



# UNITED STATES

## 2011 ARTICLE IV CONSULTATION

July

### Selected Issues

**This Selected Issues Paper for the United States was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed on July 7, 2011. The views expressed in this document are those of the staff team and do not necessarily reflect the views of the government of United States or the Executive Board of the IMF.**

**The policy of publication of staff reports and other documents by the IMF allows for the deletion of market-sensitive information.**

Copies of this report are available to the public from

International Monetary Fund • Publication Services  
700 19<sup>th</sup> Street, N.W. • Washington, D.C. 20431  
Telephone: (202) 623-7430 • Telefax: (202) 623-7201  
E-mail: [publications@imf.org](mailto:publications@imf.org) Internet: <http://www.imf.org>

Price: \$18.00 a copy

**International Monetary Fund  
Washington, D.C.**

INTERNATIONAL MONETARY FUND

UNITED STATES

**Selected Issues**

Prepared by Nicoletta Batini, Oya Celasun, Thomas Dowling, Marcello Esteveao, Geoffrey Keim, Martin Sommer, Evridiki Tsounta, Grace Bin Li (all WHD); John Kiff (MCM); Sally Chen (SPR); Joshua Felman, Roxana Mihet, and Lev Ratnovski (all RES)

Approved by Gian Maria Milesi-Ferretti

July 7, 2011

	Contents	Page
I.	The U.S. Housing Market Outlook—What are the Potential Benefits of Mitigating Distressed Sales?.....	4
	A. Introduction.....	4
	B. Weak Demand, Elevated Inventories, and Distress Sales Bearing on House Prices	5
	C. What is the Outlook for Home Prices?.....	7
	D. Conclusion .....	9
II.	Household Deleveraging and the Recovery.....	14
	A. Introduction.....	14
	B. Analysis.....	15
	C. Conclusion.....	17
III.	Policies to Facilitate Labor Market Adjustment.....	21
	A. Introduction.....	21
	B. Structural Job Losses During the Great Recession .....	22
	C. Policy Implications.....	24
IV.	Strengthening Private Mortgage Securitization.....	36
	A. The Mortgage-Backed Securities Market After the Financial Crisis .....	36
	B. The Magnitude of Mortgage Credit Shortfall as the GSEs Shrink .....	37
	Impact of New Incentive Structure on Securitization.....	38
	C. The Impact of Winding Down the GSEs .....	40
	The Impact of Reducing Conforming Loan Limits on Mortgage Volume .....	40
	The Impact of Raising the GSEs' Guarantee Fees .....	40
	D. Conclusion .....	41
V.	Why Are U.S. Firms Hoarding Money? .....	44
	A. Motives for Money Holdings.....	45
	B. Money and Investment.....	46

VI.	How do Commodity Price Shocks Affect TIPS-Based Inflation Compensation?.....	55
	A. Introduction.....	55
	B. Results.....	56
	C. Conclusion.....	57
VII.	Fiscal Challenges Facing the U.S. State and Local Governments.....	59
	A. Fiscal Adjustment in the Aftermath of Great Recession.....	60
	B. Medium-Term Challenges.....	62
	C. Financial Market Developments.....	64
	D. Conclusions.....	65
VIII.	Budget Institutions for Federal Fiscal Consolidation.....	68
IX.	The Challenge of Dealing with Mortgage Delinquencies.....	77
	A. Introduction.....	77
	B. Current Federal Foreclosure Mitigation Efforts.....	78
	C. What More Can be Done?.....	79
	Parametric Changes to Existing Programs.....	79
	Allowing All Mortgages to be Modified in Bankruptcy Proceedings (“Cram downs”).....	80
	Further Incentives for Short Sales/Deed in Lieu.....	81
	GSEs and Principal Writedowns.....	82

## Figures

I.1.	Simulation and House Price Dynamics, 1995–2015.....	11
II.1.	Response of Consumption to Various Shocks.....	18
II.2.	Percentage Deviation of Consumption from the Predicted Path: 2007Q4–2010Q4.....	19
III.1.	Cyclical and Structural Changes in Employment Across U.S. Sectors.....	27
III.2.	Sectoral Employment Changes Above and Beyond Usual Patterns During Downturns.....	28
III.3.	Sectoral Employment Changes Above and Beyond Usual Patterns During Recoveries.....	28
III.4.	Comparison of Labor Cutbacks in the United States, Canada, and Germany.....	29
III.5.	Cumulative Change in Unemployment Rates in the United States, Canada, and Germany.....	29
V.1.	Money Holdings and Investment Deviations from Desired Values.....	48
V.2.	How Does Investment React to an Increase in the Money Stock Held?.....	48
VIII.1.	Comparison of Long-Term GDP Forecasts.....	70

## Tables

I.1.	Model Analysis .....	7
I.2.	Expected Nominal Home Price Changes by Year .....	8
II.1.	Variance Decomposition of Consumption (PCE) Fluctuations .....	17
III.1.	Industries with Structural Employment Losses, December 2007–May 2011 .....	30
III.2.	Industries with Structural Employment Gains, December 2007–May 2011 .....	31
III.3.	Industries with Procyclical Employment Flows, December 2007–May 2011 .....	31
III.4.	Industries with Countercyclical Employment Flows, December 2007–May 2011 .....	32
III.5.	Estimates of the Sensitivity of Industrial Employment Growth to Output Growth, 1947–2007 .....	32
III.6.	Seven Largest Programs: Estimated Amount Spent on Employment and Training Activities in Fiscal Year 2009 and Estimated Number of Participants Served .....	33
IV.1.	Potential Scenario for Financing New Home Mortgage in 2018 .....	38
V.1.	Pairwise Granger Causality Tests .....	45
VI.1.	The Sensitivity of TIPS-Based Inflation Compensation to Oil and Food Commodity Price Shocks .....	58
VIII.1.	Selected Institutional Reforms to Support Fiscal Adjustment .....	72
VIII.2.	Key Institutional Characteristics of the Fiscal Forecasting Process .....	74

## Appendices

III.1.	Data Definitions and Sources .....	34
V.1.	Methodology and Data .....	50

## Appendix Figures

VI.1.	Fitted Versus Actual Values of the I(I) and I(0) Representations .....	54
VIII.	Real Output Forecast Errors .....	75

## Appendix Table

V.1.	Test of Identifying Restrictions on the Co-integrating Vectors .....	53
------	--	----

## Boxes

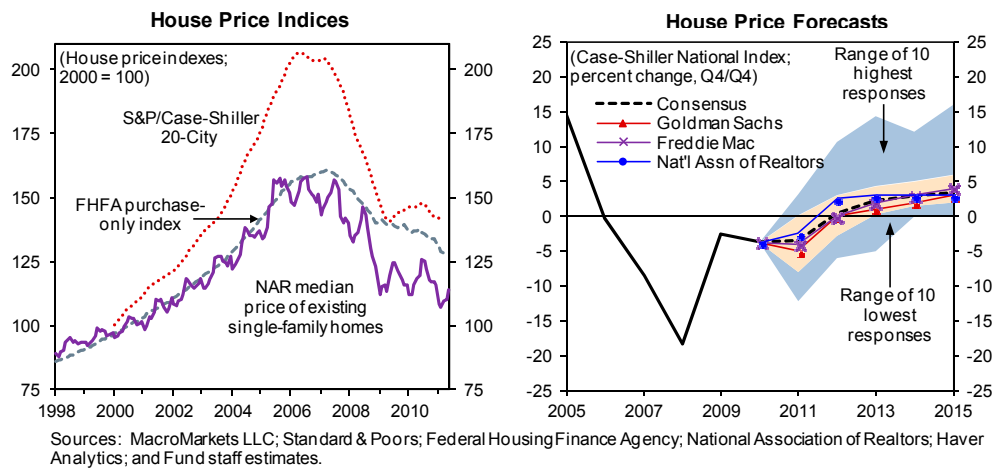
I.1.	The U.S. Housing Market: Some Basic Facts .....	10
I.2.	The Mortgage Legal Documentation Problem .....	10
IV.1.	Dodd-Frank Act Securitization Risk Retention Options .....	42
IX.1.	Selected Federal Foreclosure Mitigation Policies .....	83

## I. THE U.S. HOUSING MARKET OUTLOOK—WHAT ARE THE POTENTIAL BENEFITS OF MITIGATING DISTRESSED SALES?<sup>1</sup>

*The housing market still faces headwinds. Construction activity and sales hover around historic lows and prices have fallen again in recent months. With a large housing inventory already on the market and a large “shadow inventory” of distressed properties that could enter the market, we expect only a subdued recovery in house prices over the medium term. We update prior research by Fund staff and confirm that foreclosure starts have a large negative effect on house prices, suggesting that effective foreclosure mitigation policies could have measurable macroeconomic benefits.*

### A. Introduction

1. **The housing market remains weak** (Box 1). Housing starts, building permits, and sales remain close to historic lows while house prices have fallen since the expiration of temporary homebuyers’ tax incentives in mid-2010, although at a declining clip. The outlook remains clouded, with a sizable “shadow inventory” of houses that are likely to come on the market through distressed sales.<sup>2</sup> Most analysts and staff expect further price declines in the near term and a recovery in housing activity to levels consistent with demographic trends only after 4–5 years (MacroMarkets, 2011).



