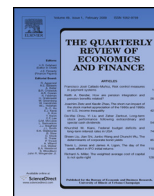




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Bitcoin and the bailout

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ABSTRACT

On March 16, 2013, Cyprus announced that it would accept a bailout that required imposing a one-time levy on bank deposits. It has been argued that, by making traditional deposit accounts seem less secure, the bailout announcement prompted some to consider—or reconsider—using the cryptocurrency bitcoin. Relying on rank data for a subset of apps, existing studies maintain that interest in bitcoin increased following the announcement, especially in countries with troubled banks. We argue that (1) focusing on a subset of apps does not allow one to distinguish a general increase in the demand for bitcoin apps from a substitution between bitcoin apps and (2) changes in rank data are a poor predictor of changes in the number of downloads. In order to address these concerns, we collect rank data for all fifteen bitcoin apps available at the time and use an established technique to estimate an index of downloads for each country considered. We find that, while downloads of bitcoin apps increased following the announcement, the observed effect was not especially pronounced in countries thought to have had troubled banking systems at the time.

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1. Introduction

On March 16, 2013, Cyprus announced that it would accept a €10 billion bailout to recapitalize its banking system. The agreement reached with the Eurogroup, European Commission, European Central Bank, and International Monetary Fund would require closing the country's second-largest bank and imposing a one-time levy on bank deposits. The initial terms announced included a 6.75% levy on deposit balances less than 100,000 euros and a 9.9% levy on deposit balances in excess of 100,000 euros (Christie & Ruhe, 2013).¹ A modified version of the plan ultimately saw no levies issued on deposit balances less than 100,000 euros—the maximum amount covered by European Union deposit insurance. Balances in excess of 100,000 euros were converted at just 37.5 cents on the euro (Tagaris, 2013).

The reactions of major commentators at the time of the initial announcement suggest that such a policy had not been anticipated. A BBC (2013a) headline described “Shock in Cyprus as savers face bailout levy.” Writing for Forbes, Tim Worstall (2013) warned that it “could be setting an entirely disastrous precedent for the entire European banking system.” Those with deposits in Cypriot banks had been caught off guard—and were none too happy about it. Those holding deposits in other countries with troubled banking systems worried they might be next.

If the announcement were a shock, as is widely believed, it might also correspond to a genuine shift in expectations regarding the set of policies a government might employ when dealing with undercapitalized banks. Prior to the announcement, few if any expected a deposit levy was on the table—and those acknowledging the existence of such a policy surely thought the odds it would be implemented were quite low. After the announcement, however, it was clear that such a policy could be adopted—and those acknowledging the prospect in advance almost certainly thought it more likely to be implemented.

If the announcement marks a genuine shift in expectations, where people no longer believe traditional deposit accounts are as secure as previously thought, it might prompt them to reconsider which liquid assets to hold. In particular, one might expect the bailout announcement prompted some to consider (or

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¹ There are conflicting reports concerning the extent to which Cypriot President Nicos Anastasiades supported the levy on small depositors. Traynor and Smith (2013) claim he was “keen on spreading the burden, fearful of scaring off the wealthy Russians with too punitive levies.” In public, Anastasiades vowed “to fight with the eurogroup to amend their decisions in the coming hours to limit the impact on small depositors” (BBC, 2013b).

reconsider) the relatively new cryptocurrency, bitcoin.² Like traditional deposit accounts, bitcoin can be transferred electronically to make payments. Unlike traditional deposit accounts, bitcoin cannot be acquired without the accountholder's permission. Hence, the bailout announcement—insofar as it represents a genuine shift in expectations concerning the risk that traditional deposit account balances would be seized—might prompt some to consider using bitcoin instead of traditional deposit accounts.

Kuittinen (2013) is, to our knowledge, the first to note the possibility that the Cyprus bailout announcement would encourage some users to consider bitcoin. To be sure, it was too late for those holding funds in Cypriot banks to avoid the deposit levy. However, those concerned that future levies would follow—in Cyprus or elsewhere—might transition to bitcoin in order to avoid the risk of appropriation. Indeed, Kuittinen (2013) notes an increase in popularity—as measured by rank—for several bitcoin apps on the Spanish iPhone market immediately following the bailout announcement:

Bitcoin Gold shot up [...] from 498 to 72, and another app called Bitcoin Ticker zoomed from 526 to 52 in just one day. A leading service called Bitcoin App jumped from 194 to 151 between Friday and Sunday as Spaniards brooded over the Cyprus crisis.

Recall that Spain had a similarly troubled banking system at the time and, hence, might have been thought to be considering its own deposit levy.

The observation that bitcoin-related apps climbed the rankings in a country with a troubled banking system would seem to support the hypothesis that some turned to bitcoin following the bailout announcement. However, Kuittinen (2013) offers little more than anecdotal evidence. He notes that a similar surge does not appear to have happened in Cyprus, but does not make systematic cross-country comparisons; nor does he attempt to control for potential day-of-the-week biases.

