



Contents lists available at ScienceDirect

## International Journal of Forecasting

journal homepage: [www.elsevier.com/locate/ijforecast](http://www.elsevier.com/locate/ijforecast)

# Balance sheets of financial intermediaries: Do they forecast economic activity?

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## ARTICLE INFO

## Keywords:

Financial intermediaries  
Forecasting  
Macro financial linkages

## ABSTRACT

This paper conducts a *real-time*, out-of-sample analysis of the forecasting power of various aggregate financial intermediaries' balance sheets for a wide range of economic activity measures in the United States. I find evidence that the balance sheets of leveraged financial institutions do have out-of-sample predictive power for future economic activity, and this predictability arises mainly through the housing sector. Nevertheless, I show that these variables have very little predictive power during periods of economic expansion, with predictability arising mainly during the financial crisis period.

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## 1. Introduction

The extent of the recent turmoil in financial markets and its long-lasting spillover effects on the real economy have renewed the interest in studies of the interaction between credit conditions and the macroeconomy. More meaningfully, it has attracted attention to the role played by financial intermediaries in the fluctuations of risk premia and economic activity.

This paper conducts a careful examination of the predictive power of different financial intermediaries' balance sheets for future changes in a wide set of economic activity measures in the US. Unlike previous research, I conduct all of my forecasting tests in an out-of-sample, *real-time* setting. I report evidence that the balance sheets of some financial intermediaries, namely security broker-dealers, and, to a lesser extent, shadow banks, have out-of-sample power in *real time* for future economic activity. Nevertheless, I also find that the informational content of the balance sheets is quite unstable, accruing more significantly

in recessionary periods, and/or times of financial stress. I then show, using data-rich forecasting methods, that the information contained in these balance sheets is roughly equal to that of traditional macrofinancial series in normal economic environments.<sup>2</sup> On the data front, I contribute to the real-time forecasting literature by constructing a quarterly real-time data set of aggregate financial intermediaries' balance sheets, as released quarterly by the Flow of Funds of the Federal Reserve Board.

My results also point to the relevant channels through which fluctuations in financial intermediaries' balance sheets forecast economic growth. I find that the predictive power of these balance sheets for future GDP arises mainly through the housing sector. Fluctuations in broker-dealers' leverage and equity are strong predictors of the expected real housing investment growth. To a large extent, this predictability is orthogonal to the information contained in traditional macro and financial indicators.

Recently, several papers have attracted attention to the importance for the economy of financial intermediaries' balance sheets. On the theoretical front, a large number

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<sup>1</sup> The views expressed in this paper are those of the author. No responsibility for them should be attributed to the Bank of Canada.

<sup>2</sup> I define normal economic environments as periods without recessions or financial crises.

of recent papers have shown how fluctuations in the balance sheets of financial intermediaries impact economic activity and amplify economic shocks. Christensen, Meh, and Moran (2011), Meh and Moran (2010) and Sandri and Valencia (2013) develop dynamic stochastic general equilibrium (DSGE) models for studying the ways in which financial intermediaries' balance sheets may amplify shocks to the economy, as well as becoming the source of economic activity fluctuations themselves, following significant disturbances to their net worth. These studies generally show that shocks to financial intermediaries' balance sheets have a much more disruptive effect on economic activity than shocks to households' or non-financial firms' balance sheets. This is due mainly to the higher leverage of financial intermediaries, which reduces their ability to buffer shocks to their net worth. Thus, an exogenous shock to financial intermediaries' net worth leads to a large reduction in their risk-bearing capacity, resulting in a significant cut in financial intermediation, and hence a fall in economic activity. By this same mechanism, one would expect that shocks to the highly leveraged financial intermediaries, such as broker-dealers, would have a stronger potential to impact economic activity than shocks to the commercial banks' balance sheets.<sup>3</sup>

On the empirical side, Adrian and Shin (2010a, chap. 12) provide one of the first studies showing that fluctuations in the balance sheets of financial institutions, especially broker-dealers, contain in-sample forecasting power for future GDP growth. In addition, Adrian, Moench, and Shin (2010) argue that the balance sheets of broker-dealers and shadow banks have information for the expected returns of various bond and equity markets in the United States.<sup>4</sup> This result holds both in- and out-of-sample, as well as before the financial crisis. However, these authors do not study the out-of-sample predictability of economic activity by means of these financial intermediaries' balance sheets. Kollmann and Zeugner (2012), on the other hand, show that the leverages of various sectors of the economy (financial and non-financial firms, and households) have both in-sample and out-of-sample forecasting power for economic activity. I add to their results by considering a real-time setting with additional financial intermediaries, more measures of economic activity, and a more systematic evaluation of the time-varying out-of-sample forecasting performances of the different models.