<sup>1</sup> Prepared by Evridiki Tsounta (WHD). The paper has benefited from numerous conversations with Oya Celasun and John Kiff. Special thanks to Vladimir Klyuev for providing the code for his housing model and to Grace Bin Li for updating it.

<sup>2</sup> Distress sales typically include foreclosed properties and short sales. They represented over a third of all homes sold in the past 2 years (the most recent observation for the share of distress sales, for May 2011, was about 30 percent of sales). The Corelogic National Home Price Index including distress sales is down 33 percent from its peak and 21 percent excluding such sales.

2. **The anemic level of residential construction is largely the natural—and necessary—consequence of past overbuilding.** Vacancy rates remain well above normal frictional levels, reflecting both the overbuilding during the housing boom as well as the subdued pace of household formation since the crisis. High vacancy rates, in turn, are weighing on new residential construction activity.<sup>3</sup> We estimate excess vacancies to be currently around 3 million units, based on deviations of vacancy rates from historic averages. Residential construction is expected to increase to an annual rate of around 1.2 million units by 2015 (much higher than the current ½ million), close to past trends in household formation, as vacancy rates return to normal levels.

#### **B. Weak Demand, Elevated Inventories, and Distress Sales Bearing on House Prices**

3. **The inventory of houses for sale remains unusually high, putting downward pressure on house prices.** Despite a very subdued pace of residential construction, the inventory of existing houses for sale is equivalent to around 9¼ months of current sales—well above the historical average of 6 months.<sup>4</sup> This elevated inventory-to-sales ratio reflects both the large stock of houses for sale and the very subdued sales pace (existing home sales are around 5 million in annualized terms, compared to a peak of over 7 million during the housing boom).

4. **The supply of houses for sale could remain high for some time, given the large stock of mortgages that are either in the foreclosure process or severely delinquent, or likely to default in the future.** We estimate the glut of properties that could enter the market through distress sales—often referred to as shadow inventory—at around 6 million.<sup>5</sup> The shadow inventory includes:

- *The 2.3 million houses currently in the foreclosure process.* In 2010, according to Realty Trac (2011), there were a record 2.9 million foreclosure filings (by contrast, around 550,000 foreclosures took place each year between 2000–05).<sup>6</sup> Foreclosure activity has been subdued so far in 2011, with a 40-month low in April largely due to

---

<sup>3</sup> Estimates of excess vacancies range between 1½ and 4½ million units, depending on the assumptions for equilibrium household formation and construction activity (Lawrel, 2011 and Goldman Sachs, 2011). According to Marple (2011), household formation, which is a key driver of the construction of new housing, has fallen to 0.3 million in 2010 versus 1.6 million in 2007, given dismal labor market conditions (particularly for those below age 35).

<sup>4</sup> Only a small fraction of foreclosed properties is included in this inventory stock.

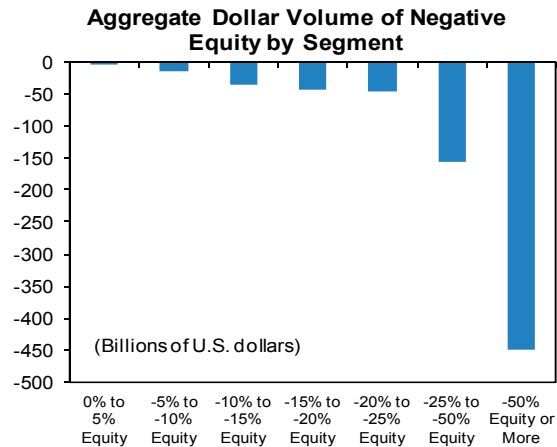
<sup>5</sup> There is a large variation in shadow inventory estimates, which mostly reflect differences in the definition used; for example, some analysts only include seriously delinquent mortgages in the definition.

<sup>6</sup> A foreclosed property might have more than one filing if there are junior mortgage liens. It is estimated that around 10 percent of the mortgaged value is in unsecured-second liens (Amherst, 2011a). According to Amherst (2011b), the percentage of second loans bundled into securitizations is negligible.

a temporary freeze in foreclosure processing amid documentation problems, with banks facing increasing scrutiny, lawsuits from states, and investigations from various federal agencies (Box 2).

- *An additional 1.8 million mortgages at risk of becoming foreclosed with payments past due for at least 90 days.* Under historical norms for delinquency rates, about 400,000 mortgages would have been past due for 90 days or more given the current number of outstanding mortgages.

- *Around one million underwater mortgages that are still being serviced but could potentially become delinquent.*<sup>7</sup> CoreLogic (2011) estimates that at the end of the first quarter of 2011 as many as 11 million mortgaged properties were underwater with another 2.4 million borrowers only five percent shy from negative equity. The aggregate level of negative equity was around \$750 billion at end-2010.<sup>8</sup> Strategic defaults—the decision by a borrower to default despite having the financial ability to make the payments—are closely associated with negative equity. Strategic defaults are estimated to have accounted for as much as 31 percent of all defaults in 2010, as compared to about 4 percent in mid-2007 (Guiso et al., 2011, Sapienza and Zingales, 2010).



Sources: FirstAmerican CoreLogic and Fund staff calculations.

- *Around one million in modified mortgages with a high re-default risk* (given a re-default rate of around 40 percent within a year of modification for private servicer mortgages, OCC (2011)).

##### 5. **Distress sales form a key impediment to a faster housing market recovery.**

Foreclosed properties not only add to the housing inventory for sale but they often sell at a significant discount of as much as 27 percent (Campbell et al., forthcoming); in addition, foreclosed properties dampen neighboring house prices by 1½–2 percent (Hartley, 2010).

<sup>7</sup> We assume that 10 percent of the 11 million underwater mortgages would default, consistent with the experience of Massachusetts in the 1990s as analyzed in Foote et al. (2008).

<sup>8</sup> There are around 52 million households with a mortgage out of 130.8 million housing units; household mortgage debt outstanding was \$10 trillion at end-2011Q1 with housing value estimated at \$16.1 trillion.

The shadow inventory of houses could enter the market through distressed sales and exert additional downward pressure on house prices if markets have not already incorporated this potential future source of supply in existing prices. Furthermore, the shadow inventory raises the uncertainty as to when house prices would reach the bottom, possibly keeping prospective home buyers and investors out of the real estate market. It is also possible that house prices are depressed just by the uncertainty about these channels.

### C. What is the Outlook for Home Prices?

#### 6. Staff estimates suggest that foreclosures are indeed associated with downward pressure on house prices at the aggregate level.

We updated the Klyuev (2008) house price model using data up to 2011Q1. We find that the inventory-to-sales ratio (a measure of imbalance between supply and demand in the housing market) and foreclosure starts are important determinants of house price developments. A 20 percent increase in the inventory-to-sales ratio would weaken house prices by almost 0.15 percentage points in the next quarter. And foreclosures not only lower prices by adding to the inventory of for-sale properties, but also exert additional significant downward pressure on prices on their own (Table 1).<sup>9</sup> We also attempt to control for the deviation of actual house prices from levels suggested by economic fundamentals (the “price gap”, calculated as residuals in an estimated equation linking the ratio of house prices to rents and the real interest rate); we find that the gap is a statistically significant determinant of quarterly price changes but its impact is economically small.

Table 1. Model Analysis

Quarterly House Price Dynamics	
Dependent variable	Change in the log of real home price from previous quarter times 100.
Estimation Period	1982Q3-2011Q1
Estimation technique	OLS
Standard Errors	Newey-West
Constant	-0.0080
Lagged dependent variable	0.7293***
Lagged log of inventory to sales ratio	-0.5985**
Second lag of foreclosure starts	-0.5868***
Lagged price gap 1/	-0.0115*

Source: Author's calculations.

