion of our financial fragility variables. This is what we do next, we focus on the sensitivity of abnormal returns to *NPL*, *Maturity* and *Currency*.

In specification 2 we add *NPL* and *Maturity* to the variables of specification 1. We exclude *Currency* because the introduction of this variable reduces the number of observations given that we can only calculate it for eight banks as explained in Section 3.3. However, we do include the three financial fragility variables in specification 5.

As expected, *NPL* has a significant and negative coefficient, while the interaction term of *Maturity* with the first categorical variable *DI_mat* (dummy equal to 1 when interest rates are expected to increase, 0 otherwise) is negative and significant showing that a 1-month increase in *Maturity* leads to a fall in abnormal returns of 37 basis points.

In specifications 3, we add to the variables of specification 2, two new interaction terms of *Earnings* with the *Maturity* variables. The purpose is to test whether the sensitivity of abnormal returns to earnings depends on the magnitudes of the financial fragility variables. Our results point in this direction. The negative sign of the interaction term of *Earnings***Maturity***DI_mat* together with the positive sign of *Earnings* suggest that the positive effect of higher earnings on abnormal returns is attenuated when there are contemporaneous bad news of an increase in the maturity mismatch (if interest rates are expected to increase). We interpret this result as indicating that while shareholders react positively to news about increases in current earnings, this reaction is attenuated by the concern about the negative impact that the mismatches (as published in the accounting statements) could have on future earnings.

¹⁶ We explain this in detail in Section 3.2.

Table 3 Descriptive statistics. The table displays the descriptive statistics for the time period between 1992/6 and 2001/9 for 12 Turkish commercial banks. The data are quarterly. *CAR* denotes the Cumulative Abnormal Returns for the event window $(-1, 0)$. *NPL* is defined as quarterly changes in Non-performing Loans/Total Loans, *Maturity* as quarterly changes in gaps in months, *Currency* as quarterly changes in mismatch defined as FX Liabilities minus FX Assets to Total Assets and *GS* as quarterly changes in Government Securities/Total Assets. *Earnings* is defined as yearly (same quarter of the preceding year) changes in Net Income before Extraordinary Items/Market Value of Equity. Panel B displays the descriptive statistics for the Reporting Lags defined as number of days between disclosure date and end of quarter for audit versus non-audit quarters

Panel A

		Mean	Median	sd	Min	Max
<i>CAR</i> $(-1, 0)$	%	0.47	-0.07	6.00	-27.71	20.83
<i>NPL</i>	%	0.08	0.00	1.02	-7.05	3.69
<i>Maturity</i>	months	0.23	0.11	2.78	-11.72	12.41
<i>Currency</i>	%	0.07	-0.08	3.54	-17.72	20.13
<i>GS</i>	%	0.39	0.31	6.10	-24.84	28.20
<i>Earnings</i>	%	-0.45	-0.65	9.62	-57.15	38.81

Panel B

Reporting lags for audited quarters

Variable	Mean	p25	p50	p75	Min	Max
Lag	47.78	38	47	57	7	99

Reporting lags for non-audit quarters

Variable	mean	p25	p50	p75	min	max
Lag	31.59	25	33	40	7	48

In specification 4 we slightly modify specification 3, replacing *NPL* with interaction terms of *NPL* with two dummy variables, *After Banks Act* equal to 1 after the year 1999, 0 otherwise; and *Before Banks Act* equal to 1 before the year 1999, 0 otherwise. In 1999 the problems in the Turkish banking sector led to the enactment of the Banks Act 4389¹⁷ followed by the establishment of an autonomous body, The Banking Regulation and Supervision Agency (BRSA). The new regulation brought considerable changes in the disclosure requirements of banks, and it also improved the transparency of the reporting of non-performing loans. Specifically, with the new regulation, if one loan was non-performing, other loans of the same customer had to be classified also as non-performing (Barth et al. 2001). We expect the ratio of non-performing loans to be more informative after 1999. In fact, specification 4 shows that it is only significant, both statistically and economically, after 1999.¹⁸

We note that the interaction term of *Maturity* with the first categorical variable *DI_mat* (dummy equal to 1 when interest rates are expected to increase, 0 otherwise) is negative and significant in all specifications from 2 to 4 as expected. A 1-month increase in *Maturity*, leads to negative abnormal returns ranging from 37 to 43 basis points. *Maturity* interacted with *DD_mat* (dummy equal to 1 when interest rates are expected to decrease, 0 otherwise) is not significant in any specification.

¹⁷ Amended by Act No. 4491.

