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Run on Continental Illinois**

Mark A. Carlson and Jonathan D. Rose

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Can a Bank Run Be Stopped?

Government Guarantees and the Run on Continental Illinois

Mark Carlson**
Jonathan Rose*

Abstract

This paper analyzes the run on Continental Illinois in 1984. We find that the run slowed but did not stop following an extraordinary government intervention, which included the guarantee of all liabilities of the bank and a commitment to provide ongoing liquidity support. Continental's outflows were driven by a broad set of US and foreign financial institutions. These were large, sophisticated creditors with holdings far in excess of the insurance limit. During the initial run, creditors with relatively liquid balance sheets nevertheless withdrew more than other creditors, likely reflecting low tolerance to hold illiquid assets. In addition, smaller and more-distant creditors were more likely to withdraw. In the second and more drawn out phase of the run, institutions with relative large exposures to Continental were more likely to withdraw, reflecting a general unwillingness to have an outsized exposure to a troubled institution even in the absence of credit risk. Finally, we show that the concentration of holdings of Continental's liabilities was a key dynamic in the run and was importantly linked to Continental's systemic importance.

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** Board of Governors of the Federal Reserve and Bank for International Settlements. Mark.carlson@bis.org

* Board of Governors of the Federal Reserve. Jonathan.d.rose@frb.gov.

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1 Introduction

Continental Illinois (Continental) was a major US commercial bank that experienced a massive and widely publicized run by its short-term creditors in May 1984.¹ Out of fear that Continental's failure would have broad fallout in the financial system, the Federal Reserve and the FDIC provided funding to the bank, and the FDIC put in place an exceptional guarantee of all of the bank's creditors (FDIC 1997, 1998). About two months later the FDIC essentially took over the bank to rehabilitate it. Eventually, Continental was recapitalized and reprivatized; previous shareholders were wiped out and the FDIC absorbed serious losses. This episode is well known for elevating the neologism "Too Big to Fail" in public consciousness and prompting a national discussion about very large banks.²

In this paper, we study the run on Continental and the impact of the government response, particularly the FDIC's guarantee of all bank liabilities. To do so, we use a remarkable data set, comprising daily data on broad aggregates of Continental's liabilities and monthly data on funding provided by a large number of individual creditors. The daily data quickly reveal that the run on Continental was immense and extremely swift. In just 9 days, 30 percent of the firm's previous funding left and was replaced by new funds from the government and a support coalition of private banks. To put the speed of these withdrawals in perspective, Rose (2014) finds that during 2008 the most severe runs on traditional banks affected Washington Mutual and IndyMac. Washington Mutual lost 10 percent of its deposits and IndyMac lost about 8 percent, each in about two weeks. Thus, even in a more digital, seemingly faster moving era, these runs were less dramatic than the one on Continental, while still severe enough to lead to the seizure of both institutions by the FDIC.

¹ We generally use the phrase "Continental" to refer to the entire bank holding company, Continental Illinois Corporation (CIC). The main subsidiary of CIC was Continental Illinois National Bank, which held the great bulk of CIC's assets. Where specificity is needed we refer specifically to the holding company or the bank subsidiary.

² The connection between the bailout of Continental and the origins of the phrase "too big to fail" in the bank regulatory lexicon may have arisen during Comptroller of the Currency Conover's testimony on September 19, 1984 to the House subcommittee on Financial Institutions, Supervision, Regulation, and Insurance. In the session, Congressman St Germain asked Conover whether he could foresee letting one of the eleven international money center banks fail and Conover admitted that, in the absence of a way of handling a large bank subsequent to its failure, he could not. Congressman McKinney promptly labeled these large banks as "too big to fail" (Conover 1984, p. 300). The press had been using the phrase "too big to fail" since at least July 1984, but this is often considered the first time a government official indicated that large banks might not be allowed to fail.

The daily data show that the run on Continental proved hard to arrest. The run slowed but did not stop after the government's announcement of support in May. Continental's funding did not stabilize until the permanent support program was put in place in July, at which point almost half of its funding was being provided by the government. After that, the bank was finally able to raise more private funds, on net. These dynamics raise the question of what incentives creditors had to run. Previous studies of runs have largely focused on the incentives shaped by deposit insurance or on information from social networks, as those studies have generally examined household depositors, often at small savings banks (Brown, Guin, and Morkuetter (2013), Kelly and Ó'Gráda (2000), Ó'Gráda and White (2003), and Iyer and Puri (2012)). In contrast, Continental raised a great part of its funding from creditors who were large and sophisticated. Many invested more than \$1 million in Continental at a time when the deposit insurance limit was \$100 thousand. As a result, to understand the decision to run, we focus on the financial condition and business models of the counterparties, rather than deposit insurance or social networks.

With the monthly data we are able to characterize the types of creditors that were more likely to run. The run was driven importantly by a broad set of US and foreign financial institutions. We gather additional information about the financial condition of the US depositories in the data set in particular, and estimate a set of simple models to predict which were likely to withdraw large amounts. We examine whether their withdrawal patterns were associated with indicators related to desires for liquidity, fear of losses, or fear of contagion. Early on, in the run that occurred during May, we find little support that fear of losses drove runs, as measures of the size of direct exposures have little relation to withdrawals. Instead, creditors that held relatively greater amounts of liquid assets on their books and were less dependent on funding from wholesale markets were more likely to withdraw large amounts, which suggests that liquidity preferences played a role. These results suggest that efforts to bolster the liquidity condition of individual institutions may improve the safety of those institutions, but it does not necessarily follow that those institutions will be more likely to be a source of stability during a stress situation. In addition, we find that more profitable and smaller creditors were more likely to withdraw.

After May, the data exhibit a different pattern. Unlike during the initial run, we find some evidence that banks with higher exposures to Continental (relative to their own assets) were more likely to mitigate those exposures by withdrawing. This finding indicates that, even though Continental was reportedly paying above market rates on its liabilities, many creditors did not feel like they were being adequately compensated for holding onto more substantial exposures to Continental. It could be that creditors were still concerned about potential losses, despite the protection offered by the FDIC, or were concerned about “headline risk” should they be identified as having a larger exposure to the troubled bank. In addition, in both periods more physically distant banks tended to withdraw more funds from Continental, perhaps revealing information about the quality of geographically proximate creditors’ relationships with Continental.

The last part of this paper describes how the concentration of funding in a small number of large accounts had important implications in this episode. While a broad set of creditors withdrew funds from Continental, the outflows were quite concentrated among the largest creditors. For example, Continental’s largest 25 creditors as of April 1984 withdrew about \$2 billion from April to August, roughly 6 percent of the bank’s total liabilities and about 30 percent of the total withdrawals. Each of these large creditors was owed tens or hundreds of millions of dollars, far above the insurance limit. Such large short-term creditors have long played key roles in deposit runs, and deserve special focus in planning for potential future crises.

Even if the government support did not stop the funding drain on Continental, it does appear to have been important in preventing serious spillovers to other institutions and thus in containing the crisis. Some of the largest providers of funding for Continental were money market mutual funds. It is highly likely that these institutions would have suffered losses and “broken the buck” in the event that Continental had been allowed to fail. As money market funds were important providers of funds to many other large financial institutions, even at this time, problems at money market funds would likely have had systemic consequences.³ The

³ While it is not clear that any difficulties would have approached the troubles that occurred in the wake of the Lehman Brothers bankruptcy and the “breaking of the buck” by Reserve Fund, it is likely that there would have been significant dislocations.

funding data also indicate that several large banking institutions had significant exposures to Continental and that these institutions may have faced significant losses.

These findings have important lessons for policymakers. In response to crises, one tool governments can employ is to guarantee the liabilities of financial institutions; scholars have studied such actions and found mixed evidence on their effectiveness (Ingves and Lind 1996, Estrella 2001, Shin 2009, McCabe 2010). Our results suggest that a guarantee of liabilities may not always be effective in stabilizing the funding of troubled institutions. Relatedly, in the future, one method for dealing with an insolvent but systemically important depository institution could be for the FDIC to place it into a special type of receivership, using its new Orderly Liquidation Authority. This type of receivership is intended to provide for the resolution of a firm in the long run, and the preservation of the firm's systemically important operations in the short run. Under such circumstances, an important question is whether the FDIC would be able to convince short-term creditors to stay. Continental's experience suggests that obtaining sufficient financing from private sources to keep the firm operating while in receivership may be difficult.

The paper proceeds as follows. Section 2 provides an overview of the crisis at Continental. Section 3 discusses the dynamics of various deposit aggregates during the crisis and section 4 examines the composition of creditors and which creditors were more likely to run. In section 5 we discuss the responses to the FDIC guarantee along with how the responses compared to other instances of government support. Section 6 discusses the distribution of liabilities, and the role that concentration played in the run and in shaping Continental's systemic importance. Section 7 concludes.

Section 2. Overview of the 1984 Crisis at Continental Illinois

Continental was the eighth largest bank in the United States in 1984, following rapid growth over the previous several years. Continental's troubles began on the asset side, as the credit quality of Continental's loans to oil and gas companies deteriorated in the early 1980s. Some of these loans had been acquired from Penn Square Bank, which failed in 1982. Market participants also became concerned about Continental's loans to entities in developing countries in the Americas, particularly after Mexico's default in 1982. Because of

these developments, Continental's poor earnings release in April 1982 was taken badly by market participants. The release contributed to downgrades of its credit and debt ratings by rating agencies later that year, and also to downgrades by stock analysts of its earnings estimates.⁴ This scrutiny created difficulties on the bank's liability side as well. Continental had always been limited in its retail deposit network, since Illinois law forbade any branching. To fund its expansion, the bank aggressively competed for wholesale deposits. After Penn Square's failure, Continental increasingly raised funds in the Eurodollar market rather than in the domestic commercial paper market, and its funding costs increased.⁵ This change in the mix of Continental's funding may have left the bank with creditors that were more likely to run later on.

Table 1 shows the degree to which the bank had funded its expansion by aggressively competing for wholesale deposits, rather than by the means of a retail banking business. The table reports a simple breakdown of Continental's liabilities at the end of the first quarter of 1984. The bank was particularly dependent on foreign deposits (typically eurodollar deposits) which accounted for more than 40 percent of the bank's liabilities, nearly twice the amount of domestic deposits. (Note that both domestic and foreign creditors supplied money to Continental through the eurodollar market.) Continental maintained correspondent relationships with a large number of domestic banks and held significant balances connected to these relationships. Continental also provided a variety of services to institutions involved with Chicago financial markets, and some of those institutions maintained balances with Continental in connection with those services. Additionally, Continental funded itself with a moderate amount of funds purchased on the federal funds and repo markets.