With these objections in mind, Luther and Olson (2014) collect download rank data for the popular bitcoin app BitGold for ten countries (Cyprus, Portugal, Ireland, Italy, Greece, Spain, France, Germany, United Kingdom, and United States) over the seven-day periods before and after the bailout announcement. They find that the average increase in download rankings “were typically larger in countries suspected of having troubled banking systems than those occurring in non-troubled eurozone and non-euro countries” (p. 29).

We find two problems with the existing literature. First, in considering a subset of all bitcoin-related apps available at the time, Kuittinen (2013) and Luther and Olson (2014) are unable to distinguish a general increase in the demand for bitcoin apps from a substitution between bitcoin apps. As such, they cannot rule out that (perhaps for reasons entirely unrelated to the bailout) users were switching from other apps to the subset of apps they consider—i.e., that there was no change in the overall popularity of bitcoin following the bailout announcement. Second, since app download data is not publicly available, Kuittinen (2013) and Luther and Olson (2014) rely on app download rank data. If fewer downloads are required to move up the rankings from a lower starting point than a higher starting point, one cannot be sure that a large rank increase observed in Country A corresponds to larger increase in relative popularity than a small rank increase observed in Country B when the initial ranking of Country A is lower than that of Country B. Hence, the relatively large rank increases Luther and Olson (2014) find in countries suspected of having a troubled

² Luther (2016) considers forces that might preclude individuals from adopting bitcoin. See also: Hendrickson, Hogan, and Luther (2016), Hendrickson and Luther (2016), Luther (2016a, 2016b), Luther and White (2014), and McCallum (2015).

Table 1

List of bitcoin tracker apps available March 9–22, 2016.

Name	Price	Introduced	Category
Bitcoin App	2.99	6/2/2011	Finance
Bitcoin App FREE	Free	9/16/2011	Finance
Bitcoin Explorer	Free	7/15/2011	Finance
BitCoin Gold	Free	5/17/2012	Finance
Bitcoin Miner Stats	0.99	7/1/2011	Utilities
BitCoin Price	Free	7/18/2011	Finance
Bitcoin Quote	Free	Unavailable	Finance
BitCoin Stats	Free	2/26/2013	Utilities
Bitcoin Ticker	Free	6/30/2011	Finance
BitCoins Mobile	2.99	7/22/2011	Finance
BitRate Bitcoin Monitor	Free	7/21/2011	Utilities
BTCom Bitcoin Monitor	0.99	9/13/2011	Utilities
btcReport	Free	7/7/2011	Finance
Coinbits	Free	8/25/2011	Finance
Scanbook	Free	7/14/2012	Finance

banking system might merely reflect the initial rankings in those countries relative to others.

In order to address the aforementioned concerns, we collect download rank data for all fifteen bitcoin apps available in ten countries (Cyprus, Portugal, Ireland, Italy, Greece, Spain, France, Germany, United Kingdom, and United States) over the seven-day periods before and after the bailout announcement. We then use an established technique to estimate an index of downloads for each country considered. We find that, while downloads of bitcoin apps increased following the announcement, the observed effect is not especially pronounced in those euro area countries thought to have had troubled banking systems at the time. Consistent with Kuittinen's (2013) initial observation, however, the estimated effect is strongest in Spain.

2. Data

App Annie, an analytics company, provides historical in-country download rank data for apps available through Apple's App Store. Table 1 shows the apps we include. It also details the retail price of the app, the date the app was launched, and the iPhone downloads category under which the app is classified. The 15 apps we consider come from the 'Finance' and 'Utilities' categories of iPhone app downloads and comprise the totality of bitcoin tracker apps followed by App Annie that existed prior to the Cyprus announcement.³

The apps considered herein perform various functions for actual and potential bitcoin traders. For example, the app 'Bitcoin App FREE,' allowed users to keep track of the activity in various bitcoin markets and allows them to observe the exchange rate of bitcoin to major currencies, such as the dollar or the pound. It also provided general information of interest to miners of bitcoin, such as the total number of bitcoin mined and the estimated difficulty of the cryptographic problem required to create new bitcoin.⁴ Bitcoin Gold, the app Luther and Olson (2014) examine, listed bitcoin exchange rates on MtGox, a popular online bitcoin exchange market at the time. Other apps, such as Bitcoin Miner Stats, contained data purely for miners. None of the apps allowed users to purchase bitcoin directly.

We collect in-country rank data from App Annie for each app listed in Table 1 for the period March 9 to March 22, 2013. Each country is considered a distinct market. Each app receives a

³ App Annie also tracks 14 apps that were launched after the period considered herein. The app Bitcoin Quote, which is included herein, has since been removed from the app store.

⁴ For an overview of how bitcoin works, see Velde (2013). Lo and Wang (2014), Dwyer (2015), Selgin (2015), and Harwick (2016) discuss the economics of bitcoin. White (2015) considers the market for cryptocurrencies more broadly.

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