Note: One, two, or three stars indicate significance at the 10, 5 and 1 percent level, respectively.

1/ The price gap was estimated as the residual of an equation linking house price-to-rent ratio and real interest rates using dynamic OLS estimation for the period 1970Q1-2010Q4. The coefficient of the real interest rate (-0.0404) was statistically significant at the 1 percent level.

7. **We project house prices under the assumption that sales gradually return to normal levels and the shadow inventory enters the market over the next 2–3 years.** We project home prices using the estimated equation based on projected paths for the inventory-to-sales ratio, foreclosure starts, and the price gap (Figure 1). We assume that all economic fundamentals governing house price changes will return to their historical averages over the medium term. Foreclosure starts will remain at the current elevated levels until 2013 given

<sup>9</sup> Foreclosures influence prices with a lag since it takes time for the foreclosure process to run its course and add to inventory and for information to affect market sentiment and lending standards (Klyuev, 2008).



the large shadow inventory and then gradually decline to the long-run average of around 600,000 annually.<sup>10</sup> Similarly, the inventory to sales ratio would remain elevated for the next 2–3 years given the foreclosed properties entering the market but it would return to its historical average of 6 months supply of sales as the pace of sales normalizes (with the sales-to-population ratio gradually returning to its historic average). To calculate the price gap, we assume that real rents would continue to increase in the short run; once real rents revert to their long-run average, nominal rents would start to grow at the rate of headline inflation.

8. **Based on these simulations, we project a subdued and protracted recovery in house prices** (Figure 1 and Table 2). Both staff and consensus expect further weakening in house prices in the near term, with staff projecting somewhat larger declines consistent with its below-consensus economic outlook. However, we see somewhat greater momentum over the medium term as foreclosures and the housing inventory decline to normal levels. We expect house prices to increase by only 4½ percent between end-2010 and end-2015 (Table 2).

Table 2. Expected Nominal Home Price Changes by Year (in percent)

Year	Consensus		IMF staff (baseline 1/)		IMF staff (alternative 2/)		IMF staff (alternative 3/)	
	Year-over-Year (Q4 to Q4)	Cumulative (Q4 vs. Q4 2010)	Year-over-Year (Q4 to Q4)	Cumulative (Q4 vs. Q4 2010)	Year-over-Year (Q4 to Q4)	Cumulative (Q4 vs. Q4 2010)	Year-over-Year (Q4 to Q4)	Cumulative (Q4 vs. Q4 2010)
2010	-3.8	..	-3.8	..	-3.8	..	-3.8	..
2011	-3.5	-3.5	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5
2012	0.5	-3.0	0.5	-5.0	1.7	-3.8	1.5	-4.0
2013	2.2	-0.9	2.3	-2.9	4.0	0.0	3.8	-0.4
2014	2.9	2.1	3.0	0.0	4.0	4.0	3.9	3.5
2015	3.5	5.7	4.4	4.4	4.3	8.4	4.3	7.9

Sources: MacroMarkets and Fund staff projections.

1/ In the baseline scenario, 6.8 million foreclosures occur between 2011Q2 and 2013-Q4.

2/ Preventing 1 million foreclosures vis a vis baseline scenario with houses not entering the real estate market.

3/ Preventing 1 million foreclosures vis a vis baseline scenario with houses entering the real estate market.

9. **We also examined a scenario where one million foreclosure starts are averted between 2011Q3 and end-2013**, through the enactment of foreclosure mitigation policies (e.g., as discussed in Chapter 9). In that case, since distressed sales would be avoided, house prices would be 3¼–4 percent higher by 2015 compared to the baseline scenario, depending on whether the properties (for which foreclosures are averted) eventually enter the market or not. In particular, if the one million properties are not posted for sale by 2015 (that is, if the households retain their properties), then house prices would be 4 percent higher than in the

<sup>10</sup> Specifically, staff projects that foreclosures would stay at their current elevated level for the next two years with almost 7 million foreclosures taking place between 2011Q2 and 2013Q4 given (i) the large shadow inventory of houses for sale and (ii) the negative outlook for house prices that could result in additional underwater mortgaged properties. Staff does not expect additional pressures on foreclosures (from current levels) from the sluggish recovery in the labor market, since it projects a gradual improvement on that front.

baseline scenario. If distress sales are avoided but the one million properties are nonetheless posted for sale, then house prices would be 3¼ percent higher than in the baseline scenario.

#### **D. Conclusion**

10. **The U.S. housing market remains depressed, given a large overhang of vacant or distressed properties—a key legacy of the housing bubble.** We expect moderate house price declines in 2011 and only modest increases over the medium term, broadly in line with consensus forecasts. House prices are projected to increase only by 4½ percent between end-2010 and end-2015, with foreclosures remaining significantly elevated through 2013.

11. **Our analysis suggests that policies to mitigate distress sales would have a significant positive impact on house prices.** We estimate that avoiding one million foreclosures through 2013 could raise house prices by 3¼–4 percent by end-2015 compared to the baseline scenario. These estimates could be on the low side since they ignore the potential improvement in homebuyer sentiment from reducing the uncertainty surrounding the housing market outlook by reining in the shadow inventory.

### Box 1. The U.S. Housing Market: Some Basic Facts<sup>1</sup>

**There are a large number of players in the U.S. mortgage market, involved with originating, funding and servicing mortgages.** Loans are made (originated) by a huge variety of retail finance institutions, including banks, mortgage brokers and finance companies. The most typical loans are: (i) *conforming mortgages*, which satisfy certain legally mandated restrictions on credit risk and size and are most often securitized by the Government Sponsored Enterprises (GSEs); (ii) *jumbo mortgages*, which are large mortgages with higher than normal credit risk (given the larger loan balances and the fact that the properties are more expensive and thus tend to be harder to sell) typically securitized by private entities; and (iii) *government-backed mortgages*, guaranteed by the Federal Housing Administration (FHA) and the Veterans' Administration.

**Before the crisis, mortgage lenders have fund their loans with a mix of equity, debt and secondary market transactions.** There was a well-developed secondary mortgage market comprised of GSEs, which fund conforming loans, and private mortgage conduits, investment banks, and pools of managed assets. This market allowed lenders to transform the mortgage into a highly-rated liquid security.

**Mortgage servicers play an important role.** Servicers are responsible with the day-to-day business of managing payments from borrowers and are usually responsible for handling delinquent borrowers. In return, they charge a small fraction of the mortgage monthly payment as a fee. Servicers are typically required to advance scheduled principal and interest payments to the holder even if the borrower is delinquent; but they are later reimbursed of all out-of-pocket expenses incurred during the foreclosure proceeding (Cordell et al., 2008), making it less than clear if it is profitable for the servicer to offer mortgage modifications (Eggert, 2007).

**Foreclosure laws vary widely by state**, with 23 states requiring a judicial foreclosure process. In these cases, the court oversees and approves each stage of the foreclosure process, making it much lengthier (prior to a foreclosure, the borrower must be delinquent for at least 90 days). Typically in states where non-judicial foreclosures are authorized, most loans are considered non-recourse (i.e., the lender cannot go after the borrower's other assets in case of default). The 18 non-recourse states include Florida and California.

<sup>1</sup> The analysis draws heavily from Lehnert (2011).