Continental's insurance coverage for its deposits was quite low, with only around 15 percent of deposits insured by the FDIC. The low coverage was due to Continental's reliance on foreign deposits, which are not eligible for FDIC insurance, and the fact that only about 40 percent of its domestic deposits were covered by the insurance.⁶ Moreover, Continental had a substantial number of other domestic liabilities that were not covered by insurance.

⁴ Moody's rated the firm Aaa in 1981 but only A3 in 1983 (Moody's Investor Service 1981 and 1983).

⁵ This paragraph draws on FDIC (1997, 1998) and US Congress (1984), pp. 54-57.

⁶ The most recent insurance coverage information prior to the May 1984 run is from the June 1983 FFIEC Call Report.

Table 2 compares Continental with the other banks comprising the largest 20 in the country, by assets, as of March 1984. The table indicates credit quality problems at Continental, with elevated delinquency rates, charge-off rates, and provisioning for future losses, as well as lower profitability. Continental's reliance on foreign funds and on fed funds and repos were also elevated compared to its peers. The average interest rates it paid for its funds is about in line with this set of peers, though.

Starting about May 7, 1984, rumors circulated that the bank could fail or be forced to seek a merger.⁷ On Tuesday May 8, 1984, this rumor, along with a denial by Continental, appeared in Dow Jones Capital Markets Reports. These articles reportedly made financial market participants even more concerned about the financial health of Continental and precipitated a sudden and rapid run on the bank.⁸ Consequently, Continental's funding situation deteriorated as investors either refused to roll over eurodollar deposits or demanded significantly higher rates for renewal. Continental also had difficulty placing large CDs, and investors holding outstanding CDs reportedly tried to dump them in the secondary market (Bailey and Zaslow 1984). To address its funding problems, Continental turned increasingly to the discount window (FDIC 1997, Kilborn 1984, Rowe 1984).

In response, the banking industry rallied to support Continental. On Monday, May 14, Continental announced that 16 of the nation's largest commercial banks had agreed to provide the firm with \$4.5 billion in short-term credit (Bailey, Carrington, and Hertzberg 1984).⁹ This action was reportedly taken in part to shore up the confidence of financial market participants, especially overseas investors, and prevent the crisis from spreading. There were some indications that the provision of this facility eased general conditions; interest rates retreated somewhat and the Wall Street Journal reported that markets for managed deposits were calmer (Bailey, Helyar, and Hertzberg 1984). However, other reports indicated that the run on

⁷ Prior to this, the most recent piece of news came in late April 1984, when Continental's announcement of an increase in nonperforming loans may have increased investor concerns.

⁸ For example, The Wall Street Journal reported that "at one point word was spreading at the Chicago Board of Trade that Continental's traders had been abruptly called off the floor at the same time Continental's traders were in prominent view on the other side of the bond trading pit" (Bailey and Zaslow 1984).

⁹ Reports from the time widely noted that the Federal Reserve had a tacit role in the formation of this coalition, by providing private assurances to the coalition members that Continental would be able to borrow up to \$17 billion from the discount window based on collateral already on deposit with the Chicago FRB. See Rowe (1984b) and Bennett (1984). The Federal Reserve's first public statement regarding Continental came on May 17.

Continental continued as foreign depositors refused to renew CDs and Continental's sources for eurodollar funding were being withdrawn (FDIC 1997; Sprague 1986, p.154).

On Thursday May 17, continuing pressures on Continental led the FDIC, Federal Reserve, and the Office of the Comptroller of the Currency to create a temporary assistance plan, announced in a joint news release. This program was a combined effort by these regulatory agencies and commercial banks. Most importantly, the FDIC announced that it would guarantee all deposits and general creditors of Continental.¹⁰ The press release stated the FDIC's guarantee clearly, but briefly and with few details:

In view of all the circumstances surrounding Continental Illinois Bank, the F.D.I.C. provides assurance that, in any arrangements that may be necessary to achieve a permanent solution, all depositors and other general creditors of the bank will be fully protected and service to the bank's customers will not be interrupted.

This guarantee was particularly important given Continental's low level of insurance coverage; the FDIC (1998) reported that at this point, Continental had about \$3 billion of insured liabilities and \$30 billion of uninsured liabilities. The guarantee covered all the creditors, including the uninsured liabilities. Liabilities of the bank holding company excluding the bank were not covered, although these were generally small.¹¹

In the same press release, the FDIC also announced an injection of \$2 billion into the bank in the form of subordinated notes provided by itself and a group of commercial banks. The Federal Reserve stated that it would meet extraordinary liquidity needs, without many further details. Finally, the \$4.5 billion short-term credit facility from 16 commercial banks, which had been initiated on May 14, was replaced by a \$5.3 billion line of credit to Continental from a consortium of 24 banks. The bank support coalition eventually expanded to 28.

The regulators stated that the assistance package and guarantee were needed to maintain confidence and prevent the run on Continental from spreading to other large banks (Conover

¹⁰ Before Continental, we know of one instance in which the FDIC gave an explicit general guarantee of all creditors to a depository institution: Greenwich Savings Bank in 1982 (see p. 223 of the FDIC (1997), chapter 6). Nevertheless, Continental's guarantee was of much greater significance given Continental's size and systemic importance. In other instances prior to Continental and Greenwich the FDIC had provided open bank assistance to troubled institutions. This assistance involves capital injections, therefore providing protection to the general creditors of the institutions being assisted, but not explicit guarantees.

¹¹ Moody's reports that at the end of 1983, liabilities of the consolidated company were \$40.3 billion of which nonbank subsidiaries accounted for \$1.2 billion.

1984, and Volcker 1984). Of particular concern was that the run on Continental would cause funding problems at other large institutions. The chair of the FDIC argued that “the funding problem at Continental was beginning to affect financial markets generally. Something needed to be done quickly to stabilize the situation” (Isaac 1984, p. 459). FDIC Board Member Irvine Sprague reported that regulators believed the collapse of Continental would cause funding difficulties at other large banks which in turn would likely bring down two large (unnamed) institutions (Sprague 1986, p. 155). These concerns were reportedly reflected in market data; Bailey and Zaslow (1984) reported a widening of spreads between rates on Treasury Bills and bank CDs for banks other than Continental.¹² Further, Continental had numerous correspondent banks and the FDIC maintained that the deposits of these smaller banks needed to be guaranteed to keep these institutions from failing (Conover 1984, FDIC 1997). Isaac (1984, pp. 470-474) noted that even if some of the smaller banks might not have failed had Continental closed, they might have experienced liquidity problems and decreased profitability while Continental was being liquidated.

The initial response by regulators and other commercial banks was meant to assure investors that there would be sufficient capital, liquidity, and time to arrange an orderly resolution. It did appear to calm markets for a time, as we will document in the next section. However, starting in late June, concerns gradually re-emerged about the viability of Continental and the bank experienced renewed outflows of deposits. On July 26, federal regulators announced a permanent assistance plan (FDIC 1998). Under this plan, the FDIC acquired \$1 billion in preferred stock in Continental’s holding company (an 80 percent stake), with the ability to convert these shares into common stock at a later date. The FDIC also assumed Continental’s liabilities to the discount window, which had been hovering between \$2 billion and \$4 billion, and in return received an equal amount of loans held by Continental in its asset portfolio, along with an option to buy stock in Continental at a rate that depended on the recovery rate on the loans. The Federal Reserve also agreed to continue to provide liquidity assistance (and the commercial banks continued to extend a line of credit). The permanent assistance plan was put

¹² Similarly, Goldsmith-Pinkham and Yorulmazer (2010) find that when the British bank Northern Rock experienced a run that other banks paid more for their money market and interbank liabilities, especially those more depending on money market funding.

into place in September, and was successful in preventing Continental from being closed. Discount window borrowings by the bank edged up briefly following the July announcement, but then declined steadily as the firm was able to use market sources to a greater extent. Financial markets remained orderly. However, the assistance plan was one of the most expensive ever arranged by financial regulators at the time: the FDIC estimated its cost for the bailout at \$1.1 billion and Continental's shareholders were essentially wiped out.¹³

Section 3. The run by type of liability

Daily data on Continentals' liabilities from May 8 to August 29, 1984, presented in Figure 1, show the timing of the outflows on an aggregate basis.¹⁴ Between the end of 1983 and May 8, there had been only a slight decline in Continental's liabilities. Once the run started, though, private sector funding dropped quickly: between May 8 and May 17, private sector funds declined by about \$10 billion, or about 30 percent of Continental's liabilities. Private sector funds were largely replaced with funds from the government—either the FDIC or the Federal Reserve—and from the support collation of large banks.¹⁵ Altogether, this support quickly totaled almost \$9 billion (in addition to funds that the banks in the support coalition had already been supplying Continental).

These data show that the announcement of the interim support package arrested the steep run-off in deposits, as non-support liabilities were roughly stable for a while. However in late June and early July there was a renewed decline. Between May 17 and July 26, when the permanent assistance program was announced, non-support liabilities declined by another \$7 billion. Support by the government and bank coalition increased only \$3.6 billion, so that total liabilities contracted. Even after the announcement of permanent support, non-support liabilities continued to decline, but more modestly. At the end of August, the amount of non-support and support liabilities were nearly equal. Altogether, between May 17 and August 29, non-support

¹³ If its losses exceeded \$800 million, the FDIC's call option allowed it to purchase all 40.3 million of the holding company's outstanding stock shares at a price of \$0.00001 per share, or about \$400. The FDIC ended up exercising this option.

¹⁴ This information was presumably provided to the Federal Reserve as part of the monitoring of the firm.

¹⁵ The members of the support coalition identified themselves publicly. The 28-member coalition ultimately comprised the largest 20 commercial banks outside of Continental, and 8 additional banks.

liabilities declined \$9 billion, almost as much as during the initial run. Thus, while the FDIC guarantee clearly slowed the withdrawal of funds, it also clearly did not completely convince creditors to remain.

Figure 2 shows more detail regarding the composition of the decline in private, non-coalition liabilities. All types of liabilities declined during the run on Continental. The steepest drop occurred in federal funds purchased and reverse repurchase (repo) transactions, which contracted 77 percent.¹⁶ Offshore and domestic deposits also both declined during the initial run. Following the interim support announcement, the fed funds and repo liabilities rebounded and then stabilized somewhat. Deposits continued to decline after the interim support announcement, especially offshore deposits, though at a slower pace than during the initial run.¹⁷ After the announcement of the permanent assistance package, domestic deposits, fed funds, and repo liabilities stabilized, but offshore deposits declined a bit more.