¹⁸ We also test whether the two coefficients of the interaction terms are statistically different. They are significantly different from each other at 10% level.

Table 4 Estimation results. The table displays the results of alternative specifications for the event window (−1, 0). The dependent variable is the Cumulative Abnormal Returns (*CAR*). The data are quarterly. *NPL* is defined as quarterly changes in Non-performing Loans/Total Loans, *Maturity* as quarterly changes in gaps in months, *Currency* as quarterly changes in mismatch defined as FX Liabilities minus FX Assets to Total Assets and *GS* as quarterly changes in Government Securities/Total Assets. *Earnings* is defined as yearly (same quarter of the preceding year) changes in Net Income before Extraordinary Items/Market Value of Equity. *DI_mat* denotes the dummy variable, equal to 1, if interest rates are expected to increase, and *DD_mat* if they are expected to decrease. *DI_curr* denotes the dummy variable, equal to 1, when the Turkish lira is expected to depreciate and *DD_curr* if the Turkish lira is expected to appreciate. To calculate the sign of the interest rate (exchange rate) expectations, we take the sign of the ex-post 3-month change in the average deposit interest rates (exchange rates). *After Banks Act* denotes the dummy equal to 1 after the introduction of the new Banks Act, 0 otherwise and *Before Banks Act* equal to 1 before the introduction of the new Banks Act. Specification 1 covers the full sample for 12 banks and the time period 1992/6–2001/9. *NPL*, and *Maturity* and *Currency* are included in the next specifications due to non-availability of data before 1995. The last specification including *Currency* covers only eight banks that were consistent in their reporting. Regressions are pooled OLS with standard errors robust to heteroskedasticity and within cluster correlation. *p*-values are in parentheses

	(1)	(2)	(3)	(4)	(5)
<i>NPL</i>		−0.800 *	−0.808*		−1.295 **
		[0.076]	[0.080]		[0.023]
<i>Maturity</i> * <i>DI_mat</i>		−0.367 *	−0.425 **	−0.410 **	−0.359
		[0.094]	[0.025]	[0.028]	[0.102]
<i>Maturity</i> * <i>DD_mat</i>		−0.017	−0.032	0.003	0.145
		[0.918]	[0.856]	[0.985]	[0.457]
<i>Earnings</i> * <i>Maturity</i> * <i>DI_mat</i>			−0.022 *	−0.023 *	
			[0.071]	[0.070]	
<i>Earnings</i> * <i>Maturity</i> * <i>DD_mat</i>			−0.014	−0.017	
			[0.428]	[0.293]	
<i>NPL</i> * <i>After Banks Act</i>				−1.310 **	
				[0.018]	
<i>NPL</i> * <i>Before Banks Act</i>				0.198	
				[0.778]	
<i>Currency</i> * <i>DI_curr</i>					−0.252*
					[0.079]
<i>Currency</i> * <i>DD_curr</i>					1.219
					[0.441]
<i>Earnings</i>	0.104 ***	0.098 *	0.100 **	0.090 *	0.114 **
	[0.005]	[0.053]	[0.043]	[0.064]	[0.046]
<i>GS</i>	0.039	0.056	0.041	0.019	0.071
	[0.506]	[0.362]	[0.496]	[0.737]	[0.328]
Constant	0.433	0.36	0.368	0.349	0.476
	[0.181]	[0.335]	[0.320]	[0.342]	[0.299]
Observations	333	199	199	199	138
Adjusted R-squared	0.026	0.032	0.039	0.048	0.064

Asterisks indicate significance at the 10% (*), 5% (**) and 1% (***)

Finally in specification 5, we add the currency variable to our mainline model in specification 2. We interact *Currency* with two dummy variables: *DI_curr* equal to 1 if the Turkish lira is expected to depreciate against the dollar, 0 otherwise; and *DD_curr* equal to 1 if Turkish lira is expected to appreciate, 0 otherwise. We note here that for all quarters except for two, *DI_curr* is equal to 1. Our results show that *Currency* interacted with *DI_curr* is negatively significant at 10% level. An increase of 1% in the mismatch drives abnormal returns down by 25 basis points when the Turkish lira is expected to depreciate, supporting the hypothesis that shareholders react negatively to increases in currency mismatch.

All in all these results suggest that stock market participants monitored the banking system. We find evidence that they reacted negatively to adverse changes in financial fragility variables, showing concerns about the impact of these variables on future profits.