### Box 2. The Mortgage Legal Documentation Problem<sup>1</sup>

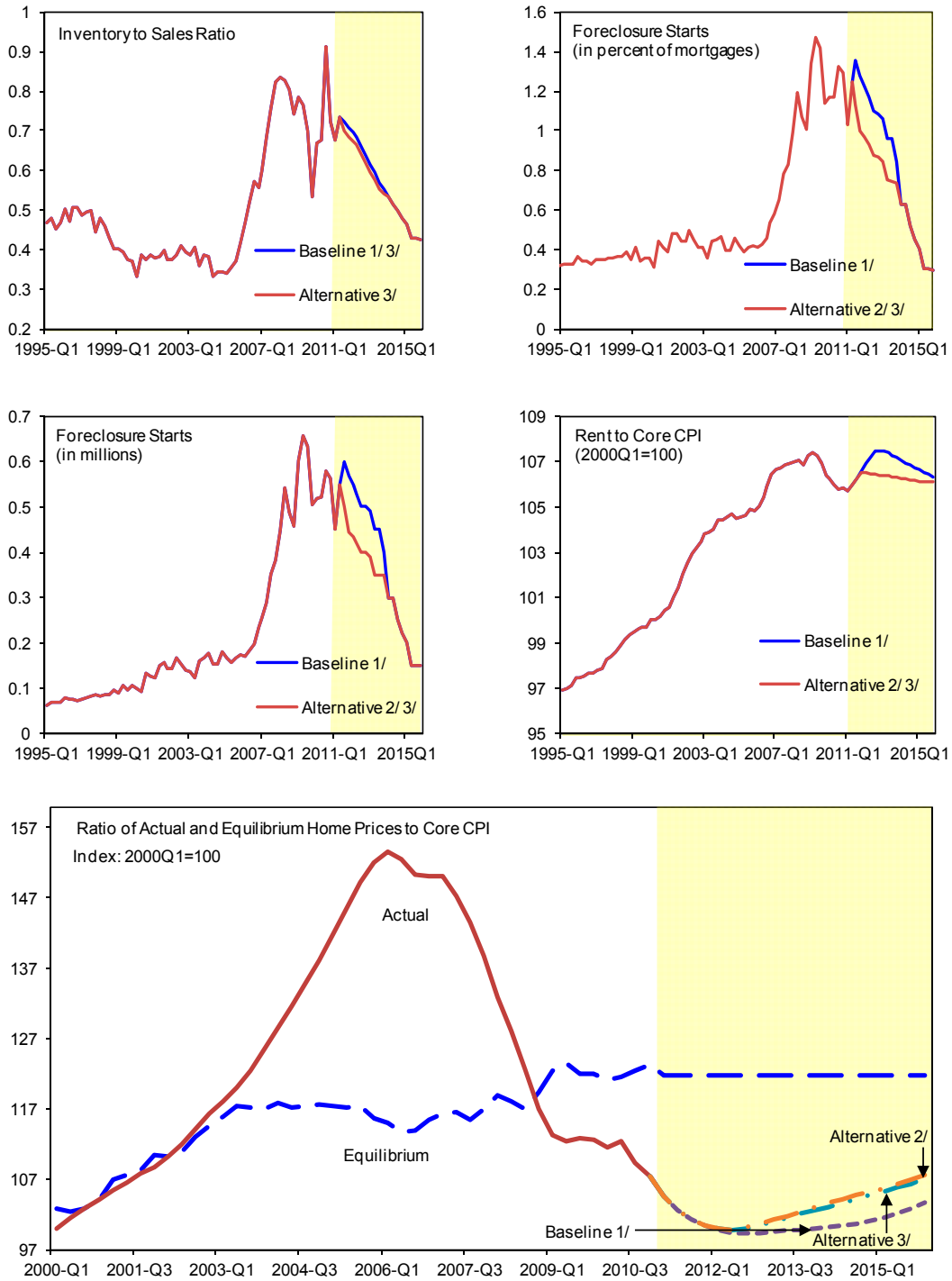
**In September 2010, many banks temporarily suspended foreclosures as a result of potential technical deficiencies in necessary legal documentation relating to the handling of mortgage “notes” that set the terms and conditions of the loans.**<sup>2</sup> In many cases, transfers of the notes were improperly executed or were misplaced. When the note is missing, a notarized lost note affidavit along with a copy of the note can be presented. However, in their haste to process large volumes of foreclosures, in some cases the affidavits were signed by “robo-signers”—individuals who did not have the necessary personal knowledge of the validity of the missing notes—or were not properly notarized. Following these allegations, some homeowners challenged the validity of foreclosure proceedings altogether.

**Another part of the securitization chain that has been raising concerns is the role of the Mortgage Electronic Registration System (MERS) used by many lenders to record the ownership chain of a mortgage.** MERS records have been challenged in the courts before with mixed results depending on the jurisdiction.

<sup>1</sup> The box includes contributions by John Kiff.

<sup>2</sup> A “mortgage loan” consists of two parts, (i) the notes, which are negotiable instruments that transfer along the securitization chain from the originator to the sponsor and ultimately to the trust and (ii) the lien, that gives the holder the right to take away the underlying property if any of the terms and conditions of the note is violated

**Figure 1. United States. Simulation and House Price Dynamics, 1995-2015**



Sources: Haver Analytics and Fund staff projections.

1/ In the baseline scenario, 6.8 million foreclosures occur between 2011Q3 and 2013-Q4.

2/ Preventing 1 million foreclosures vis a vis baseline scenario with houses not entering the real estate market.

3/ Preventing 1 million foreclosures vis a vis baseline scenario with houses entering the real estate market.

## REFERENCES

- Amherst, 2011a, “Outlook and Opportunities in the U.S. RMBS Market,” *Presentation Book April*.
- Amherst, 2011b, “Borrowers stay current on 2nd lien for liquidity,” available at: <http://www.housingwire.com/2011/02/17/borrowers-stay-current-on-2nd-lien-for-liquidity-amherst>
- Campbell, J.Y., S. Giglio, and P. Pathak, forthcoming, “Forced Sales and House Prices,” *American Economic Review*.
- Cordell, L., K. Dynan, A. Lehnert, N. Liang, and E. Mauskopf, 2008, “The Incentives of Mortgage Servicers: Myths and Realities,” *Finance and Economics Discussion Series Divisions of Research & Statistics and Monetary Affairs 2008–46*, Federal Reserve Board, Washington, D.C.
- Corelogic, 2011, *Negative Equity Report*.
- Eggert, K., 2007, “Comment: What Prevents Loan Modifications?” *Housing Policy Debate*, Vol. 18, pp. 279–97.
- Foote, C. L., K. Gerardi, and P.S. Willen, 2008, “Negative Equity and Foreclosure: Theory and Evidence,” *Journal of Urban Economics*, Vol. 64(2), pp. 234–45.
- Goldman Sachs, 2011, “Excess Vacant Units,” excerpt available at: <http://www.calculatedriskblog.com/2011/04/goldman-estimates-35-million-excess.html>
- Guiso, L., P. Sapienza and L. Zingales, 2011, “The Determinants of Attitudes Towards Strategic Default on Mortgages,” *EUI Working Paper*, European University Institute.
- Hartley, D., 2010, “The Effect of Foreclosures on Nearby Housing Prices: Supply or Disamenity?,” *Working Paper 10–11*, Federal Reserve Bank of Cleveland.
- Klyuev, V., 2008, “What Goes Up Must Come Down? House Price Dynamics in the United States,” *IMF Working Paper 08/187*, Washington, DC: International Monetary Fund.
- Lawler, T., 2011, “Census 2010 and Excess Vacant Housing Units Understanding Why Demographers Drink,” excerpt available at: <http://www.calculatedriskblog.com/2011/03/lawler-census-2010-and-excess-vacant.html>

Lehnert, A., 2011, “Residential Mortgages” in A.N. Berger, P. Molyneux and J.O.S. Wilson (eds) *Oxford Handbook of Banking*, pp. 565–98.

MacroMarkets, 2011, *Home Price Expectations Survey*, June.

Marple, J., 2011, “Setting the Stage for a U.S. Housing Recovery,” *Observation*, TD Economics, April.

Office of the Comptroller of the Currency and Office of Thrift Supervision, 2011, *OCC and OTS Mortgage Metrics Report Fourth Quarter 2010*, available at:  
<http://www.occ.gov/news-issuances/news-releases/2011/nr-ia-2011-38.html>

Realty Trac, 2011, *U.S. Foreclosure Trends and Foreclosure Market Statistics*, available at:  
[www.realtytrac.com/trendcenter/](http://www.realtytrac.com/trendcenter/)

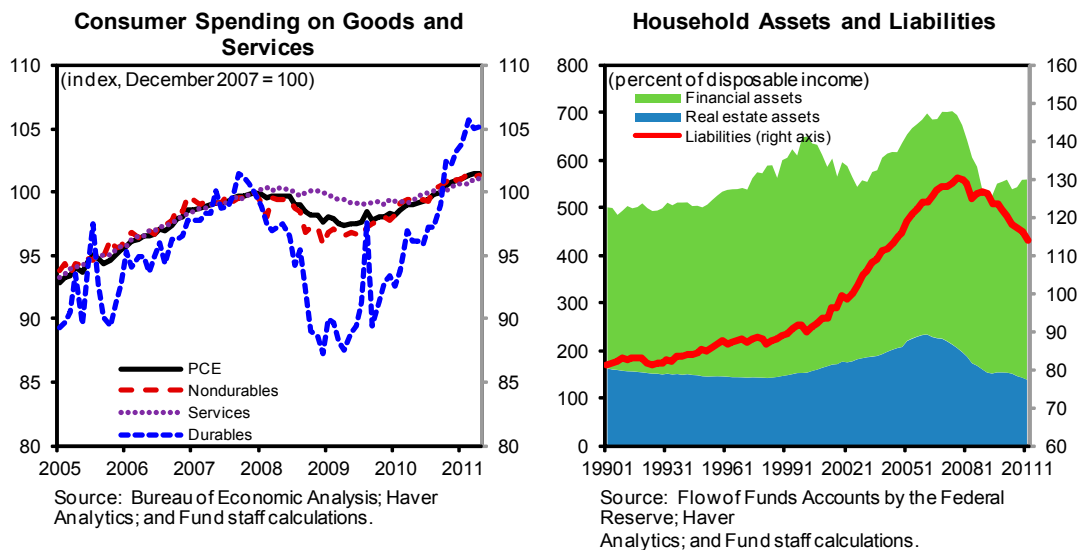
Sapienza, P. and L. Zingales, 2010, “Strategic Defaults Continue to Rise,” Chicago Booth, Kellogg School.