Section 4. Composition of creditors and runners

To analyze the composition of creditors, and gain insights into which ones were most likely to run, we also have data on the individual liability holdings of nearly 600 institutions at a month-average frequency during 1984.¹⁸ The list was compiled by Continental's Treasury Services Division. (For brevity, we refer to these as the CTS reports.) It is not a complete list of all creditors, and the selection process is unknown to us, but the list evidently comprises a group that Continental's Treasury department deemed important enough to track with a monthly report. Most likely, this is a list of the institutions who provided Continental with largest amounts of funding in 1984 or in recent years. We view our data as most representative of large depositors that are least likely to be insured and most likely to run, and which are the types of depositors of most interest to us in this investigation.

¹⁶ Many Eurodollar deposits had 3-month maturities, which could affect the rate at which this type of funding dropped. However, a House of Representatives Staff Report (House of Representatives 1984) found that in some cases Continental was forced to prepay such deposits.

¹⁷ Domestic deposits includes items such as demand deposits, retail savings, commercial certificates of deposit, and commercial time deposits.

¹⁸ Our data on the liabilities of Continental are from a memorandum provided by the Continental's Treasury Services Division entitled "January, 1985 CICorp Funding Concentration Report." This memorandum was included in the bank examination reports at the Federal Reserve Bank of Chicago.

We estimate that liabilities to these creditors accounted for at least one-third of Continental's total liabilities.¹⁹ For each month in 1984, the documents give the average amount of funding provided by each of the creditors. The data cover all types of funding provided to Continental from these creditors, including domestic and foreign deposits, federal funds, commercial paper, discount window loans, and other forms. Not every creditor in the panel contributed to funding Continental in every month. Rather, in any given month, Continental typically had nonzero liabilities to about 350 to 450 institutions listed in the report.

Section 4.1 Types of creditors

We report the distribution of funding provided by the creditors in the CTS panel by type of institution in Table 3. The types are the U.S. government and its agencies, domestic banks in the support coalition, foreign banks, money market institutions, foreign governments and official institutions, domestic banks not in the support coalition, nonfinancial corporations, savings and loans, and other customers (primarily state and municipal governments). Just prior to the run, in April 1984, the most numerous group was domestic banks which, when including both those in and outside the support coalition, accounted for a bit less than 25 percent of the liabilities. Foreign banks were the largest by amount, accounting for a bit more than 30 percent of the liabilities, and also had the highest average balance. Money market institutions (money funds, brokers, and investment banks) and foreign governments were also important funding sources for Continental and provided 18 percent of the funding covered in the CTS reports. A fairly sizeable number of corporations maintained balances at Continental, though these balances were generally of more modest size. Rounding out the sample are savings and loan associations and other customers, which primarily consists of municipalities.

Table 3 also shows how the positions of Continental's major short-term creditors changed between April, May, and August 1984. Across the whole period, from April to August,

¹⁹ Comparing these data to aggregates for the holding company filed in the Y9-C report form, we estimate the CTS documents capture the bulk of federal funds borrowings and about 65 percent of offshore deposits. In other areas, the CTS documents capture less, such as the domestic deposit market where our data cover only about 20 percent of the roughly \$7 billion in domestic deposits. Finally, as over 95 percent of the liabilities of the holding company were consolidated into the commercial bank, most of the liabilities covered in our data reflect liabilities of the bank (and thus were covered by the FDIC's guarantee).

Continental gained \$10 billion from federal government entities and the 28-bank coalition, but lost \$7 billion from the other private creditors identified in the CTS reports. (Note that these data capture all of the institutions in Continental’s public and private support coalitions, but cover only a portion of the institutions withdrawing funds.) Each group of the non-support-coalition creditors withdrew funds to some extent. The Table shows that foreign banks, foreign governments and official institutions, and other customers withdrew a bit less than the other groups, in the aggregate. There was some tendency for the groups that withdrew at a slower pace in the initial run to withdraw more quickly in the latter period. Nevertheless, by August all groups had withdrawn quite significant amounts, with the exception of the other customers group who, as municipal creditors primarily, may have been assured by collateral that was posted against their deposits, a typical practice for municipal deposits.²⁰

Section 4.2 Outflows in a cross section of banks

In this section, we further investigate the funding outflows by assessing whether creditors with certain characteristics were more likely to make large withdrawals. We focus on domestic banks, as we are able to obtain detailed financial information on those institutions from regulatory filings.²¹

As a first step, we match as many domestic banks from the CTS reports as possible to data from the Reports of Income and Condition (Call Reports) on those institutions from the Federal Financial Institutions Examination Council (FFIEC). We are able to match nearly every domestic bank not in the support coalition listed in the CTS reports to the call report data (we match 128 of the 136 domestic banks that provided nonzero funding to Continental in April or

²⁰ Similar patterns are also apparent when we examine withdrawal behavior at individual institutions. For example, we ran a simple probit regression (not shown) of a dummy variable—indicating a withdrawal of more than 50 percent from April to May—on dummies for each institution type. The results suggest that foreign banks, foreign and other customers were about 20-30 percentage points less likely to withdraw than the omitted group, domestic banks, and that money market institutions, savings and loans, and corporations had average withdrawal rates not statistically significantly different than domestic banks.

²¹ We also gathered information on savings and loans, with a sample of 19 such institutions that supplied more than \$300 thousand to Continental as of April. However, the financial information collected from savings and loans in this period differed materially from the information collect from commercial banks. As a result, the independent variables we use in our analysis are not homogenously generated, and some variables cannot be constructed at all for the savings and loans. As a result we do not use these observations in the analysis below, and do not report the results for these institutions separately as the sample is too small for robust analysis.

May 1984).²² When analyzing the run from April to May, we exclude 19 banks that provided \$300,000 or less in funding to Continental in April (to ensure that we are capturing the behavior of institutions whose incentives might have been affected by the deposit insurance limit, which was \$100,000 at the time). This leaves a sample of 109 banks for the initial run period.²³

As outcome variables, we look at measures of funding withdrawals. We examine the period of April to May separately from May to August.²⁴ We take the reaction in the first period as capturing primarily the response during the initial run period before the government response, while the second period captures the response during the more protracted run in subsequent months. Since our data are monthly-average data, some portion of the change from April to May will reflect movements during the first few days of May, before the initial run.

The withdrawal behavior across banks from April to May is summarized in Table 4 and also depicted in Figure 3. The median bank withdrew about 40 percent of their funds in Continental, with the rest of the banks fairly evenly distributed around that figure. However, there is a cluster of banks that withdrew 90 percent or more of their funds, and there are also some banks that increased their funding, leading to highly negative measures of percent withdrawn. For example, as shown in Table 4, at the most extreme one creditor had a negative 1375 decrease in funding (i.e. a 1375 percent increase) from April to May.²⁵

To put these monthly-average withdrawal rates in perspective, consider a hypothetical creditor who withdrew 100 percent of their funds on May 9th but otherwise made no changes during April or May. The monthly-average data would record a 74 percent withdrawal for such a creditor from April to May. Thus, larger rates of withdrawal of 75 percent or more could be

²² The few we could not match are the result of ambiguity of some of the names. For example, a common bank name such as “Bank of Commerce” without any information on its location could refer to many different banks.

²³ Nevertheless, the results are generally robust to including the 19 banks that provided positive funding equaling \$300,000 or less to Continental.

²⁴ We also looked at withdrawals from January 1984 to April 1984 but did not find any association between bank characteristics at the end of 1983 and withdrawals. Moreover, few institutions completely removed funding from Continental during that period, and we find that there is little correlation between changes in funding between January and April and subsequent withdrawals. More aggregated, at the institution type level, the fractions of different institution types that reduced funding were roughly proportional to their shares in the overall funding base. These results are consistent with the run being sudden and generally unexpected.

²⁵ Technically, a few observations exhibit small negative balances with Continental. In practice, we consider these to be observations of zero funding, because we are not interested in capturing dynamics from whatever financial arrangement the negative balances indicate.

recorded if the creditor edged down deposits in the beginning of May, while rates of withdrawal in the range of 90 percent would reflect significant withdrawals before the general run.

The withdrawals from May to August are a bit more unevenly distributed, with the median bank withdrawing about 85 percent of their funds. A considerable portion of our observations, about twenty five percent, withdrew all of their funds. At the other end, there are extreme outlying values in which customers increased funding, such as a negative 6275 percent decrease in funding (i.e. a 6275 percent increase) as a creditor increased its funding from a small initial level.

In our analysis, we use a median regression as our baseline specification when analyzing withdrawals in each period. The median regression framework has the benefit of not assigning undue importance to the outliers in the measure of percent withdrawn, as just discussed. As an alternative, we also construct an ordered variable based on the quintiles of withdrawals and analyze it as an outcome variable using an ordered logit approach.²⁶ We also use a probit to analyze withdrawals over thresholds of 50 and 75 percent for the first period, and 75 and 100 percent in the second period. The probit approach is similar to the one used by Iyer and Puri (2012).

We now turn to right hand side variables. Given the modest number of institutions in the sample, we also use a limited number of variables, measured as of March 31, 1984, to predict the extent to which each institution participated in the run on Continental. Summary statistics of these variables are shown in Table 4. To measure the liquidity position of the banks, we use the ratio of cash and Treasury securities to assets—an asset based measure—and the share of liabilities that consisted of large time deposits—a liability based measure.²⁷ As an indication of the solvency position of the bank, we include the ratio of equity to assets and the delinquency rate on loans; we also include the ratio of net income to equity as a measure of current profitability. To measure potential exposure to direct losses, we include the size of each bank's exposure to Continental with the total funding provided as of April 1984 divided by assets, and we take the log of this variable since a handful of banks have very large exposures. Together

²⁶ Using deciles instead of quintiles yielded identical results.

²⁷ In an alternate specification (not reported) we included the ratio of borrowing via fed fund and repos to liabilities and an indicator of whether the bank raises at least five percent of its funds from foreign deposits. We did not find robust impacts of either of these measures and omitted them from the reported specifications.

these variables are meant to roughly correspond to ideas related to the fear of illiquidity, losses, and contagion.

We include several other variables to measure additional aspects of these banks' business models that may affect their withdrawal behavior. We use log assets to measure the size of the institutions. We use distance from Chicago to measure physical proximity to Continental, which could be correlated with other unobservable relationships between the banks and Continental. In particular, banks in Illinois and the surrounding states may hold deposits with Continental for different reasons or have different views on the institution and its prospects compared to those located farther away. We also control for the creditor banks' business models by including the ratio of loans (excluding loans to depository institutions) to assets and the ratio of due from other banks to assets.