Next, and in order to see how the quality of the disclosure affects stock prices, we split the sample into two groups according to whether the financial statements are audited or not, and re-estimate the model (see Table 5). We do not include the specification with *Currency* due to the very low number of observations when the sample is split. For the second and fourth quarters when the financial statements are audited, only the coefficient for *NPL* is significant. However estimations with non-audit quarters result in larger effects of *Earnings* and *Maturity* interacted with *DI_mat* compared to the findings with the entire sample. Not only do the coefficients reflect higher sensitivities in non-audit quarters, but they are also more significant. Moreover the explanatory power of the regressions of audit quarters is zero, while it ranges from 15% to 19% for non-audit quarters. In order to try to explain this puzzling result we calculate reporting lags (number of days between disclosure date and end of quarter) for audit versus non-audit quarters. The lag for audit quarters is on average 47.78 days while it is only 31.59 days for non-audit quarters (See Table 3-Panel B for the distribution of the lags). This means that on average, the accounting statements are disclosed two weeks later for audit quarters. This lag may be long enough for some bank accounting information to leak to the market before disclosure, given that during those two weeks the accounting statements are ready (though being audited). The more the information leakage before the disclosure date, the less informative the statements will be on that day. Therefore we re-estimate the model by splitting the sample according to the length of reporting lags (higher values than the median reporting lag which is 40 days versus lower values than 40). The results are presented in Table 6, which are extremely similar to the findings in Table 5 in terms of explanatory power. This result indicates that the timeliness of disclosure is extremely important. Moreover it suggests a potential trade-off between accuracy and timeliness.

These results also provide an explanation for the relatively low explanatory power of the regressions using the entire sample (Table 4) where half of the disclosures lack timeliness and where the adjusted R-squared ranges between 3% and 6.5%. The “no-audit” regressions (Table 5) together with the “shorter-reporting lag” regressions (Table 6) which, in spite of having fewer observations, have an adjusted R-squared that ranges between 15% and 19%, suggest that our proposed accounting variables, if disclosed on average not later than 40 days after the end-of-quarter, are informative.¹⁹

Finally, instead of using dummies that intend to capture whether agents expect positive or negative changes in the interest/exchange rate, we use the actual change in interest/exchange rates as a proxy for the *magnitude* of the expected change. This involves a

¹⁹ Another possible explanation for the low explanatory power of our regressions is that accounting variables do not reflect future prospects and this can be a problem if future prospects are weakly related to current earnings. This is a recognized problem in the accounting literature (see for example Amir and Lev (1996)).

Table 5 The impact of audit. The table displays the results for the event window $(-1, 0)$. The dependent variable is the Cumulative Abnormal Returns (*CAR*). “Audit” covers the second and fourth quarters where financial statements are audited. “No Audit” covers the first and third quarters. *NPL* is defined as quarterly changes in Non-performing Loans/Total Loans, *Maturity* as quarterly changes in gaps in months, and *GS* as quarterly changes in Government Securities/Total Assets. *Earnings* is defined as yearly (same quarter of the preceding year) changes in Net Income before Extraordinary Items/Market Value of Equity. *DI_mat* denotes the dummy variable, equal to 1, if interest rates are expected to increase, and *DD_mat* if they are expected to decrease. To calculate the sign of the interest rate expectations, we take the sign of the ex-post 3-month change in the average deposit interest rates. *After Banks Act* denotes the dummy equal to 1 after the introduction of the new Banks Act, 0 otherwise and *Before Banks Act* equal to 1 before the introduction of the new Banks Act. Specification 1 covers the full sample for 12 banks and the time period 1992/6–2001/9. *NPL* and *Maturity* are included in the next specifications due to non-availability of data before 1995. Regressions are pooled OLS with standard errors robust to heteroskedasticity and within cluster correlation. *p*-values are in parentheses