## II. HOUSEHOLD DELEVERAGING AND THE RECOVERY<sup>1</sup>

*The bursting of the house price bubble and the 2007–08 financial crisis left U.S. consumers with record-high leverage (defined as the ratio of household liabilities to net worth). Despite recovering equity prices and some debt reduction, leverage remains above historic norms given weak house prices. This chapter quantifies the extent to which the post-crisis deleveraging process has held back private consumption, and examines the linkages between foreclosure mitigation efforts, house prices, and consumption.*

### A. Introduction

1. **Post-bubble deleveraging by households is a key factor behind the modest recovery.** Following a prolonged debt build-up, sharp drops in house and equity prices during the crisis reduced the household sector's net worth, leaving it with record-high leverage. Consumers responded to the wealth loss by raising their saving rates, in particular by cutting purchases of durable goods. The demand loss drove a plunge in employment, exacerbating the retrenchment by consumers. The drop and subdued recovery of consumption—which accounts for 70 percent of GDP—is a key reason why output remains well below its pre-crisis trend.



<sup>1</sup> Prepared by Oya Celasun and Grace Bin Li. The authors thank Evridiki Tsounta and Martin Sommer for useful discussions.

2. **The adjustment of leverage towards pre-bubble norms is not complete** (Figure 6 of the staff report). Household wealth is unlikely to return to a strong upward trend in the near term given the tepid house price outlook. Hence, debt reduction via defaults and household savings will continue for some time, with the future path of house prices a key determinant of the pace and extent of the needed overall adjustment in household debt.

3. **How much of the weakness in consumption since the start of the recession be attributed to the deleveraging process? And what would be the effect on consumption and output of alleviating the housing sector and leverage adjustment via mortgage writedowns?** This chapter uses a VAR model to quantify some answers to these questions.

## B. Analysis

4. **To quantify the impact of leverage and credit conditions on consumption growth, we estimated a vector autoregression (VAR) model** using a sample from 1971:Q1–2010:Q4. The endogenous variables include (1) logarithm of real private consumption expenditure (PCE); (2) logarithm of household real disposable income; (3) an index of changes in bank's willingness to make consumer installment loans (from the Fed's Senior Loan Officer Opinion Survey), (4) 30-year mortgage interest rates; (5) logarithm of the core PCE deflator; (6) logarithm of the energy price deflator (a subcomponent of the PCE deflator); and (7) the leverage ratio of the household sector, defined as the ratio of household liabilities to net worth (from the Fed's Flow of Funds). The use of leverage follows the approach in Bianco and Occhino (2011), and allows us to capture a measure of misalignment between liabilities and net worth as well as the traditional wealth effects that have been the key focus of the prior literature.<sup>2</sup> We use two lags in the vector autoregression model based on the Bayesian information criterion—the results are similar if we use up to four lags.

5. **The leverage of the household sector and credit supply conditions as captured by banks' willingness to lend are estimated to be the two key drivers of aggregate consumption.** In combination, estimated structural shocks to banks' willingness to lend and household leverage account for 35 percent of PCE fluctuations over two years (Table 1, Figure 1).<sup>3</sup> Shocks to disposable income, mortgage interest rates, and prices also play a role in accounting for short term consumption movements.

6. **How much of the post-crisis sluggishness of PCE can be attributed to the heightened leverage ratio?** For the period 2007:Q4–2010:Q4, about 60 percent of the deviation of the PCE level from a path predicted by the VAR can be attributed to shocks to the leverage ratio—supporting the notion that heightened leverage and subsequent balance

---

<sup>2</sup> See, for instance, Case, Shiller and Quigley (2005) and Carroll, Otsuka, and Slacalek (2011).

<sup>3</sup> We use a Cholesky decomposition, with the following ordering: log of PCE, real disposable income, willingness to lend, PCE deflator, energy price deflator, log of the leverage ratio (liabilities-to-net worth).



sheet repair have been key headwinds for consumption (Figure 2).<sup>4</sup> The tightening of the supply of consumer loans has also been a key restraint on PCE, explaining another 30 percent of the deviation of consumption from its pre-recession trend.

7. **The estimates suggest that an improved house price outlook could significantly strengthen consumption by reducing leverage.** For instance, the estimated impulse responses suggest that a five percent increase in house prices would raise the level of PCE by about  $\frac{3}{4}$  percent (and GDP by about  $\frac{1}{2}$  percent) over five years. In nominal terms, the estimated relationships suggest that a one dollar increase in household net worth would add 5–6 cents to consumption over a horizon of five years. These estimated sensitivities are within the range of results reported in the prior literature.

8. **Thus, effective foreclosure mitigation could provide a measurable amount of support to the recovery.** We have considered a stylized policy scenario in which one million foreclosures are avoided (along the lines discussed in Selected Issues Chapter 9) for underwater borrowers. An updated estimate of the house price model in Klyuev (2008) suggests that avoiding 1 million foreclosures would raise aggregate house prices by about  $3\frac{1}{4}$ –4 percent over five years.<sup>5</sup> The estimated VAR impulse-responses then suggest that the impact of the policy (through effects on leverage via house prices and debt) would add about 0.3–0.4 percentage point to the end-2015 GDP level.<sup>6</sup>

---

<sup>4</sup> We decompose the deviation of actual consumption from the path predicted by the VAR (starting the projection with 2008:Q1) into deviations of outturns from predicted values of all other variables in the system. We thank Timothy Bianco and Filippo Occhino for sharing their Gauss codes for this decomposition.

<sup>5</sup> The updated estimates of the house price model are described in Chapter 1 of this Selected Issues paper. The house price gain is  $\frac{3}{4}$  or 4 percent depending on whether the houses for which foreclosures are avoided subsequently enter the market or not.

<sup>6</sup> The avoidance of mortgage defaults has two opposing effects on the household sector balance sheet (compared to a baseline with higher foreclosures): it would raise households' real estate assets given higher house prices (since distress sales would be avoided) but would offer less charge-offs on household debt and less shedding of negative equity. We assume that the modification policy involves a principal debt reduction of about \$10,000 per modified mortgage while raising house prices by  $3\frac{1}{4}$ –4 percent over 5 years given lower distress sales (mortgage modifications are discussed in Chapter 9 of the Selected Issues Paper—in the present exercise we assume for simplicity that writedowns equal the subsidy offered to banks). By contrast, a foreclosure reduces debt by about \$80,000 on average (given by the ratio of mortgage debt charge-offs to total foreclosures over 2008:Q1-2010Q3) and improves net worth by about \$8000 as defaulting mortgages are assumed to have 10 percent negative equity. Under our assumptions, avoiding foreclosures improves leverage since the effect through stronger house prices more than offsets the effect of lower debt and negative equity.