Before turning to the regression estimates, it is important to first consider how to interpret the results. In interpreting any correlation between withdrawal behavior and these variables, we must keep in mind that each of these variables relates to other aspects of the banks' business models. For example, a bank with a large amount of assets would not withdraw or deposit money with Continental because of the large amount of assets, but rather because large banks may systemically have different business models than smaller banks, with more sophisticated risk management or more diversification, for example. Nevertheless, we can generally rule out the possibility of reverse causation—that withdrawing from Continental caused banks to display certain balance sheet characteristics. Given the sudden onset of the run, and the fact that we measure these balance sheet variables as of the end of March while the run occurs in May, that direction of causation is very unlikely.²⁸

In addition, one caveat to this analysis is that, given the concentrated nature of Continental's funding that we will discuss in section 6, the cross sectional results may or may not translate into major aggregate funding movements, depending on whether or not the institutions

²⁸ In a conversation by the authors with Paul Volcker, the chairman of the Federal Reserve Board during the Continental crisis, Volcker recalled that while Continental's financial condition had been deteriorating over the previous two years, the timing of the crisis in May took him and market participants by surprise. Volcker recalled quickly traveling to New York after delivering a graduation speech at William and Mary College, in order to attend meetings at the New York Federal Reserve Bank held on Sunday May 13th, the day before the coalition of private banks announced its funding support.

supplying the largest amounts of funding to Continental conform to the average trends we identify.

April to May

The results for the initial period, from April to May, are shown in Table 5. Here and in the subsequent tables, we report robust standard errors in parentheses and, where relevant, marginal effects evaluated at the means of the independent variables. A positive coefficient indicates that a larger value of the independent variable is associated with a greater degree of withdrawal in the funding provided to Continental (in column 1), a higher propensity to be in the highest withdrawal bucket (in column 2), or to withdraw 50 percent or more (in column 3) or 75 percent or more (in column 4).²⁹

Overall, we find strong associations between withdrawals and our measures of liquidity, but do not find that it was the “weaker” banks that withdrew. Instead, withdrawals were greater at banks with stronger liquidity positions. Specifically, we find that banks with relatively more liquid assets (cash and Treasury securities) withdrew more, and that banks more dependent on large deposits, presumably a more run-prone liability, withdrew less.³⁰ The magnitude is medium in size: a one standard deviation decrease in the liquid assets variable is associated with an increase of 12 percentage points in withdrawals in the median regression. These results suggest that withdrawals were unlikely to be related to concerns of the creditor institutions that they would be put under pressure by their own creditors. Instead, it seems that the preferences for liquidity of the creditor institutions themselves, perhaps due to the business model of those banks not controlled for elsewhere that might lead them to prefer to not hold a potentially illiquid claim on Continental. As a result, even though highly liquid banks may appear, from a naïve point of view, to be able to absorb an illiquid investment in Continental, they nevertheless withdrew more than other banks on average. The results also suggest that efforts to bolster the liquidity position of banks do not necessarily mean that these institutions will be willing to

²⁹ In the ordered logit quintile estimation we display the marginal effects on the probability of the bank’s withdrawal rate falling in the highest quintile of withdrawal rates, which corresponds to a withdrawal rate of 73 percent or greater.

³⁰ We also tried interacting these variables, but do not find that doing so provides any additional information.

provide support to other institutions in times of stress and points to the micro-prudential nature of these efforts.

Similarly, we also find that more profitable banks, as measured by net income over equity, were more likely to withdraw. However, banks' capital buffers do not have any predictive power. These results again point to a pattern in which "stronger" institutions did not support Continental more than others, even though they might have been in a position to do so.

The results also point to large banks as being less likely to withdraw. The magnitude is fairly large: a one log point difference in size (roughly the difference between the 25th and 75th percentiles) corresponds to a 17 percentage point decrease in the rate of withdrawal in the median regression. Combined with the fact that the 28-bank support coalition (not included in these regressions) comprised many of the country's largest banks, these results indicate that large banks inside and outside the coalition were more stable funding partners for Continental. In part, the large banks could have been acting in self-interest, out of a desire to avoid possible contagion to themselves if Continental's failure had disrupted funding markets. Even so, the banks outside of the support coalition never publicly committed themselves to support Continental. If they had an incentive to withdraw, they would have also had an incentive to free ride on the support of others. The fact that they tended to not do so might reflect, as another explanation, more sophisticated managers who were in a better position to understand the FDIC's guarantee and satisfy themselves with the guarantee even though the FDIC left many details unexplained. That said, as a group in aggregate domestic banks withdrew a good deal of money from Continental, implying that the large number of withdrawals from smaller banks added up.

In terms of geography, the ordered logit and probit results suggest that banks that were located physically close to Continental were less likely to withdraw large amounts, though the median regression does not yield this result. This result is robust to excluding a small number of banks that were located in Chicago and in Illinois, as other nearby banks were located in Wisconsin and Indiana. One possible explanation is that nearby banks had different and more longstanding relationships with Continental, or perhaps were more likely to suffer if Continental had failed.

Interestingly, we do not find strong evidence that banks with larger exposures to Continental (measured relative to their assets) were more likely to make large withdrawals, at

least in the initial period from April to May. As we will see below, there is a bit more evidence that the most exposed institutions did withdraw more during the second period from May to August. One interpretation of these results is that the managers of these institutions understood the support provided by the FDIC and the Federal Reserve in the short run and so did not rush to withdraw, but over the subsequent months nevertheless had an incentive to pull down their funding to more modest proportions.³¹

May to August

Results for the second period, from May to August, are shown in Table 6. The sample is limited to banks which had provided funding to Continental in May of at least \$300,000, yielding 10 fewer banks than in April, given the withdrawals from April to May. The independent variables are the same with the exception that we add a dummy for whether a bank withdrew more than 50 percent of its funds in the first period. We also adjust the exposure measure so that it reflects the amount of exposure in May, rather than April, relative to the creditor bank's assets.

As in the previous period, the results suggest that physically distant banks were more likely to withdraw large amounts, as were institutions that withdrew more between April and May. In contrast to the previous period, there is some evidence that banks with relatively high exposures to Continental withdrew more. This could reflect that, as time went on, banks with outsized exposures to Continental decided to mitigate those exposures, even though credit risk was not likely a concern. This is an important result in the context of understanding the effect of the government's guarantee, and we will discuss it at more length below in Section 5.

After August

Following the approval of the permanent restructuring plan in late July, the creditor data show that Continental was able to attract some funding from private sector creditors and reduce its dependence on government support. Nevertheless, the overall size of its non-government liability base remained well below the level at the start of the year. In the same spirit as the

³¹ Among the other results in Table 5, we put less stress on the statistical result that banks with high amounts of loans to depository institutions were more likely to withdraw, because this is sensitive to a couple of outlying observations. Similarly, the statistical result on loan delinquency rates is sensitive to one outlier.

previous analysis, it is interesting to analyze what institutions were likely to increase or decrease the funding they provided to Continental.

First, we look at all of Continental's creditors (not just domestic banks) between August 1984 and January 1985, outlined in Table 7. Of the 447 institutions outside of the support coalition listed in the CTS report, 147 (about one-third) increased the funding they provided to Continental over this period. Some of the institutions that increased their funding to Continental had previously not provided much to the bank; in some cases the amount of new funding they provided was quite considerable. The institutions that increased their exposure to Continental appear to have had confidence in the rescue plan (and were likely attracted by the premiums that Continental was willing to pay).

Looking at the types of institutions that increased or decreased funding according to Table 7, it is apparent that foreign governments and international agencies, as well as money funds, brokers, and investment banks, were notably less likely to increase funding than other types of institutions (for both types, there were about three institutions that decreased funding to Continental for each institution that increased funding). Nonfinancial corporations appear to have been the most willing to increase funding (the same number increased funds provided to Continental as decreased funding). As speculation, we note that one difference between these types of institutions is the scrutiny they would face about where they placed their funds. Governments are subject to public scrutiny and unlikely to want to deal with negative publicity should they be found to be keeping funds with a troubled foreign bank. Similarly, investors in money funds are generally quite risk averse and such institutions might prefer to avoid being associated with Continental. By contrast, nonfinancial corporations are generally subject to relatively less scrutiny than the other types of institutions about where they invest their short-term cash.

Focusing again on our sample of domestic banks, we run a similar regression as before but use the change in funding provided to Continental from August 1984 to January 1985 as our dependent variable. We again run a median regression with the percent increase in funding after August as the outcome variable, an ordered logit based on the quartiles of changes in deposits, and a probit regression with a dummy variable indicating whether the change in funding after

August was positive. In Table 8, the sample is restricted to institutions with more than \$300,000 in deposits in August 1984.

The results suggest that institutions with large exposures as of August tended to decrease the funding they provided to Continental through the end of 1984. In contrast to prior periods, large banks in this period tended to withdraw as well.

Section 5. Discussion of the response to the FDIC guarantee

Besides Continental, there have been a number of cases in which government guarantees and backstops have been introduced or expanded in response to runs on financial institutions. Scholars have noted that, during financial crises, a government guarantee of the liabilities of private financial institutions, like the one put in place for Continental, is one of the strongest responses that can be employed (Estrella 2001, Tanaka and Hoggarth 2006). For example, the U.S. Treasury issued a guarantee of money market mutual fund investments to stop a run on those funds during the financial crisis of 2008 (Bernanke 2009, McCabe 2010). The U.K. and Swedish governments similarly issued guarantees in 2007 and in the early 1990s, respectively (Shin 2009, Ingves and Lind, 1996). Sometimes these guarantees have been effective, such as the Treasury's 2008 guarantee of money market funds, which stopped a dramatic run on those firms (McCabe 2010). Liabilities of these institutions had dropped by about 20 percent in the two weeks after Reserve Fund "broke the buck" but stabilized quickly after the guarantee was announced. By the end of the year, about half of the drop had been reversed. There have also been instances where government support has been less effective. In the case of Northern Rock, Shin (2009) reports that while the bank had been losing funding from money market providers from some time, the run by retail depositors on Northern Rock started only after the Bank of England announced that it was intervening to support the bank. The run stopped when the Chancellor of the Exchequer provided a taxpayer-backed guarantee, but funding conditions for the bank did not improve and several months later the institution was taken over by the state.

Scholars have also studied the effect of static guarantee policies on runs. In their examination of a run at a small cooperative bank in India, Iyer and Puri (2012) find that the deposit insurance system did help the bank retain insured depositors, but there were still withdrawals by some fully-insured depositors with balances closer to the insurance limit.

Brown, Guin, and Morkoetter find that coverage by deposit insurance had little effect on the probability of a household to withdraw money from two large Swiss banks affected by the 2007-2009 financial crisis.