	Audit		No audit					
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
<i>NPL</i>		-1.165** [0.035]	-1.143** [0.035]			-0.426 [0.534]	-0.428 [0.553]	
<i>Maturity</i> * <i>DI_mat</i>		-0.169 [0.311]	-0.133 [0.441]	-0.127 [0.448]		-0.827** [0.013]	-0.855*** [0.003]	-0.797*** [0.003]
<i>Maturity</i> * <i>DD_mat</i>		0.128 [0.635]	0.066 [0.836]	0.071 [0.822]		-0.399* [0.093]	-0.343 [0.152]	-0.289 [0.225]
<i>Earnings</i> * <i>Maturity</i> * <i>DI_mat</i>			0.008 [0.453]	0.008 [0.429]			-0.03** [0.037]	-0.034** [0.028]
<i>Earnings</i> * <i>Maturity</i> * <i>DD_mat</i>			-0.022 [0.261]	-0.023 [0.197]			0.018 [0.535]	0.016 [0.594]
<i>NPL</i> * <i>After Banks Act</i>				-1.285 * [0.059]				-1.536* [0.062]
<i>NPL</i> * <i>Before Banks Act</i>				-0.709 [0.492]				0.971 [0.206]
<i>Earnings</i>	0.044 [0.303]	0.022 [0.726]	0.017 [0.795]	0.012 [0.853]	0.225*** [0.001]	0.257*** [0.000]	0.208*** [0.007]	0.190*** [0.008]
<i>GS</i>	0.076 [0.268]	0.054 [0.431]	0.050 [0.473]	0.043 [0.532]	-0.047 [0.607]	0.086 [0.376]	0.072 [0.474]	0.024 [0.768]
Constant	0.048 [0.918]	0.095 [0.865]	-0.012 [0.983]	-0.027 [0.961]	0.820* [0.060]	0.582 [0.228]	0.540 [0.286]	0.543 [0.284]
Observations	166	101	101	101	167	98	98	98
Adjusted R-squared	0.000	-0.010	-0.014	-0.023	0.090	0.158	0.161	0.193

Asterisks indicate significance at the 10% (*), 5% (**) and 1% (***)

Table 6 The impact of reporting lags. The table displays the results for the event window $(-1, 0)$. The dependent variable is the Cumulative Abnormal Returns (*CAR*). The sample is split according to the length of the reporting lags of financial statements with a median threshold of 40 days. *NPL* is defined as quarterly changes in Non-performing Loans/Total Loans, *Maturity* as quarterly changes in gaps in months, and *GS* as quarterly changes in Government Securities/Total Assets. *Earnings* is defined as yearly (same quarter of the preceding year) changes in Net Income before Extraordinary Items/Market Value of Equity. *DI_mat* denotes the dummy variable, equal to 1, if interest rates are expected to increase, and *DD_mat* if they are expected to decrease. To calculate the sign of the interest rate expectations, we take the sign of the ex-post 3-month change in the average deposit interest rates. *After Banks Act* denotes the dummy equal to 1 after the introduction of the new Banks Act, 0 otherwise and *Before Banks Act* equal to 1 before the introduction of the new Banks Act. Specification 1 covers the full sample for 12 banks and the time period 1992/6–2001/9. *NPL* and *Maturity* are included in the next specifications due to non-availability of data before 1995. Regressions are pooled OLS with standard errors robust to heteroskedasticity and within cluster correlation. *p*-values are in parentheses

	Longer reporting lags				Shorter reporting lags			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
<i>NPL</i>		-0.772 [0.161]	-0.845 [0.140]			-0.421 [0.484]	-0.368 [0.554]	
<i>Maturity</i> * <i>DI_mat</i>		-0.065 [0.688]	-0.049 [0.769]	-0.033 [0.840]		-1.292*** [0.000]	-1.213** [0.026]	-1.278*** [0.010]
<i>Maturity</i> * <i>DD_mat</i>		-0.254 [0.120]	-0.367* [0.068]	-0.332* [0.084]		0.348 [0.240]	0.371 [0.216]	0.377 [0.199]
<i>Earnings</i> * <i>Maturity</i> * <i>DI_mat</i>			0.003 [0.747]	0.003 [0.742]			-0.008 [0.803]	-0.003 [0.910]
<i>Earnings</i> * <i>Maturity</i> * <i>DD_mat</i>			-0.034 [0.167]	-0.037 [0.140]			-0.013 [0.496]	-0.016 [0.395]
<i>NPL</i> * <i>AfterBanksAct</i>				-1.276** [0.040]				-1.086 [0.149]
<i>NPL</i> * <i>Before Banks Act</i>				-0.112 [0.910]				1.222 [0.363]
<i>Earnings</i>	0.055 [0.179]	0.000 [0.996]	0.007 [0.917]	-0.002 [0.976]	0.159** [0.015]	0.163** [0.016]	0.166** [0.014]	0.151** [0.021]
<i>GS</i>	-0.016 [0.837]	0.123* [0.090]	0.116 [0.159]	0.108 [0.157]	0.110 [0.207]	0.099 [0.406]	0.097 [0.424]	0.049 [0.671]
Constant	-0.062 [0.898]	-0.474 [0.330]	-0.454 [0.360]	-0.469 [0.349]	1.034** [0.039]	0.953* [0.088]	0.912 [0.104]	0.848 [0.119]
Observations	176	121	121	121	157	78	78	78
Adjusted R-squared	-0.002	-0.005	-0.009	-0.009	0.063	0.166	0.149	0.167