The paper is organized as follows. Section 2 discusses the data. Section 3 provides an initial exploration of the forecasting power of financial intermediaries' balance sheets in a simple set-up. This section also explores how the forecasting power of financial intermediaries' balance sheets compares to those of traditional macroeconomic and financial predictors, and examines the time stability of the former. Section 4 concludes.

<sup>3</sup> For a comparison of the balance sheet dynamics of commercial banks and broker-dealers, see Adrian and Shin (2010b) and Nuño and Thomas (2013).

<sup>4</sup> Adrian, Etula, and Shin (2009) also argue that fluctuations in the aggregate balance sheets of broker-dealers forecast exchange rate returns for a large set of countries at the weekly, monthly and quarterly horizons, both in- and out-of-sample. Etula (2013) shows that broker-dealers' asset growths forecast a wide range of commodity prices at quarterly horizons, both in- and out-of-sample.

**Table 1**

Composition of balance-sheet variables.

Financial intermediaries	Variables
Broker-dealers (BD)	Broker-dealers
Commercial banks (CB)	Commercial banks Savings institutions Credit unions
Shadow banks (SB)	Asset-backed securities issuers Finance corporations Funding corporations
Mortgage pools (MP)	Mortgage pools

Note: The table shows the compositions of all balance sheet indicators used in the analysis. All data were gathered from the Federal Reserve Board Flow of Funds data. Equity is defined as total financial assets minus total financial liabilities,  $(A - L)$ . Leverage is defined as total financial assets over equity,  $A/E = A/(A - L)$ .

## 2. Data

I use quarterly data on financial intermediaries' balance sheets, and macroeconomic and financial indicators from 1985Q1 to 2010Q4, to study the predictability of a diverse group of economic activity variables, namely gross domestic product, industrial production, non-farm payroll, real private investment, real housing investment, and durable consumption. In this section, I detail how I constructed both my financial intermediaries' balance sheet data set, and the macrofinancial data set.

In assessing the marginal predictive content of financial variables for real activity using real-time data, one important issue is the fact that the latter are being revised constantly. I follow Faust and Wright (2009) and use the data as recorded two quarters after the quarter to which the data refer as the realized value. For the national income and product accounts data, this corresponds to the data recorded in the second revision.

### 2.1. Financial intermediaries' balance-sheet data

I investigate the predictive power of aggregate balance-sheet fluctuations of the following financial intermediaries: (i) *commercial banks* (CB), comprising commercial banks, credit unions and savings institutions; (ii) *securities broker-dealers* (BD); (iii) *shadow banks* (SB), comprising the issuers of asset-backed securities, finance corporations and funding corporations; and (iv) *agency- and government sponsored enterprise (GSE)-backed mortgage pools*.<sup>5</sup> Table 1 details the compositions of all balance-sheet variables. For

<sup>5</sup> (i) Commercial banks are financial institutions that raise funds through demand and time deposits, as well as from other sources, such as federal funds purchases and security repurchase agreements, funds from parent companies, and borrowing from other lending institutions; then use these funds to make loans, primarily to businesses and individuals, and to invest in securities. (ii) Broker-dealers are financial institutions that buy and sell securities for a fee, hold an inventory of securities for resale, or do both. (iii) The issuers of asset-backed securities (ABS) are special purpose vehicles (SPVs) that hold pools of assets (usually loans) in trust and use them as collateral for the issuance of ABS. (iv) Agency- and GSE-backed mortgage pools are groups of mortgages that are used as collateral for a mortgage-backed security. For a full description of these financial intermediaries, see the Financial Accounts Guide at <http://www.federalreserve.gov/apps/fof/>.

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