The most surprising result of this study is the degree to which creditors continued to withdraw funding from Continental following the FDIC's blanket guarantee. We suggest a few possible reasons for this finding.

One possible reason that institutions may have opted to withdraw funding is that the FDIC's guarantee may not necessarily have ensured timely payment in case of Continental's failure. The *Wall Street Journal* interviewed a bank manager who dealt with Continental, and described him as worrying that "if the FDIC was to take control of Continental, depositors would get all their money back but there might be some delay."³² If so, resolution process might have converted demand obligations into longer-term obligations, and some creditors may have been unwilling to take on the longer and uncertain duration (especially institutions with short-term liabilities of their own). As a potential sign of the illiquidity of Continental obligations, its negotiable certificates of deposit commanded a premium to T-bills despite the guarantee. The *Wall Street Journal* reported that "Without a deep secondary market, investors are wary about being trapped with a security they can't resell."³³ However, there are limits to this line of reasoning, as the Federal Reserve had committed to providing liquidity support to Continental that presumably could have been tapped to repay liabilities. Moreover, institutions awaiting payment from the FDIC would likely have been easily able to borrow on a short-term basis against that future receipt.

Another possible explanation is that Continental's short-term creditors may not have found the announcement by the FDIC and Federal Reserve to be sufficiently clear or credible. Support for this explanation comes from a *Wall Street Journal* article containing interviews with officials at several of Continental's peers and noted a few reasons for incredulity.

From Continental's point of view, perhaps the FDIC hasn't done enough to reassure depositors. One banking official close to Continental's problems said, "All there is (to explain the FDIC's guarantee) is a press release. The FDIC won't provide more

³² *Wall Street Journal*, "Run Continues On Continental Illinois Deposits --- Bank Sells \$5 Billion in Assets As U.S.-Led 'Safety Net' Proves to Be Insufficient" July 2, 1984.

³³ *Wall Street Journal*, "Is a Continental CD a U.S. Treasury Bill by Another Name?" May 25, 1984, p. 6.

specificity. That quite obviously limits the effectiveness of the assurance. There is no precedent for this,” the banker said, “so it’s probably very difficult for investors to get their arms around (the FDIC guarantee).”

It is possible that the press release, which was quite laconic (see it quoted above on page 5), did not give enough details, such as listing all types of creditors that would be covered, or how and when the funds would be released. Along these lines, Guttentag and Herring (1987) assert that concerns about the lack of formal legal safeguards led to reluctance among Continentals’ creditors. In particular, it may have been unclear how the creditors of the overseas subsidiaries would be treated. Concerns about the lack of clarity regarding those entities would be consistent with the steady run-off in these liabilities even after the announcement of the interim support package (See Figure 2). Concerns about the ambiguity of the press release may have been most important for foreign banks whose officers would be least familiar with FDIC policies. However, the CTS reports show the large declines in funding provided by domestic depository institutions between June and August, which is somewhat surprising as these institutions were most likely to understand the guarantees provided by the FDIC and the Federal Reserve. Otherwise, creditors may have been concerned that the courts or Congress could change the nature of their investments with unexpected interventions.

Finally, creditors may have been unwilling to deal with Continental regardless of its creditworthiness because of potential “headline risk” of being associated with a troubled institution or because of the procedural difficulties in dealing with such a firm. The *Wall Street Journal* interviewed one banker who stated that dealing with Continental would not be worth the trouble of explaining the decision to his superiors, given other investment options. Another banker noted that many potential creditors would rather not have exposures to Continental on public accounting statements. These concerns may not explain the largest withdrawals but could have had at least a marginal impact if not more.

There were however some creditors that increased their exposure to Continental. Among the individual institutions covered in our sample, about 16 percent of institutions (excluding the support coalition and the US government) increased their exposure to Continental between April and August 1984. Foreign banks were somewhat more likely than other types of institutions to increase their exposure (about 21 percent of these institutions in the sample did so), and some increased the amount of funding they were providing considerably. As discussed above, there

were also further increases in funding in late 1984. Thus it appears that at least some institutions took the government guarantee fairly seriously.

Section 6 Liability concentration and Continental's systemic risk

The CTS reports reveal that, before the run, Continental's liabilities were heavily concentrated with a small number of large creditors. Looking at all non-U.S. government institutions, in April 1984, Continental's largest 10 creditors provided funding of \$3.4 billion, (roughly 9 percent of all liabilities). The largest 25 funded about \$6 billion (16 percent of all liabilities).³⁴ Among those creditors holding domestic deposits, the deposit insurance limit of \$100 thousand would have been essentially irrelevant given that all of the largest 25 creditors held liabilities exceeding \$100 million each. About half of the largest 25 creditors were foreign banks, and the rest were a mix of domestic banks, money market funds, and foreign governments or international institutions.

The concentration of funding played an important role during the run. To document this, in Table 9 we examine the concentration of funding among institutions that were not part of the support coalition. The creditors are separated into groups such that their exposures are roughly equal in size. The top 10 accounted for nearly 22 percent of the funding from these institutions, while the next 15 accounted for another 17 percent. The run-off rates from April to May are shown to the right. The run-off rate for the top 10 is elevated compared to the other groups. In addition, because of the size of the top group's initial liability holdings, the sizable run-off rate in this group meant that the dollar drop in funding from just 10 institutions accounted for about one-third of the total decline that we observe. Thus, this small number of institutions had a very large impact on the funding situation. In contrast, the run-off rate for the next banks 15 largest bank creditors is modest in size, giving Continental some amount of much-needed stability but also underscoring the idiosyncratic levels of support that Continental faced from its most important creditors. Each of the remaining groups of creditors also decreased their funding to Continental, by varying amounts.

³⁴ Total liabilities are measured as of the March 31, 1984 FFIEC Call Report for the purposes of these comparisons.

Figure 4 displays the concentrated nature of the outflows among Continental's largest 25 private creditors (including those within the support coalition but excluding government creditors), displaying the movements of each between April and August. The green arrows indicate the changes for those that were not in the support coalition, and the black dashed arrows indicate the changes in funding for each that were in the coalition. The graph shows the extremely large amounts withdrawn by the largest creditors, as several of those not in the coalition withdrew between \$100 million or \$200 million each. The creditors responsible for the very largest declines between April and July mainly included money market mutual funds and foreign banks.

This concentration is also related to the nature of Continental's systemic importance, and in fact we identify an additional channel through which Continental may have posed a systemic risk. Several of the largest creditors were money market mutual funds. Four of these funds had exposures to Continental amounting to more than \$100 million. For at least one institution, which has publicly available information on total assets, the holdings of Continental funds accounted for roughly 7 percent of its assets. Given the losses incurred by the FDIC, it is highly likely that this fund would have seen a significant loss in the event that Continental had been allowed to fail. Even apart from those losses, these mutual funds would have seen these assets become inconvertible to cash and the funds' liquidity would have dried up.

The exposures of money funds to Continental brings to mind one aspect of the 2007-2009 financial crisis, when there were considerable disruptions after a money market fund "broke the buck" (i.e. was no longer able to pay out \$1 per share). As a result, there were rapid withdrawals from money funds and money funds significantly curtailed their purchases of privately issued money market securities (McCabe 2010; Duygan-Bump, Parkinson, Rosengren, Suarez, and Willen 2013). How events would have played out in 1984 had some money funds incurred significant losses cannot be known. The fallout might have touched many of the large banks, which had large amounts of non-performing loans stemming from their lending to developing countries (FDIC 1997, FDIC 1998). Had Continental failed and significantly affected some money funds, the money funds could certainly have seriously reduced their purchases of bank-issued money market instruments, either because they sought safer assets or because they experienced outflows from investors who perceived money funds as more risky than before.

Otherwise, whether the failure of Continental would have constituted a systemic event has been a matter of notable debate. The main regulators asserted that it was (Isaac 1984, Volcker 1984, Conover 1984, and Sprague 1986). Some of the academic work has been more skeptical. Several papers have analyzed the effect of Continental's failure on equity prices of various banks and firms, using event study methodologies. Wall and Peterson (1990) and Swary (1986) both examine the reactions of the equity price of other large US banks, and Jayanti and Whyte (1996) similarly analyze the reactions of foreign bank equity prices. In general, they do not find much evidence that there were increased correlations of equity prices around this time which casts some doubt on the likelihood of contagion risks. Furlong (1984) and Bailey and Zaslow (1984) report that funding costs for other banks, as indicated by the spread between the rate on large negotiable CDs and the rate on comparable maturity Treasury bills, increased during Continental's travails. These findings imply that serious problems at Continental were having spillovers effects on other institutions. Looking at systemic importance from another perspective, Slovin, Sushka, and Poloncheck (1993) find that firms who borrowed from Continental had notable negative equity price reactions to the troubles at Continental and positive equity price reactions to the FDIC rescue efforts.

FDIC Chairman Isaac indicated that, at the time they intervened, about 66 domestic banks had exposures to Continental that exceeded their capital. (Among the institutions we can identify, we find that 14 institutions had exposures to Continental that represented at least 25 percent of the equity capital and 9 institutions had exposures that represented more than 100 percent of their equity capital.) These figures suggest that some institutions could have had significant difficulties in the event that Continental failed. However, Wall (1993) argues that few of these institutions would have actually failed.

Section 7. Conclusion and Implications for Resolution in the Future

Can a bank run be stopped? To answer that question, this paper takes seriously the incentives of large sophisticated creditors. For such creditors, deposit insurance is not an important factor, and they are likely to be well informed. Instead, their incentives to withdraw are likely to be affected by their business models, including their tolerance for liquidity and credit risk, and the extent to which they could be affected by contagion. In the case of

Continental, creditors with preferences for liquidity appeared to be more likely to run, along with smaller banks and physically more distant banks. As time went on, creditors with high exposures did ultimately act to mitigate those exposures, even in the presence of low or zero credit risk which indicates that credit risk alone is not what causes creditors to reduce exposures to troubled institutions.

Continental's experience has important implications for the receivership of systemically important institutions in the future. The FDIC no longer has the ability to issue the same sort of guarantee that it issued Continental, but an effectively similar guarantee could be issued if the FDIC placed a systemically important institution into receivership using the Orderly Liquidation Authority created by the Dodd-Frank Act. In doing so, the FDIC would be required to maintain the operations of the systemically important parts of the firm, and it seems quite likely that the FDIC would be required to issue a guarantee to short-term creditors, lest those creditors run on the firm and force the very unwinding that the FDIC would be seeking to prevent. Continental's experience suggests that the FDIC should nevertheless be prepared for the possibility that short-term creditors will make enormous demands for withdrawals. This in turn would require large drawdowns from the FDIC's credit line with the Treasury that was created by Dodd-Frank to fund the FDIC's operation of an institution in receivership. The Continental experience also suggests that uncertainty about the nature of the guarantee may be detrimental and, the FDIC would likely benefit from communicating clearly and in detail the guarantees it would offer to creditors of an institution in receivership.