Asterisks indicate significance at the 10% (*), 5% (**) and 1% (***)

stronger assumption: that the ex-post magnitude of the change is a good proxy for the expected change. For the short-reporting-lag regressions, which we argue are the more informative ones, the findings are as expected. The negative effect of the maturity mismatch on abnormal returns is larger, the larger is the expected increase in interest rates.²⁰ The results are somewhat weaker for the non-audit quarters. For regressions that comprise all quarters, results have the expected sign though they are not significant.

5 Robustness checks

In this section we first compute abnormal returns using the market model instead of the market-adjusted-return model. As the market portfolio, we use the Istanbul Stock Exchange National-100 index (ISE National-100) as before. To estimate the market model parameters, we take an estimation period of 250 days before each event. Additionally, we control for non-synchronous trading by including one lead and one lag of market returns:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \gamma R_{m,t-1} + \delta R_{m,t+1} + \varepsilon_{i,t} \quad (4)$$

We derive the estimates of daily Abnormal Returns (*AR*) using the following equation where we adjust the rate of return on the stock by subtracting the expected return from the actual return:

$$AR_{i,t} = R_{i,t} - \left(\hat{\alpha}_i + \hat{\beta}_i R_{m,t} + \hat{\gamma} R_{m,t-1} + \hat{\delta} R_{m,t+1} \right) \quad (5)$$

After computing the Cumulative Abnormal Returns (*CAR*) with the estimates of daily *ARs* over 2 days for the event window $(-1, 0)$, we re-estimate our main specifications. The estimation results are presented in Table 7 and are mainly unchanged compared to the results with *CARs* computed with the market-adjusted-return approach (Table 4). The results are even statistically stronger for *Maturity* when interest rates are expected to increase, which is significant for all specifications. On the other hand, the coefficient for *Currency* interacted with *DI_curr* (equal to 1 when the Turkish lira is expected to depreciate) is still negative but statistically insignificant.

We also estimate the market model without controlling for the lead and lagged values of market return. The estimation results using those *CARs* are similar to the results in Table 7.

The second robustness check consists of running the same regressions excluding the quarters from 2000/Q3 to 2001/Q1. Because these are the quarters when the crisis unfolded, results could be mainly driven by them. If this were the case, our evidence would simply show that investors reacted too late. The results presented in Table 8 remain similar to the ones in Table 4. To summarize, the results suggest that the market did not react too late, and was in fact monitoring the banks.

Finally, because the change in the ratio of government securities (*GS*) is not significant in any specification, we run our regressions excluding *GS*.²¹ In fact, goodness of fit measures such as the Akaike information criterion point to the models that exclude *GS* as the better fit. All our key results are robust to excluding this variable.

²⁰ To save space, we choose not to report these results, but they are available upon request.

²¹ These results are available upon request.

Table 7 Robustness/using the market model. The table displays the results for the event window $(-1, 0)$. The dependent variable is the Cumulative Abnormal Returns (CAR). The Abnormal Returns are computed using the market model. The data are quarterly. *NPL* is defined as quarterly changes in Non-performing Loans/Total Loans, *Maturity* as quarterly changes in gaps in months, *Currency* as quarterly changes in mismatch defined as FX Liabilities minus FX Assets to Total Assets and *GS* as quarterly changes in Government Securities/Total Assets. *Earnings* is defined as yearly (same quarter of the preceding year) changes in Net Income before Extraordinary Items/Market Value of Equity. *DI_mat* denotes the dummy variable, equal to 1, if interest rates are expected to increase, and *DD_mat* if they are expected to decrease. *DI_curr* denotes the dummy variable, equal to 1, when the Turkish lira is expected to depreciate and *DD_curr* if the Turkish lira is expected to appreciate. To calculate the sign of the interest rate (exchange rate) expectations, we take the sign of the ex-post 3-month change in the average deposit interest rates (exchange rates). *After Banks Act* denotes the dummy equal to 1 after the introduction of the new Banks Act, 0 otherwise and *Before Banks Act* equal to 1 before the introduction of the new Banks Act. Specification 1 covers the full sample for 12 banks and the time period 1992/6-2001/9. *NPL*, and *Maturity* and *Currency* are included in the next specifications due to non-availability of data before 1995. The last specification including *Currency* covers only 8 banks that were consistent in their reporting. Regressions are pooled OLS with standard errors robust to heteroskedasticity and within cluster correlation. *p*-values are in parentheses

