Journal of Economics and Business 63 (2011) 349–371

Contents lists available at ScienceDirect

Journal of Economics and Business

A binomial model of Geithner's toxic asset plan

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A R T I C L E I N F O

Article history:
Received 29 January 2010
Received in revised form 28 March 2011
Accepted 30 March 2011

JEL classification:
G12
G13
G18
G21
G28
G38

Keywords:
Bailout
Banking
CMBS
CDOs
EESA
Emergency Economic Stabilization Act
Lending
Legacy Loans Program
Legacy Securities Program
Mortgages
Public–Private Investment Partnership
PPIP
TALF
Term Asset-Backed Securities Loan
Troubled Asset Relief Program (TARP)
RMBS
Too-big-to-fail
Toxic assets
Zombie banks

A B S T R A C T

This paper formally models the Public–Private Investment Partnership (PPIP), a plan for U.S. government sponsored purchases of distressed assets. This paper solves both the problem of the asset manager buying toxic assets and the banks selling toxic assets. It solves for the fair market value of toxic assets implied by subsidized toxic asset sales, and it estimates the size of the government's subsidy. Moreover, this paper finds the circumstances under which banks and asset managers will meet at mutually acceptable prices. In general, healthier banks will be more willing sellers of toxic assets than zombies.

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0148-6195/$ – see front matter
doi:10.1016/j.jeconbus.2011.03.003

1. Introduction

The purchases of so called toxic assets have figured prominently in the U.S. Treasury's attempts to "cleanse" the banking system of bad loans. Both Secretary Henry "Hank" Paulson, Jr., under President George W. Bush, and Secretary Timothy Geithner, under President Barak Obama, have attempted to buy bad assets from banks. Mr. Paulson's attempts culminated in the funding of the $700 billion Troubled Asset Relief Program. He abandoned the troubled assets part of the moniker when he initiated the Capital Purchase Program (CPP) in mid-October 2008 a few weeks after the legislation was signed by President Bush. The CPP bought preferred stock and warrants in "healthy banks."

U.S. Secretary of the Treasury Timothy Geithner subsequently took up this idea of buying bad assets. He released the details of this plan to buy troubled assets in March 23, 2009. Unlike the Resolution Trust Corporation, used to clean up the Savings and Loan Crisis of the 1980s and 1990s, the Public–Private Investment Partnership (PPIP) announced by Mr. Geithner planned to buy troubled assets from banks that had not yet failed. This plan proposed to partner with the Federal Deposit Insurance Corporation (FDIC), the Federal Reserve Bank of New York, and the U.S. Treasury to provide inexpensive financing to private investors to buy up to $500 billion to $1 trillion of toxic assets.[1] While it seems clear that the U.S. Treasury will not participate in such a large scale of toxic asset purchases, it has already spent tens of billions of dollars to buy toxic assets on behalf of taxpayers.

This paper attempts to formally model the incentives of both asset managers buying toxic assets and banks selling toxic assets under the framework of the Public–Private Investment Partnership (PPIP), which is currently being used to buy high yield real estate backed securities and loans with U.S. federal government funds. This is the only paper to formally model the relationship between the interest rates offered on government subsidized debt and the overbidding incentives for toxic assets. It provides closed form solutions to the prices that would prevail in the toxic asset sales, the fair market value of the assets based on prevailing prices, and the levels of expected subsidies involved in toxic asset sales.

This paper uses a binomial option pricing structure to model the joint buying and selling decisions of asset managers and banks, respectively. It proceeds as follows. In Section 2, the details of the U.S. government's toxic asset plans pursued in 2008, 2009, and 2010 are discussed. In Section 3, we discuss the relevant literature. In Section 4, we introduce the model and discuss the asset manager's problem. In Section 5, we generate closed-form solutions for the government's subsidy. Next, in Section 5.3, we discuss the incentives of the bank disposing of the toxic assets and pursue a numerical example. In Section 6, we discuss an extension of the model in continuous time, and numeric solutions are generated from the Black and Scholes (1973) approach in that section. Finally, in Section 7, the paper concludes.

2. Toxic Asset Purchase Programs

There are three toxic asset programs which have been undertaken by the U.S. government since 2009. The Term Asset-Backed Securities Loan (TALF) was sponsored by the Federal Reserve Bank of New York and the U.S. Treasury. It bought over $11 billion of commercial mortgage backed securities (CMBS). The Legacy Loans Program (LLP) of the Federal Deposit Insurance Corporation (FDIC) is ongoing and has exclusively sold troubled bank loans from the FDIC's receivership estates. The U.S. Treasury's Legacy Securities Program (LSP) is scheduled to buy $29.4 billion worth of legacy CMBS and residential mortgage backed securities RMBS. Only the first and third programs, the TALF and the LSP, are supported by taxpayer bailout funds, the TARP. More importantly for this study only the TALF and the LSP will buy toxic assets from open banks. Since this paper models the decision of an open bank to sell its toxic assets it is most relevant to studying the TALF and LSP. Nevertheless, many of the results concerning the overbidding incentives of the asset manager are also relevant to the FDIC's LLP. All three programs subsidize the purchase of toxic assets through low interest rate, non-recourse loans.[2]

[1] Timothy Geithner, March 23, 2009, "My Plan for Bad Bank Assets," *Wall Street Journal*, accessed online on January 24, 2010, at http://online.wsj.com/article/SB123776536222709061.html.

[2] Through July 2010, these LSP, the LLP, and the TALF, programs have sponsored the purchase of $16.2 billion, $7.3 billion, and $11.5 billion in toxic assets, respectively. Both the LSP and the LLP are continuing to fund the purchase of distressed real estate securities and loans.