Our findings also demonstrate that a relatively small number of large short-term creditors can destabilize a financial institution. Continental may have been unusual in its reliance on uninsured deposits, but today all of the systemically important depository institutions continue to have significant amounts of uninsured deposits. Indeed, during the 2008 crisis, Wachovia and Washington Mutual were among the largest banks in the country and both lost significant amounts of deposits during runs by short-term creditors. Though neither institution's run was as extreme as Continental's, neither survived their funding crises.

Continental was particularly dependent on funds raised in foreign money markets, much like foreign banks that today use US money markets for funding. We find that the government guarantee of Continental's liabilities appears to have been less effective in slowing the exit of

these types of liabilities than other liabilities; it is possible that it was ambiguous whether that the guarantee applied to these funds. Similarly, Correa, Sapriza, and Zlate (2013) find that US money market funds notably reduced the funding they provided to European banks amid the European Sovereign Crisis of 2011. The similarities highlight the persistence and the potential vulnerability of such a funding strategy.

Finally, while we do not find that the FDIC guarantee enabled Continental to retain funding and reduce its reliance on government funding, that guarantee may nevertheless have been vital in preserving the stability of the financial sector. Our data regarding the concentration of funding suggest that a few institutions had large exposures to Continental and would have suffered significantly in the event that Continental had been allowed to fail. Some of these institutions were large enough that their closure would also likely have had systemic implications. The FDIC guarantee was likely exceptionally important in preventing catastrophic losses at these institutions, allowing them to withdraw their funding, and preventing additional spillovers and thus preserving stability.

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Table 1: Liabilities at Continental Illinois National Bank during 1984

Liability	3/31/1984	6/30/1984	9/30/1984	12/31/1984
Domestic office deposits	10,046	6,889	6,377	7,673
Foreign office deposits	18,545	10,562	5,965	7,926
Fed funds purchased, repo	5,091	6,988	5,650	5,309
Demand notes to US Treas.	631	558	2,160	799
Other borrowed money (including discount window)	1,867	4,843	7,545	5,339
FDIC note, subordinated to deposits	0	2,000	0	0
Acceptances	870	458	418	487
Other	1,050	889	632	641
Total Liabilities (excluding capital)	38,100	33,187	28,747	28,174

Notes: Amounts are in millions of dollars. Source: FFIEC, Call Reports.

Table 2: Comparison of Continental with other large banks

Financial measurement	Continental	Median	Other 19 largest banks	
			25th pctile	75th pctile
Net charge-offs as percent of loans	0.29	0.06	0.02	0.10
Delinquencies as percent of loans	9.16	3.61	2.50	5.26
Loan loss provisions as percent of assets	0.46	0.12	0.09	0.19
Net income as percent of equity	1.46	2.83	2.19	3.36
Large time deposits as percent of liabilities	8.82	6.07	4.40	12.63
Foreign deposits as percent of liabilities	48.67	33.59	22.41	43.01
Fed funds and repo as percent of liabilities	13.36	8.51	6.16	12.00
Interest rate on large time deposits	2.46	2.43	2.40	2.55
Interest rate on domestic deposits	2.84	1.63	0.82	3.80
Interest rate on federal funds bought	2.40	2.41	2.39	2.43
Equity as percent of assets	4.65	4.38	4.12	4.65
Loans as percent of assets	73.12	63.81	56.96	67.19

Notes: Data from the March 31, 1984 FFIEC Call Report. The peer group is the other banks comprising the largest 20 banks, by assets.

Table 3: Funding by Selected Large Creditors in 1984

Type of Creditor	N	Funding Provided as of			Percent change from April to May	Percent change from May to August	Percent change from April to August
		April 1984	May 1984	August 1984			
<i>Creditors Providing Support</i>							
US government entities	8	2,569.7	4,428.5	9,955.3	72.3	124.8	287.4
Domestic bank	28	2,841.9	4,807.8	5,640.5	69.2	17.3	98.5
Total	36	5,411.6	9,236.3	15,595.8	70.7	70.7	188.2
<i>Other Creditors</i>							
Foreign banks	103	5,987.2	5,720.1	3,021.7	-4.5	-47.2	-49.5
Money market institutions	42	1,665.0	1,049.2	657.9	-37.0	-37.3	-60.5
Foreign governments and official inst'ns	37	1,658.1	1,342.2	834.2	-19.1	-37.8	-49.7
Domestic banks not in support coalition	145	1,475.8	912.3	511.2	-38.2	-44.0	-65.4
Nonfinancial corporations	74	1,201.6	869.1	444.0	-27.7	-48.9	-63.0
Other customers	20	632.1	510.0	539.5	-19.3	-11.6	-14.6
Savings and loans	27	507.7	240.4	145.3	-52.6	-39.6	-71.4
Total	448	13,127.5	10,643.3	6,153.8	-18.9	-42.2	-53.1

Note: Figures are in millions of dollars. The table includes any creditor listed in the CTS reports that gave positive funding to Continental in any month during 1984, thereby excluding those listed as providing zero or negative funding. Funding from US government entities was primarily supplied by the FDIC, FRB Chicago, the Treasury, and various government sponsored enterprises.

Table 4
Summary statistics of variables used in bank withdrawal regressions

	N	Mean	SD	Min	Max	25th pctle	50th pctle	75th pctle
<u>Withdrawals from April to May</u>								
Percent withdrawn / 100	109	0.25	1.42	-13.75	1	0.13	0.40	0.70
1(rate of withdrawal>50%)	109	0.39	0.49	0	1	0	0	1
1(rate of withdrawal>75%)	109	0.17	0.38	0	1	0	0	0
1(rate of withdrawal>90%)	109	0.12	0.33	0	1	0	0	0
<u>Withdrawals from May to August</u>								
Percent withdrawn / 100	99	-0.69	6.90	-62.75	1	0.17	0.86	1
1(rate of withdrawal>50%)	99	0.65	0.48	0	1	0	1	1
1(rate of withdrawal>75%)	99	0.56	0.50	0	1	0	1	1
1(rate of withdrawal>90%)	99	0.48	0.50	0	1	0	0	1
<u>Changes from August to January</u>								
Percent increase / 100	60	0.49	3.89	-1.84	27.50	-0.87	-0.39	0.00
1(change in funding>0)	60	0.25	0.43	0	1	0	0	0
<u>Independent variables (measured as of March 31, 1984)</u>								
log(exposure to CI/assets)	109	0.96	1.66	-2.66	5.25	0.03	0.89	1.69
log(assets)	109	14.77	1.04	11.15	16.29	14.31	15.00	15.52
log(distance to Chicago)	109	6.52	1.22	1.19	8.00	6.09	6.90	7.16
(net income)/equity	109	0.03	0.01	-0.01	0.06	0.03	0.03	0.04
loan delinquency rate	109	0.03	0.02	0.00	0.12	0.02	0.02	0.03
equity/assets	109	0.06	0.01	0.03	0.15	0.05	0.06	0.07
(cash+treasuries)/assets	109	0.16	0.06	0.04	0.44	0.12	0.15	0.18
(loans to depos. inst'ns)/assets	109	0.54	0.10	0.19	0.80	0.49	0.55	0.61
(core loans)/assets	109	0.03	0.03	0.00	0.11	0.00	0.02	0.04
(large time deposits)/liabilities	109	0.11	0.07	0.02	0.33	0.07	0.09	0.14

Note: We define core loans as excluding loans to depository institutions. The data on large time deposits cover only domestic deposits.

Table 5
Withdrawals from April to May and bank characteristics

Model	(1) Median regression	(2) Ordered Logit	(3) Probit	(4) Probit
Dependent variable(s)	Percent withdrawn	Quintiles of percent withdrawn	1(rate of withdrawal>50 %)	1(rate of withdrawal>75 %)
log(exposure to CI/assets)	0.0167 (0.0545)	0.0226 (0.0242)	7.14e-06 (0.0399)	0.0177 (0.0272)
log/assets)	-0.173** (0.0850)	-0.0761* (0.0392)	-0.196*** (0.0755)	0.00802 (0.0488)
log(distance to Chicago)	0.0561 (0.0562)	0.0525** (0.0226)	0.132** (0.0583)	0.0775* (0.0402)
(net income)/equity	10.76 (6.487)	7.370** (3.738)	14.04*** (5.184)	5.974* (3.298)
loan delinquency rate	9.681*** (3.582)	4.161 (2.932)	7.268* (3.871)	4.242** (2.079)
equity/assets	-1.962 (4.082)	-1.750 (2.096)	2.407 (3.283)	0.611 (2.463)
(cash+treasuries)/assets	1.969*** (0.726)	1.204*** (0.462)	1.780** (0.901)	0.854* (0.493)
(core loans)/assets	0.425 (0.467)	0.124 (0.260)	0.303 (0.536)	0.0156 (0.328)
(loans to depos. inst'ns)/assets	4.496*** (1.387)	3.381*** (1.171)	5.234*** (1.895)	1.680 (1.244)
(large time deposits)/liabilities	-1.748** (0.685)	-1.177** (0.475)	-1.682** (0.784)	-0.569 (0.473)
Observations	109	109	109	109
(Pseudo) R-squared	0.066	0.0839	0.180	0.134

Note: This table reports robust standard errors in parentheses and marginal effects in columns 2-4. The symbols ***, **, and * denote statistical significance at the 1 percent, 5, percent, and 10 percent levels respectively. The marginal effects for the ordered logit relate to the probability of the highest quintile, i.e. with the highest withdrawal rates. This highest quintile consists of withdrawal rates exceeding 73 percent. The goodness of fit statistics are pseudo R-squareds for each column except the median regression.