	(1)	(2)	(3)	(4)	(5)
<i>NPL</i>		-0.670 [0.153]	-0.682 [0.159]		-1.373** [0.025]
<i>Maturity</i> * <i>DI_mat</i>		-0.392* [0.060]	-0.452** [0.012]	-0.431** [0.014]	-0.367* [0.087]
<i>Maturity</i> * <i>DD_mat</i>		0.001 [0.995]	-0.034 [0.853]	0.019 [0.914]	0.176 [0.413]
<i>Earnings</i> * <i>Maturity</i> * <i>DI_mat</i>			-0.022** [0.036]	-0.023** [0.036]	
<i>Earnings</i> * <i>Maturity</i> * <i>DD_mat</i>			-0.022 [0.302]	-0.026 [0.208]	
<i>NPL</i> * <i>After Banks Act</i>				-1.287** [0.036]	
<i>NPL</i> * <i>Before Banks Act</i>				0.516 [0.456]	
<i>Currency</i> * <i>DI_curr</i>					-0.202 [0.197]
<i>Currency</i> * <i>DD_curr</i>					1.269 [0.374]
<i>Earnings</i>	0.107*** [0.005]	0.099* [0.062]	0.103** [0.037]	0.091* [0.065]	0.112* [0.060]
<i>GS</i>	0.071 [0.273]	0.070 [0.293]	0.056 [0.387]	0.025 [0.685]	0.092 [0.298]
Constant	0.273 [0.395]	0.252 [0.501]	0.258 [0.488]	0.229 [0.532]	0.492 [0.298]
Observations	331	198	198	198	137
Adjusted R-squared	0.031	0.030	0.043	0.059	0.059

Asterisks indicate significance at the 10% (*), 5% (**) and 1% (***)

Table 8 Robustness/excluding crisis quarters. The table displays the results of alternative specifications for the event window $(-1, 0)$. The dependent variable is the Cumulative Abnormal Returns (*CAR*). The data are quarterly. *NPL* is defined as quarterly changes in Non-performing Loans/Total Loans, *Maturity* as quarterly changes in gaps in months, *Currency* as quarterly changes in mismatch defined as FX Liabilities minus FX Assets to Total Assets and *GS* as quarterly changes in Government Securities/Total Assets. *Earnings* is defined as yearly (same quarter of the preceding year) changes in Net Income before Extraordinary Items/Market Value of Equity. *DI_mat* denotes the dummy variable, equal to 1, if interest rates are expected to increase, and *DD_mat* if they are expected to decrease. *DI_curr* denotes the dummy variable, equal to 1, when the Turkish lira is expected to depreciate and *DD_curr* if the Turkish lira is expected to appreciate. To calculate the sign of the interest rate (exchange rate) expectations, we take the sign of the ex-post 3-month change in the average deposit interest rates (exchange rates). *After Banks Act* denotes the dummy equal to 1 after the introduction of the new Banks Act, 0 otherwise and *Before Banks Act* equal to 1 before the introduction of the new Banks Act. All specifications exclude the crises quarters from 2000/Q3 to 2001/Q1. Specification 1 displays the results for 12 banks and the time period 1992/6–2000/9. *NPL*, and *Maturity* and *Currency* are included in the next specifications due to non-availability of data before 1995. The last specification including *Currency* covers only 8 banks that were consistent in their reporting. Regressions are pooled OLS with standard errors robust to heteroskedasticity and within cluster correlation. *p*-values are in parentheses

	(1)	(2)	(3)	(4)	(5)
<i>NPL</i>		−0.885*	−0.877*		−1.372**
		[0.069]	[0.078]		[0.023]
<i>Maturity</i> * <i>DI_mat</i>		−0.409*	−0.430**	−0.417**	−0.343
		[0.070]	[0.015]	[0.015]	[0.121]
<i>Maturity</i> * <i>DD_mat</i>		−0.008	−0.029	0.020	0.169
		[0.962]	[0.872]	[0.906]	[0.412]
<i>Earnings</i> * <i>Maturity</i> * <i>DI_mat</i>			−0.021*	−0.021*	
			[0.054]	[0.057]	
<i>Earnings</i> * <i>Maturity</i> * <i>DD_mat</i>			−0.014	−0.017	
			[0.435]	[0.306]	
<i>NPL</i> * <i>After Banks Act</i>				−1.497**	
				[0.016]	
<i>NPL</i> * <i>Before Banks Act</i>				0.14	
				[0.840]	
<i>Currency</i> * <i>DI_curr</i>					−0.255*
					[0.075]
<i>Currency</i> * <i>DD_curr</i>					1.579
					[0.438]
<i>Earnings</i>	0.113***	0.108**	0.115**	0.104**	0.119*
	[0.009]	[0.045]	[0.032]	[0.050]	[0.052]
<i>GS</i>	0.037	0.042	0.033	0.005	0.037
	[0.559]	[0.532]	[0.611]	[0.930]	[0.648]
Constant	0.590*	0.639*	0.633*	0.603	0.838*
	[0.077]	[0.097]	[0.098]	[0.105]	[0.067]
Observations	308	176	176	176	121
Adjusted R-squared	0.028	0.053	0.060	0.073	0.097