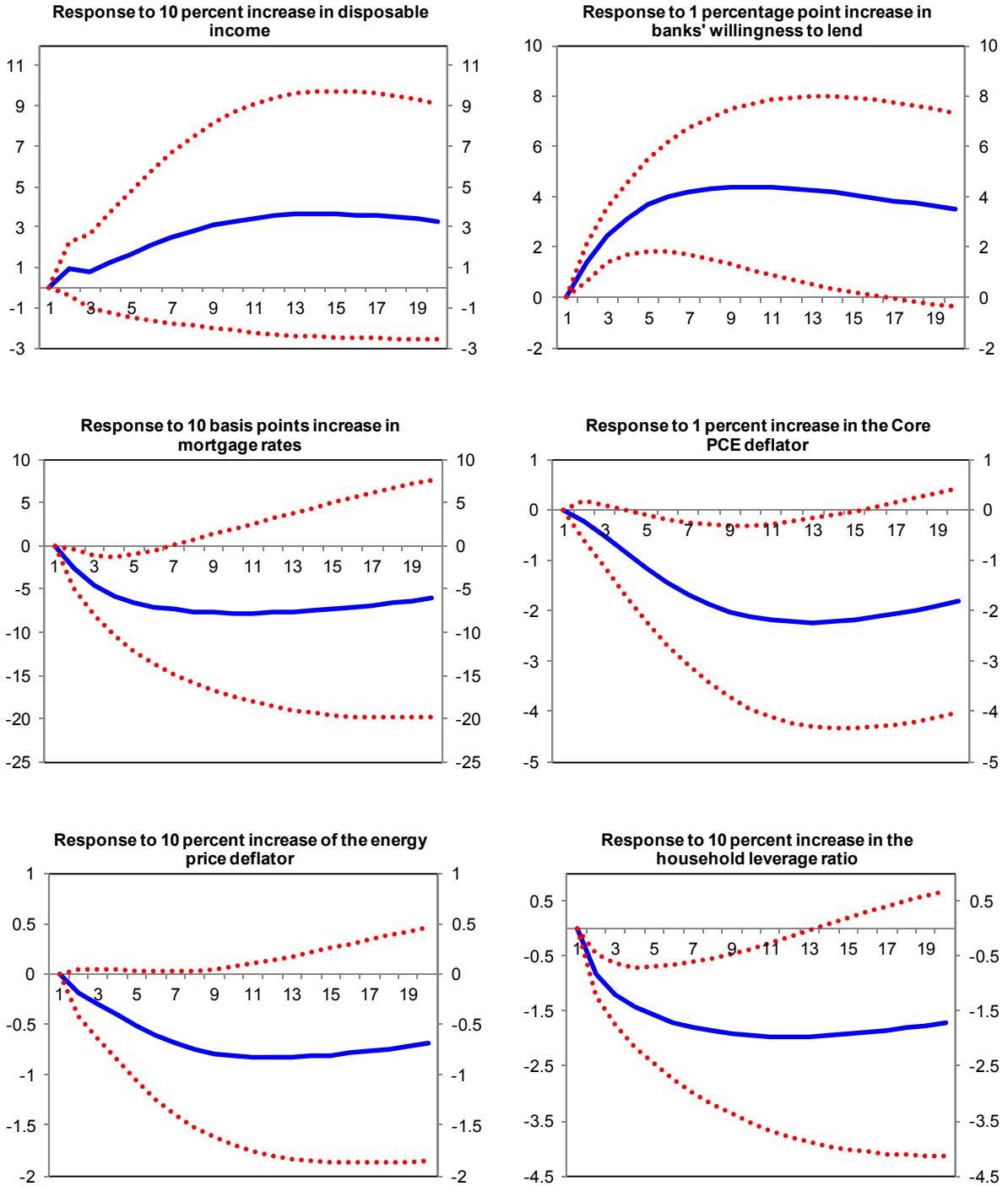
### C. Conclusion

9. **The household deleveraging process set-off by the asset price declines of 2007–08 has weighed heavily on the economic recovery**, explaining more than half of the weakness of household consumption relative to an estimated pre-recession trend. Still-high leverage (given above-norm debt ratios and a subdued path of housing wealth) suggests that consumption growth should remain moderate in the next several years. The normalization of household leverage is necessary for healthy medium-term household finances and growth, even though it provides a headwind against a faster recovery from the crisis. Sustainable mortgage modifications, which would help to curb the vicious circle between foreclosures, weak house prices, and sluggish aggregate demand and employment, would alleviate some of the pain of the post-bubble adjustment and help to put the economic recovery on a firmer footing.<sup>2</sup>

Table 1: Variance Decomposition of Consumption (PCE) Fluctuations							
Period	PCE	Disposable Income	Banks' Willingness to Lend to Consumers	Mortgage Interest Rate	Core PCE Deflator	Energy Price Deflator	Household Leverage Ratio
1	100.0	0.0	0.0	0.0	0.0	0.0	0.0
2	87.0	0.7	4.4	1.5	0.3	0.7	5.5
3	75.0	0.6	9.9	3.1	1.1	1.4	8.9
4	65.6	0.8	13.9	4.4	2.2	2.1	11.0
5	58.6	1.0	16.8	5.2	3.5	2.8	12.2
6	53.2	1.3	18.8	5.7	4.7	3.4	12.9
7	49.1	1.6	20.0	6.0	5.9	4.0	13.4
8	45.9	2.0	20.8	6.1	7.1	4.5	13.7

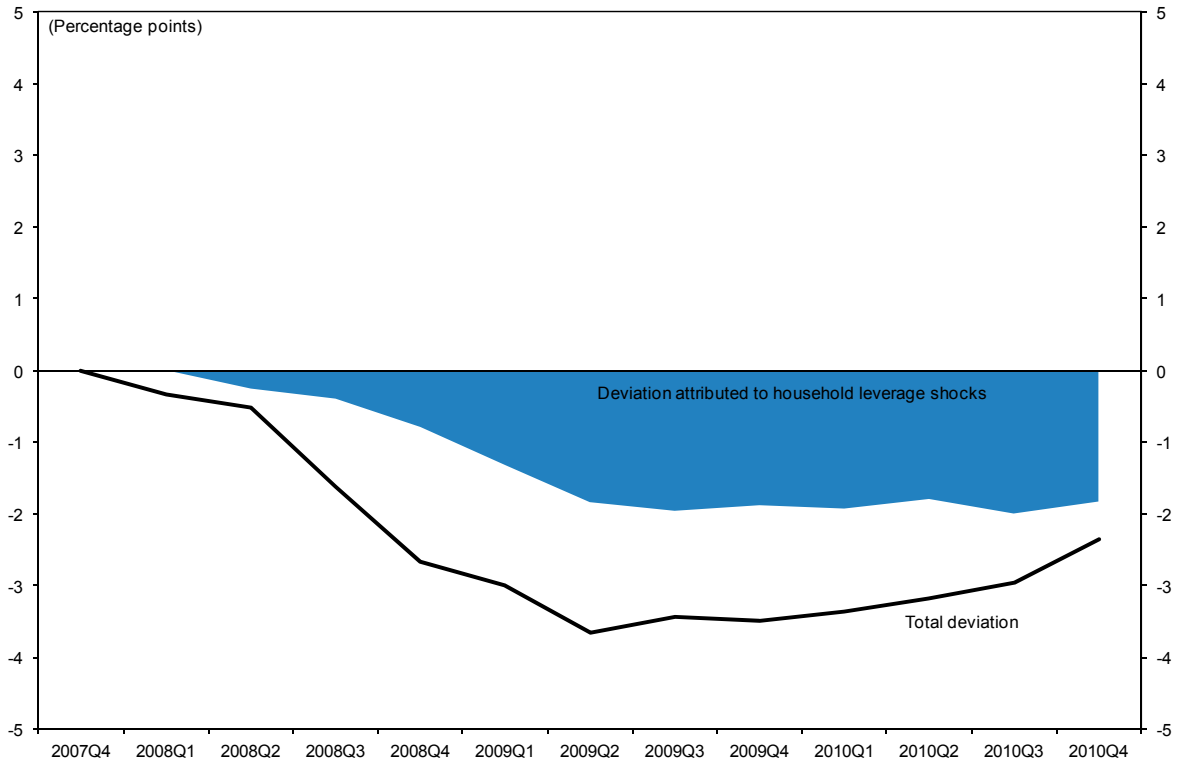
Sources: Fund staff estimates.

**Figure 1. Response of Consumption To Various Shocks**  
(percent, mean and 95 percent confidence interval)



Source: Haver Data, and IMF staff estimations.

**Figure 2. Percentage Deviation of Consumption from the Predicted Path:  
2007Q4-2010Q4**



**REFERENCES**

- Bianco, T. and F. Occhino, 2011, "Household Balance Sheets and the Recovery," *Economic Commentary*, March 2011, Federal Reserve Bank of Cleveland.
- Carroll, C., M. Otsuka, and J. Slacalek, 2011, "How Large Are Housing and Financial Wealth Effects? A New Approach," *Journal of Money, Credit and Banking*, Vol. 43, No. 1, pp. 55–79.
- Case, K., R. Shiller, and J. Quigley, 2005, "Comparing Wealth Effects: the Stock Market versus the Housing Market," *B.E. Journal of Macroeconomics*, Vol. 5 (1).
- Klyuev, V. 2008, "What Goes Up Must Come Down? House Price Dynamics in the United States," IMF Working Paper 08/187, International Monetary Fund.