Table 6: Withdrawals from May to August and bank characteristics

Model	(1) Median regression	(2) Ordered logit	(3) Probit	(4) Probit
Dependent variable(s)	Percent withdrawn	Quartiles of percent withdrawn	1(rate of withdrawal=100%)	1(rate of withdrawal>=75%)
log(exposure to CI/assets)	0.168** (0.0822)	0.0693* (0.0363)	-0.0435 (0.0383)	0.102** (0.0483)
log/assets)	0.317*** (0.120)	0.0835 (0.0525)	-0.0504 (0.0588)	0.118 (0.0800)
log(distance to Chicago)	0.119 (0.0815)	0.123** (0.0489)	0.0914 (0.0636)	0.131** (0.0620)
(net income)/equity	-10.57 (9.953)	-4.219 (2.806)	-0.802 (2.525)	-4.973 (4.130)
loan delinquency rate	-9.764 (8.225)	-3.745 (3.442)	-0.707 (3.906)	-6.381 (4.047)
equity/assets	-3.863 (4.936)	-3.236 (2.794)	-2.011 (3.581)	-0.300 (3.807)
(cash+treasuries)/assets	0.0475 (0.969)	-0.234 (0.518)	-0.626 (0.662)	-0.452 (0.822)
(core loans)/assets	1.416 (0.947)	0.947** (0.450)	0.769 (0.539)	1.227** (0.602)
(loans to depos. inst'ns)/assets	-1.108 (2.936)	0.267 (1.855)	-0.444 (1.919)	1.480 (2.578)
(large time deposits)/liabilities	0.523 (1.347)	0.0579 (0.679)	-0.880 (0.788)	0.356 (0.976)
1(withdrew 50% or more from April to May)	0.454** (0.179)	0.242** (0.109)	0.245** (0.110)	0.216* (0.118)
Observations	99	99	99	99
(Pseudo) R-squared	0.051	0.111	0.173	0.146

Note: This table reports robust standard errors in parentheses and marginal effects in columns 2-4. The symbols ***, **, and * denote statistical significance at the 1 percent, 5, percent, and 10 percent levels respectively. The marginal effects for the ordered logit relate to the probability of the highest quartile, i.e. with the highest withdrawal rates. This highest bucket consists of withdrawal rates of 100 percent. The goodness of fit statistics are pseudo R-squareds for each column except the median regression.

Table 7
Change in funding from August 1984 to January 1985

Type of institution	Total	Number of observations....		Ratio of increases to decreases	
		Funding >0 as of August	Increased funding after August		Decreased funding after August
Foreign banks	103	93	41	56	0.73
Money market institutions	42	34	9	25	0.36
Foreign governments and official institutions	37	22	5	17	0.29
Domestic banks not in the support coalition	145	126	46	93	0.49
Nonfinancial corporations	74	57	31	31	1.00
Other customers	19	13	6	8	0.75
Savings and Loans	27	14	9	7	1.29
Total	447	359	147	237	0.62

Table 8
Change in funding from August 1984 to January 1985 and bank characteristics

Model	(1) Median regression	(2) Ordered logit	(3) Probit
Dependent variable(s)	Percent increase in funding	Quartiles of percent increase	1(positive change in funding)
log(exposure to CI/assets) in August	-0.169* (0.0926)	-0.116** (0.0514)	-0.118*** (0.0410)
log(exposure to CI/assets) in April	-0.0749 (0.0650)	-0.0513 (0.0382)	-0.0377 (0.0353)
log(assets)	-0.400*** (0.132)	-0.228*** (0.0865)	-0.223*** (0.0800)
log(distance to Chicago)	-0.0175 (0.0907)	-0.0249 (0.0376)	-0.0149 (0.0499)
(net income)/equity	-5.838 (3.832)	-5.093* (2.967)	-5.590 (4.164)
loan delinquency rate	2.674 (5.905)	-0.871 (3.966)	-5.954 (4.232)
equity/assets	-1.024 (5.501)	-1.355 (2.209)	-9.366** (4.090)
(cash+treasuries)/assets	-1.223 (1.535)	-0.419 (0.513)	-0.983 (0.747)
(core loans)/assets	-2.085 (1.467)	-1.041* (0.549)	-0.306 (0.514)
(loans to depos. inst'ns)/assets	-0.517 (3.301)	-0.299 (1.898)	0.417 (1.888)
(large time deposits)/liabilities	0.887 (2.262)	0.254 (1.009)	0.738 (0.710)
Observations	60	60	60
(Pseudo) R-squared	0.0809	0.106	0.316

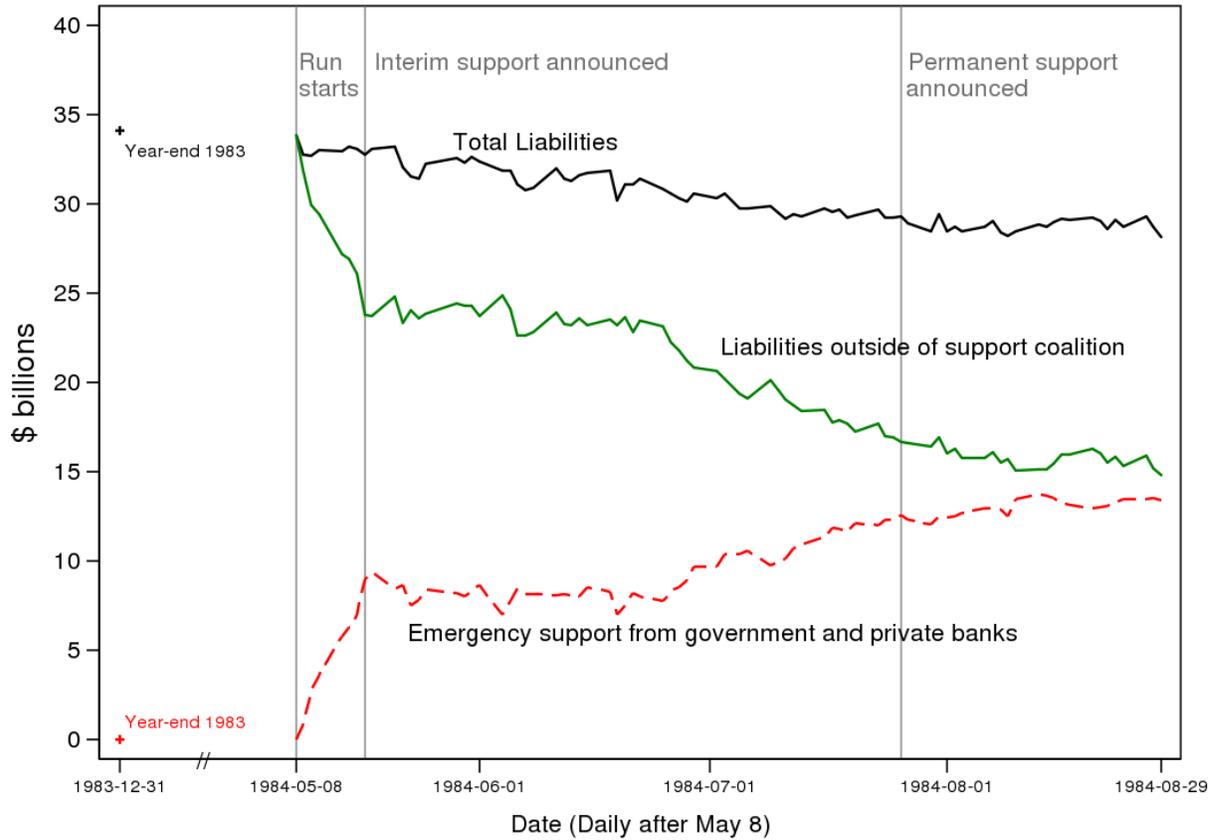
Note: This table reports robust standard errors in parentheses and marginal effects in columns 2-3. The symbols ***, **, and * denote statistical significance at the 1 percent, 5, percent, and 10 percent levels respectively. The marginal effects for the ordered logit relate to the probability of the highest quintile, i.e. with the highest rates of increase. This highest quintile consists of changes in funding exceeding 0 percent. The goodness of fit statistics are pseudo R-squareds for each column except the median regression.

Table 9: Funding by Size of Exposure for Non-Support Institutions in 1984

Type of Creditor	Funding April 1984	Funding May 1984	Dollar Change April to May	Percent of total liabilities in April	Percent Change April to May	Percent of total dollar decline
Top 10	2,859.7	2,036.0	-823.7	21.7	-28.8	33.1
11 to 25	2,212.2	2,109.7	-102.5	16.8	-4.6	4.1
26 to 50	2,074.1	1,719.9	-354.2	15.8	-17.1	14.2
51 to 100	2,500.1	1,886.0	-614.1	19.0	-24.6	24.7
101 to 200	2,383.3	1,898.5	-484.8	18.1	-20.3	19.5
Remainder	1,120.1	1,009.1	-111.0	8.5	-9.9	4.5
Total	13,149.5	10,659.2	-2,490.3	100.0	-18.9	100.0

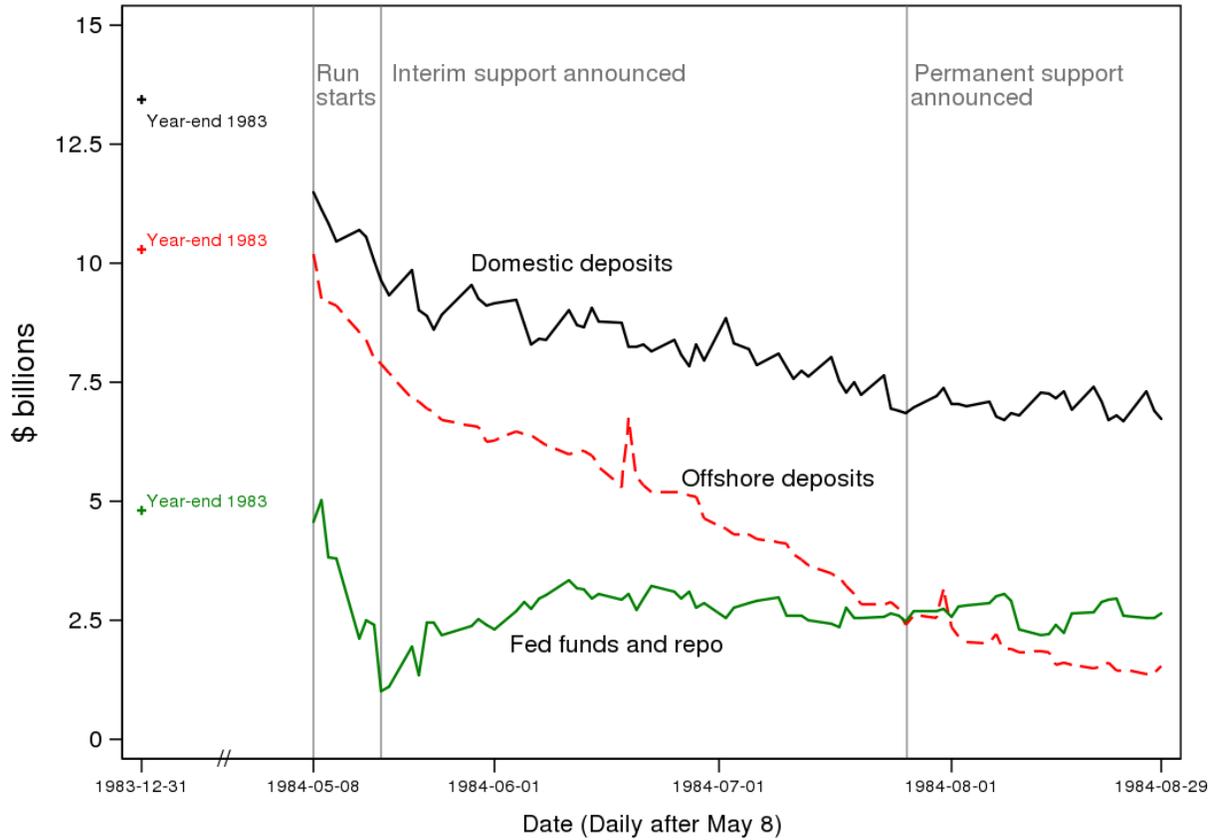
Notes: Figures are in millions of dollars. The source is the CTS reports. Creditors included are those identified in the CTS reports, providing positive funding to CTS, excluding US government institutions and domestic banks that were part of the private support coalition.