Asterisks indicate significance at the 10% (*), 5% (**) and 1% (***)

6 Conclusion

In November 2000, Turkey experienced a liquidity squeeze followed by a currency crisis in February 2001. Many studies argue that the fragility of the Turkish banking system deepened the magnitude of the crisis. In this paper, we examine the monitoring ability of the market by exploring how shareholders reacted to changes in their banks' measures of financial fragility in the years leading to the crisis. Consistent with previous literature on earnings, we find that shareholders react positively to increases in earnings. More importantly, we find strong evidence of negative reactions to indicators of financial fragility such as increases in maturity mismatches and in non-performing loans, showing shareholders concerns about their impact on future profits. We also find that investors react negatively to increases in currency mismatches. However this evidence is weaker, probably due to less availability of consistent data to correctly measure the currency variable. Overall, our results provide evidence that the stock market monitored Turkish bank in the years preceding the crisis. We are also interested in how the quality and timeliness of the disclosure affect market reaction. We find that improvements in disclosure requirements, such as the Banks Act in 1999, increase the informativeness of accounting statements. Finally, we find that audited statements with larger reporting lags are not informative, pointing to the need of improving their timeliness.

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Appendix

Table A.1: Data availability for the banks

The table displays listing periods of the banks on the Istanbul Stock Exchange. The listing periods are highlighted. A delisting of a bank indicates for its bankruptcy

	1995	1996	1997	1998	1999	2000	2001
Akbank							
Alternatifbank	1995/II						
Demirbank						2000/III	
Disbank							
Esbank					1999/III		
Finansbank							
Garanti Bank							
Isbank							
Sekerbank			1997/II				
Tekstilbank						2000/I	
Yasarbank					1999/III		
Yapi ve Kredi Bankasi							

Data source: Istanbul Stock Exchange

Table A.2: Event dates for each bank

The table contains detailed information of banks' financial statement disclosure dates. Instead of bank names (Akbank, Alternatifbank, Demirbank, Disbank, Esbank, Finansbank, Garanti Bankasi, Is Bankasi, Sekerbank, Tekstilbank, Yasarbank and Yapi ve Kredi Bankasi respectively) tickers in the Istanbul Stock Exchange are used in the table. When there is no information available about the event date, and it is denoted by N/A. Tekstilbank and Yapi ve Kredi Bankasi have two additional missing event dates for 1996/II and 1997/II respectively. Blank cells explain that for Demirbank, Esbank and Yasarbank there are no data after their delisting. Alternatifbank and Sekerbank went public after 1995 and 1997 respectively. Confounding events of dividend payouts and equity issues which fall in the event window of [-5, +5] are marked in bold