### III. POLICIES TO FACILITATE LABOR MARKET ADJUSTMENT<sup>1</sup>

*Following massive layoffs during the Great Recession, the recovery has produced relatively few jobs so far, with some sectors doing significantly better than others. These factors contribute to record-high long-term unemployment and sectoral reallocation pressures, which would affect work skills among the unemployed and, thus, structural unemployment. With this backdrop, public policy has an important role in supporting labor market adjustment, in particular by boosting training programs. Measures to reduce the large employment volatility in the United States without affecting efficient labor allocation could prevent similar problems in the future.*

#### A. Introduction

1. **The Great Recession has caused major dislocations in the U.S. labor market.**

After reaching 10.1 percent in late 2009, the unemployment rate has declined only modestly and a record-high number of people have been out of work for six months or more. Joblessness broadly defined (which includes discouraged and involuntary part-time workers) remains near the peak 17 percent of the labor force reached last year while labor force participation dropped and employment as a share of working-age population is at its lowest level in 25 years. This shock had regional and sectoral dimensions, with unemployment rates varying from 3.9 percent in North Dakota to 14.9 percent in Nevada in 2010. Construction remains very depressed while production of durable goods has turned around and demand for health care workers continued broadly unabated by the crisis.

2. **Recent research has shown that these large dislocations could have raised structural unemployment.** Estevão and Tsounta (2011) show that, historically, severe housing shocks and increased skill mismatches are associated with higher unemployment rates at the state level even after controlling for common cyclical effects, with compounded effects if mismatches and bad housing market conditions interact. Given the rise in mismatch and unequal housing market performance during the crisis, the paper estimates that the structural unemployment rate could have reached 6¾ percent in 2010. Research by the Federal Reserve Bank of San Francisco has estimated that extended unemployment benefits have restrained job-search effort and displaced workers in construction could have a hard time finding jobs in other sectors, both factors raising structural unemployment somewhat.<sup>2</sup>

3. **This chapter focuses on the need for large sectoral reallocation of workers and the “jobless” aspect of the current recovery; both potential structural issues.** It shows that (1) the recent cycle was characterized by significant sectoral heterogeneity, with many

---

<sup>1</sup> Prepared by Marcello Estevão and Geoffrey Keim.

<sup>2</sup> Valletta and Kuang, (2010).

industries actually posting employment losses so far in the recovery; and that (2) the recovery has been “jobless” so far, even after accounting for weak output growth. The chapter recognizes that long-term joblessness is also a key pressure on structural unemployment, as work skills deteriorate with idleness. Thus, the observed slower job creation in this recovery is a possible structural problem as it helps to perpetuate long unemployment spells. The chapter concludes that there is a role for public policy to facilitate job reallocation, and either boost or maintain worker skills through training programs while they search for jobs.

### B. Structural Job Losses During the Great Recession

4. **To diagnose employment flows in each industry as being either structural or cyclical, we first track the direction of job flows during and after the recession.** Job losses (or gains) during the recession that are reversed during the recovery would be classified as cyclical.<sup>3</sup> If, instead, employment declines (or increases) continued during the recovery, the adjustments would be classified as structural, at least so far in the recovery. (Figure 1 and Tables 1–4) Even if the latter category recovers at a certain point, the changes triggered by the crisis would still be “structural” unless sectoral employment shares return to pre-crisis levels.

5. **A second method—based on deviations from usual cyclical changes in employment—can also help to identify structural labor market changes.** If a recovery’s job content changes significantly, flows out of the unemployment pool could be either larger or smaller than usual, thus affecting the length of unemployment spells and, possibly, labor force attachment and work skills. To gauge the sensitivity of sectoral employment to the cycle, we regressed changes in industry’s employment on real GDP change (our measure of the cycle), dummy variables denoting recession periods and recoveries, interactions of real GDP growth with both dummies, and additional controls for wars, strikes, and other employment disruptions. To generate a comparison of employment behavior during the current episode with that of the other postwar cycles since 1957, we re-estimated the equation eight times, stopping the sample in the quarter corresponding to a business cycle peak.<sup>4</sup> After that, we calculated deviations between sectoral employment growth and simulated out-of-sample forecasts seven quarters ahead to match the latest cycle.

<sup>3</sup> See Groshen and Potter (2003).

<sup>4</sup> The equation is  $\Delta e_{it} = \beta_0 + \beta_1 \Delta y_t + \beta_2 CON_t + \beta_3 REC_t + \beta_4 CON_t \cdot \Delta y_t + \beta_5 REC_t \cdot \Delta y_t + \beta_4 Z_{it}$ , where the subscripts  $i$  and  $t$  represent industry and time, respectively;  $\Delta e_{it}$  refers to the change in average quarterly employment;  $\Delta y_t$  refers to the change in real aggregate GDP;  $CON_t$  is a dummy variable denoting NBER recession periods;  $REC_t$  is a dummy variable denoting recoveries; and  $Z_{it}$  refers to other factors unrelated to aggregate growth that could be influencing employment growth. For a fuller discussion of the data sources, please consult the appendix. The cycles for which we produced forecasts were the ones with peaks in 1957Q3, 1960Q2, 1969Q4, 1973Q4,

(continued...)

**Either procedure suggests that significant structural changes might be at play:**

- **The first measure (Figure 1) demonstrates the substantial heterogeneity in employment performance across industries.** It suggests that the housing bust and healthcare needs have triggered structural changes in U.S. employment. Construction sector industries (and related ones, like furniture producers) are among the top structural losers (Table 1 and southwestern quadrant of Figure 1), while health care providers and related industries feature prominently within the list of structural gainers (Table 2 and northeastern quadrant of Figure 1). Interestingly, federal civilian employment has grown during the crisis and during the recovery, thus supporting the labor market throughout the whole cycle. The durable goods manufacturing sector, which has also benefitted from the depreciation of the U.S. dollar, is among the largest procyclical industries (Table 3 and northwestern quadrant of Figure 1). Only a few industries behaved countercyclically, including state and local employment (Table 4 and southeastern quadrant of Figure 1).
- **Both measures indicate that employment reductions in the latest episode were particularly bleak.** Figure 1 shows that the job losses in the industries with structural losses during the late-2000s recession were outsized compared with both the early-2000s and early-1990s episodes, even though structural losses during early-2000s recovery (gray circles in the southwest quadrant of the chart on the left) were in some cases larger. Likewise, labor cutbacks during the 2007–09 recession were much larger than historical employment-output relationships would lead to expect.<sup>5</sup> (Figure 2)
- **Virtually all sectors have produced so far fewer jobs than implied by usual rebound patterns, suggesting this recovery has been “jobless”.** Model-predicted employment in the last three cycles has almost always been too optimistic when compared with actual payrolls. (Figure 3) In the 2001 cycle every sectoral employment outcome performed below expectations, in the 2007 episode only mining and logging payrolls and durable goods manufacturing were stronger than the model’s forecast, and in the early 1990s only government outperformed expectations. By comparison, employment growth was stronger than expected in 10 industries in the 1974 recession, in 11 industries in the 1982 recession, and in 9 industries during the 1957 recession. This result is consistent with other research pointing to the

---

1981Q3, 1990Q3, 2001Q1, and 2007Q4. The 1980 recession was excluded from this exercise, as the forecast period would end in the 1982 recession.

<sup>5</sup> Batini, Estevão, and Keim (2010) present evidence that the high degree of uncertainty during the 2007–09 financial crisis was a key factor behind the breakdown of the employment/output relationship.



“jobless” character of the recoveries in the early 1990s and early 2000s,<sup>6</sup> and shows that the current recovery has followed a similar pattern.

### C. Policy Implications

6. **Public policies could facilitate the resolution of potentially large reallocation needs in the job market and other emerging structural problems.** In terms of so-called active labor market programs, when well designed:<sup>7</sup>

- Classroom and on-the-job training programs yield relatively positive impacts in the medium term, even if these programs often have insignificant (or even negative) short-term impacts on employment.<sup>8</sup> Thus, training programs would be ideal for situations where cyclical unemployment is large but long unemployment spells and potential future job reallocation needs threaten future job matches.
- Job-search assistance programs usually yield positive results in the short term.<sup>9</sup> Thus, they can be used to help unemployed workers to find jobs in the current situation. Even though job availability is still the key issue in the current cyclical situation, job-search programs would be more effective if they help workers to find jobs across state boundaries, which would ease regional unemployment disparities.
- There is some cross-country evidence that direct subsidies to private sector jobs are effective in raising employment rates in the short term.<sup>10</sup>

7. **However, more research on the effectiveness of U.S. active labor market policies is needed before new programs are created or existing ones are better calibrated.** The U.S. system is characterized by a decentralized provision of government services for the unemployed, which may be more attuned to local needs, but may lack a consolidated, national strategy to address current labor market problems. In particular:

- The federal government has nearly 50 different programs dispersed across nine federal departments geared toward helping the unemployed, both through training and job-search assistance programs.<sup>11</sup>

---

<sup>6</sup> For instance, Groshen and Potter (2003) and Schweitzer (2003).