Figure 1: Liabilities at Continental Illinois during 1984



Notes: The emergency support includes discount window loans, funds from the FDIC, and funds from the private coalition of large banks. That support is additional funding beyond what those institutions were already providing Continental before the run began. The data are taken from the CTS reports.

Figure 2: Decomposition of liabilities excluding government and coalition support



Notes: Offshore deposits include the net amount due to Continental's foreign branches, and international time deposits. Domestic deposits include demand, retail savings, commercial CDs and time deposits, public funds, and retail money market funds. Not all liabilities are included so components do not sum to the total non-support liabilities from the previous figure.

Figure 3: Distribution of withdrawal rates during sample periods

Figure 3A: April to May

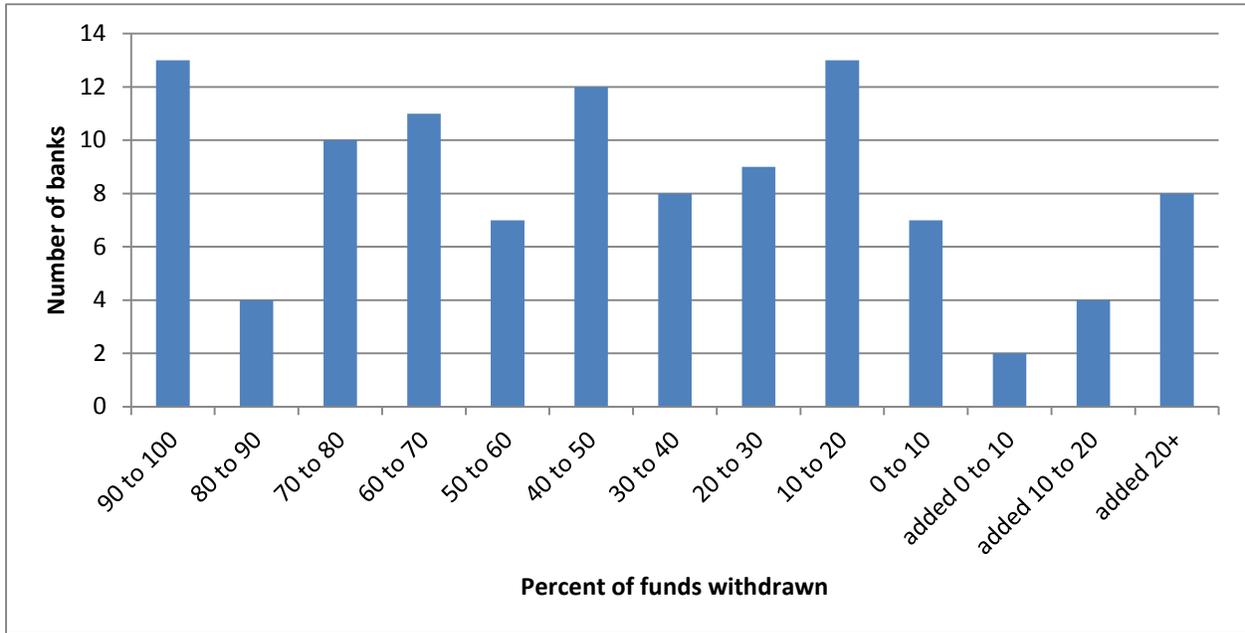
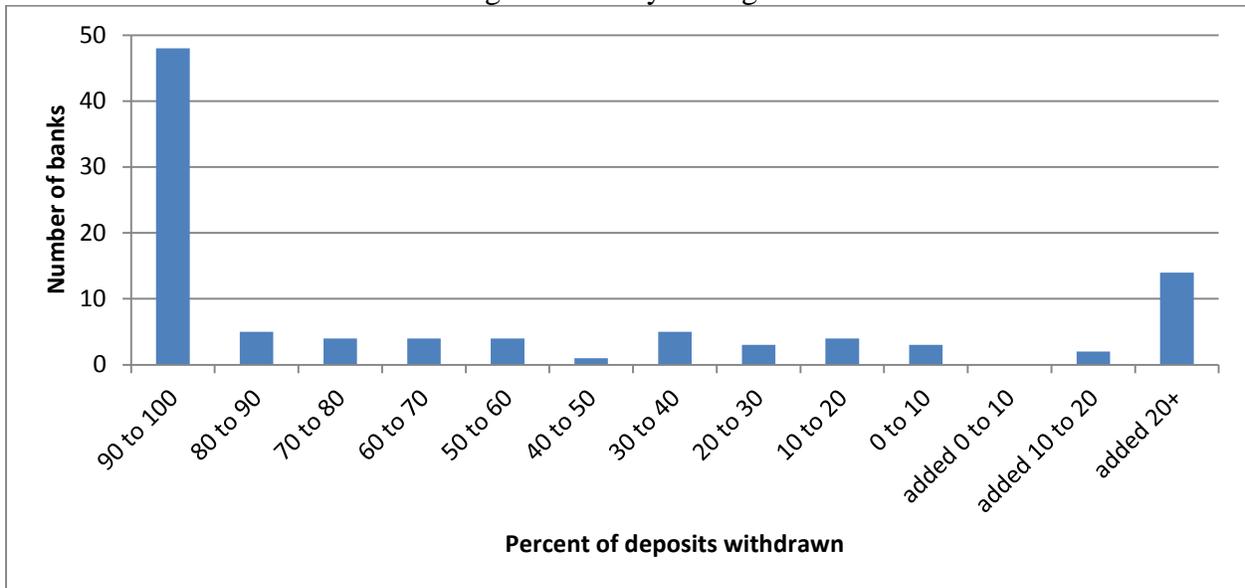
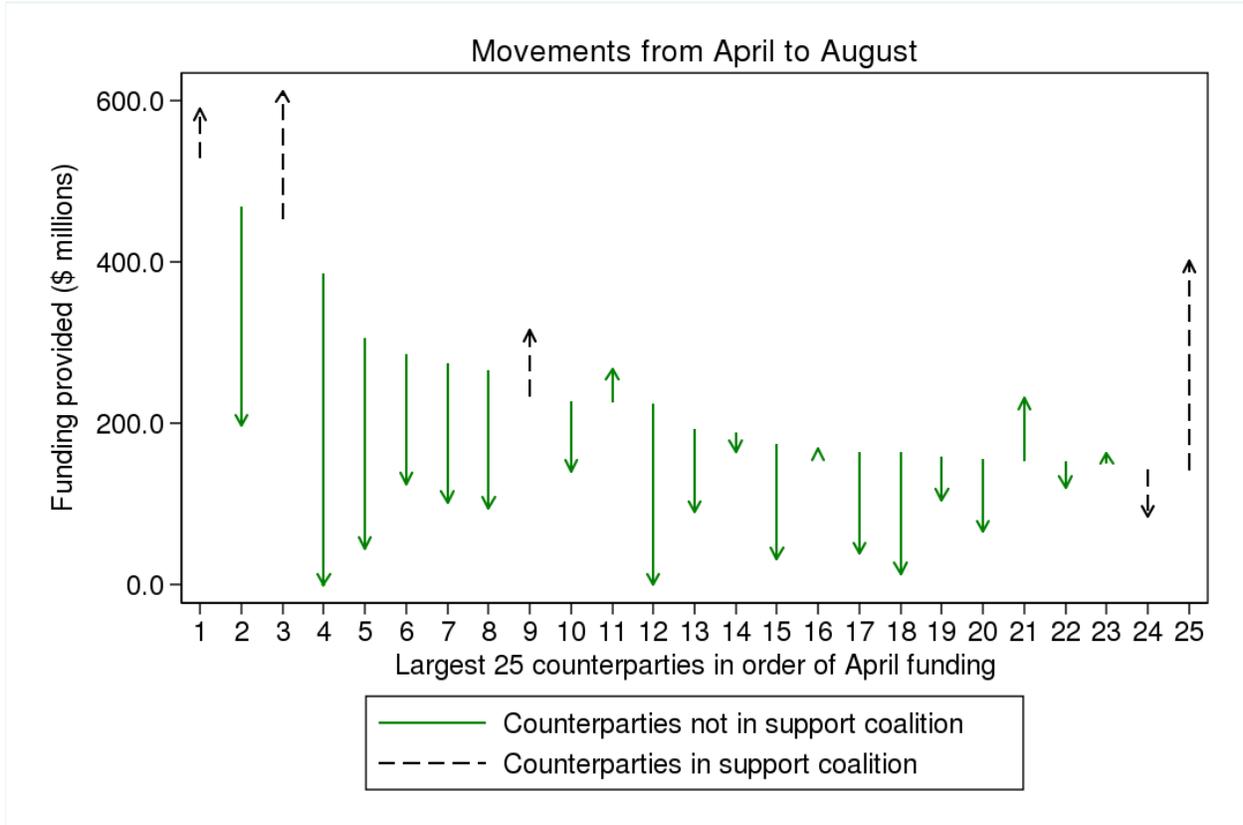


Figure 3B: May to August



Notes: Observations in Figure 3A correspond to domestic banks outside the support coalition that had at least \$300,000 in funds with Continental in April 1984. Observations in Figure 3B correspond to domestic banks outside the support coalition that had at least \$300,000 in funds with Continental in May 1984.

Figure 4: Funding provided by Continentals' Largest 25 Private Creditors



Note: This excludes US government or government-affiliated institutions. Source: CTS documents.