	AKBNK	ALNTF	DEMIR	DISBA	ESBNK	FINBN	GARAN	ISCTR	SKBNK	TEKST	YABNK	YKBNK
1995:1	15.05.1995		02.05.1995	18.05.1995	05.05.1995	01.05.1995	01.05.1995	09.05.1995		19.04.1995	04.05.1995	18.05.1995
1995:2	01.08.1995	14.08.1995	01.08.1995	21.07.1995	31.08.1995	02.08.1995	04.08.1995	23.08.1995		08.08.1995	17.08.1995	25.08.1995
1995:3	19.10.1995	09.11.1995	20.10.1995	16.10.1995	10.11.1995	03.11.1995	30.10.1995	30.10.1995		20.10.1995	08.11.1995	06.11.1995
1995:4	12.02.1996	16.02.1996	19.01.1996	15.02.1996	21.03.1996	05.03.1996	01.03.1996	08.03.1996		18.01.1996	16.02.1996	07.03.1996
1996:1	10.05.1996	10.05.1996	19.04.1996	12.04.1996	09.05.1996	10.05.1996	09.05.1996	10.05.1996		08.05.1996	10.05.1996	10.05.1996
1996:2	12.08.1996	16.08.1996	23.07.1996	16.08.1996	13.08.1996	16.08.1996	16.08.1996	23.08.1996		N/A	21.08.1996	22.08.1996
1996:3	31.10.1996	08.11.1996	06.11.1996	08.11.1996	11.11.1996	11.11.1996	06.11.1996	11.11.1996		07.11.1996	11.11.1996	08.11.1996
1996:4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1997:1	13.05.1997	14.05.1997	13.05.1997	12.05.1997	13.05.1997	13.05.1997	07.05.1997	12.05.1997		13.05.1997	13.05.1997	12.05.1997
1997:2	14.08.1997	27.08.1997	14.08.1997	28.08.1997	19.08.1997	22.08.1997	14.08.1997	14.08.1997		05.09.1997	19.08.1997	N/A
1997:3	04.11.1997	10.11.1997	07.11.1997	12.11.1997	10.11.1997	06.11.1997	04.11.1997	10.11.1997		01.11.1997	06.11.1997	10.11.1997
1997:4	16.03.1998	11.02.1998	27.02.1998	16.02.1998	28.01.1998	03.03.1998	17.02.1998	02.03.1998		20.01.1998	13.03.1998	13.03.1998
1998:1	29.04.1998	11.05.1998	06.05.1998	02.05.1998	11.05.1998	24.04.1998	13.05.1998	13.05.1998		13.05.1998	11.05.1998	13.05.1998
1998:2	01.10.1998	29.09.1998	06.10.1998	01.10.1998	05.10.1998	05.10.1998	05.10.1998	01.10.1998		07.10.1998	01.10.1998	05.10.1998
1998:3	26.10.1998	04.11.1998	26.10.1998	14.10.1998	12.11.1998	02.11.1998	22.10.1998	13.11.1998		16.10.1998	10.11.1998	09.11.1998
1998:4	17.02.1999	09.02.1999	17.02.1999	12.01.1999	04.02.1999	15.02.1999	11.02.1999	26.02.1999		11.01.1999	09.03.1999	05.03.1999
1999:1	27.04.1999	03.05.1999	15.04.1999	14.05.1999	13.05.1999	05.05.1999	26.04.1999	10.05.1999		29.04.1999	13.05.1999	07.05.1999
1999:2	09.08.1999	18.08.1999	11.08.1999	20.07.1999	27.08.1999	05.08.1999	29.07.1999	13.08.1999		27.07.1999	27.08.1999	14.08.1999
1999:3	21.10.1999	10.11.1999	03.11.1999	11.10.1999	12.11.1999	09.11.1999	20.10.1999	12.11.1999		20.10.1999	03.11.1999	27.10.1999
1999:4	15.02.2000	18.01.2000	03.02.2000	12.01.2000	12.01.2000	21.02.2000	28.01.2000	15.02.2000		12.01.2000	31.03.2000	25.02.2000
2000:1	02.05.2000	28.04.2000	18.04.2000	10.04.2000	10.05.2000	10.05.2000	21.04.2000	05.05.2000		19.04.2000	02.05.2000	02.05.2000
2000:2	24.08.2000	18.08.2000	14.08.2000	07.08.2000	18.08.2000	18.08.2000	17.08.2000	15.08.2000		18.08.2000	23.08.2000	23.08.2000
2000:3	31.10.2000	09.11.2000	01.11.2000	01.11.2000	08.11.2000	08.11.2000	02.11.2000	13.11.2000		09.11.2000	10.11.2000	10.11.2000
2000:4	13.02.2001	28.02.2001	22.01.2001	22.01.2001	22.02.2001	22.02.2001	05.02.2001	15.02.2001		20.02.2001	19.02.2001	19.02.2001
2001:1	19.04.2001	11.05.2001	01.05.2001	01.05.2001	30.04.2001	30.04.2001	11.05.2001	11.05.2001		11.05.2001	11.05.2001	11.05.2001
2001:2	07.08.2001	24.08.2001	14.08.2001	14.08.2001	14.08.2001	24.08.2001	24.08.2001	15.08.2001		24.08.2001	24.08.2001	24.08.2001
2001:3	30.10.2001	09.11.2001	15.10.2001	15.10.2001	09.11.2001	09.11.2001	09.11.2001	09.11.2001		09.11.2001	09.11.2001	09.11.2001

Data source: Istanbul Stock Exchange

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