<sup>7</sup> Active labor market policies consist mainly of training, targeted subsidies for job creation, public employment services, and other expenditures aimed at promoting employment. The definition excludes general macroeconomic policies and nontargeted policies to lower labor costs.

<sup>8</sup> As shown in the comprehensive metadata evaluation presented in Card et al (2011).

<sup>9</sup> Card et al (2011).

<sup>10</sup> Estevão (2007).

- At face value, such proliferation of programs may cause duplications and inefficient spending, although the one-stop shop career centers maintained by the Labor Department are an effort to channel these programs efficiently.<sup>12</sup>
- States have their own training and job-search programs, which add to the focus on decentralized service provision.

**8. Existing active labor market programs cost little to federal and state budgets, and could be expanded after an evaluation of how the overall system performs.**

Although, many people are affected by the federal programs, the cumulative budget dedicated to them amounted to only about \$18 billion in 2009 or a bit more than 0.1 percent of GDP.<sup>13</sup> State-level programs are funded in many different ways, including through transfers from the federal government (already included in the total amount of resources dedicated to these policies at the federal level). There are no readily available, up-to-date consolidated figures of how much states spend on these policies, but indirect evidence suggest that the amounts are very small as a share of GDP.<sup>14</sup>

**9. The U.S. education system can be further leveraged to provide training for the unemployed, in particular through community colleges.** Recently, the U.S. government has partnered with the private sector to increase training opportunities for manufacturing workers in community colleges across 30 U.S. states.<sup>15</sup> Further changes to the unemployment insurance system by making the provision of benefits conditional not only on active job search, but also on enrollment in certified training courses, could help sustain labor force attachment and skill acquisition until the cyclical situation improves.

**10. At a deeper level, excessive layoffs exacerbated the persistent unemployment problem during the current cycle.** There are many incentives for U.S. firms to fire workers, instead of changing the workweek, as a way to adjust labor inputs in response to cyclical

---

<sup>11</sup> U.S. Government Accountability Office, “Employment and Training Programs: Opportunities Exist for Improving Efficiency,” Testimony to Congress, April 7, 2011.

<sup>12</sup> One-stop shop career centers are designed to provide a full range of assistance to job seekers under one roof. Established under the Workforce Investment Act of 1998, the centers offer training referrals, career counseling, job listings, and similar employment-related services. There are many centers in all U.S. states.

<sup>13</sup> Table 6 reports the amount spent and the number of beneficiaries affected by the seven largest federal programs, which account for about 75 percent of the total federal budget for active labor market programs.

<sup>14</sup> Duscha and Graves (2006) report that states spent an aggregate amount of only \$560 million in training programs in 2006. This said, the figure may have increased during the crisis and do not account for expenditures in other programs, including job-search assistance.

<sup>15</sup> <http://www.whitehouse.gov/the-press-office/2011/06/08/president-obama-and-skills-americas-future-partners-announce-initiatives>

shocks.<sup>16</sup> Importantly, the U.S. unemployment insurance system creates a bias toward this type of adjustment. Under the current system, benefits are available for workers who are laid off, but not, in general, for workers whose hours have been cut back for economic reasons. Moreover, the system is financed with revenues from employers' payroll taxes, but that tax liability is based only partially on the employer's layoffs history. After layoffs reach a certain threshold, marginal tax rate increases are set to zero, limiting the cost of firing additional workers. However, if the cycle turns out to be more prolonged and uncertainty on future economic prospects does not clear, what started as a cyclical issue could become a structural one, as firms chose productivity-raising methods or increased working hours from incumbent employees to meet production targets, instead of hiring the unemployed.

**11. Looking ahead, institutional reforms to incentivize employee retention could limit the volatility of U.S. employment in future cycles, and reduce the risks of larger cyclical shocks being transformed into structural problems.** Changing the incentives to layoffs in the current system would help to limit the economic fallout from possible long-term unemployment in future business cycles. For instance, broader introduction of short-time compensation programs (STC) in the United States, which would provide benefits to employees working less than the usual workweek, would better align incentives across different ways to adjust labor input to cyclical shocks.<sup>17</sup> That would strengthen job stability, and avoid work-skill losses and exits from the labor force.

**12. The international experience shows that more workweek flexibility could improve labor market performance through the cycles, without affecting labor reallocation following structural changes.** Canada and Germany are good study cases, with broader and stronger STC programs (especially in Germany). As a result, fewer jobs were lost during the crisis in both countries than in the United States (even though output declines were of the same order of magnitude), while the workweek was reduced more drastically. (Figure 4) The unemployment rate has also increased less in Canada and has actually declined in Germany during the crisis. (Figure 5) Moreover, at least one in-depth study of the German institutional setup has shown that its higher reliance on short-term flexibility in working hours has not curbed efficient work allocation across economic sectors, as STC arrangements are temporary. Structural changes in the economy are still followed by firings, hirings, and worker reallocations.<sup>18</sup>

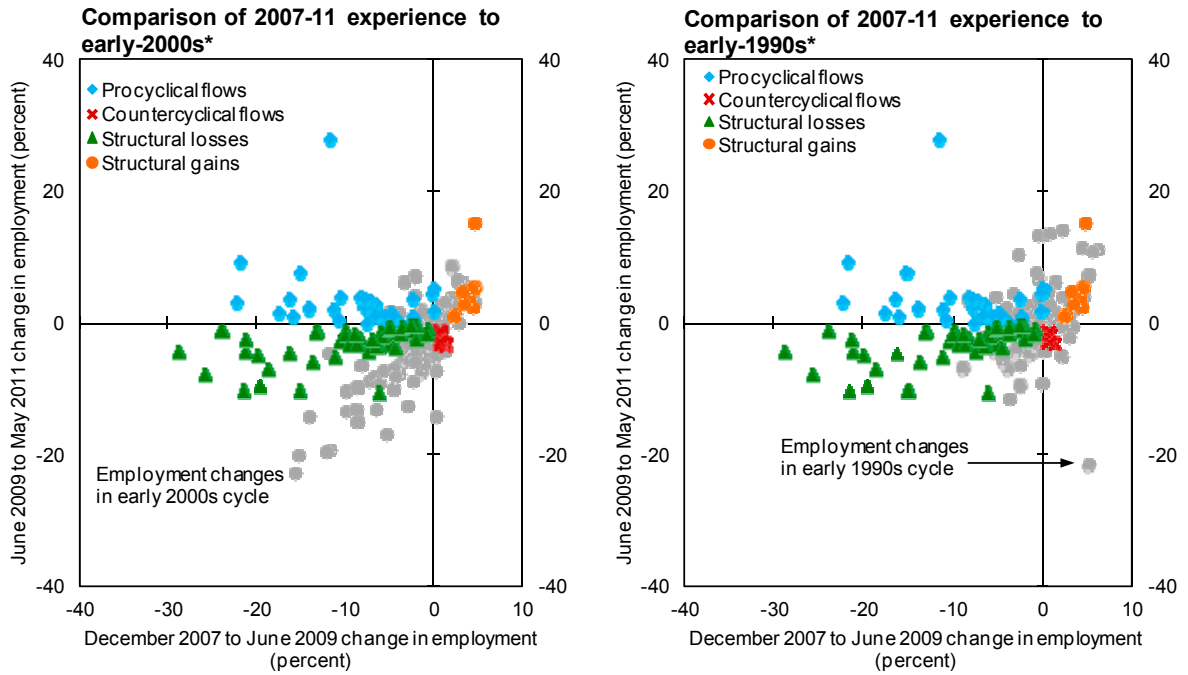
---

<sup>16</sup> For a more complete list of factors biasing labor adjustment actions towards laying off workers, see Abraham and Houseman (1993).

<sup>17</sup> Several U.S. states have some form of STC program, but they tend to be small, loaded with pre-conditions, and not well publicized. In Canada, many of the pre-conditions for qualification for STC were waived during the recent recession, which served to increase participation.

<sup>18</sup> See Abraham and Houseman (1993)

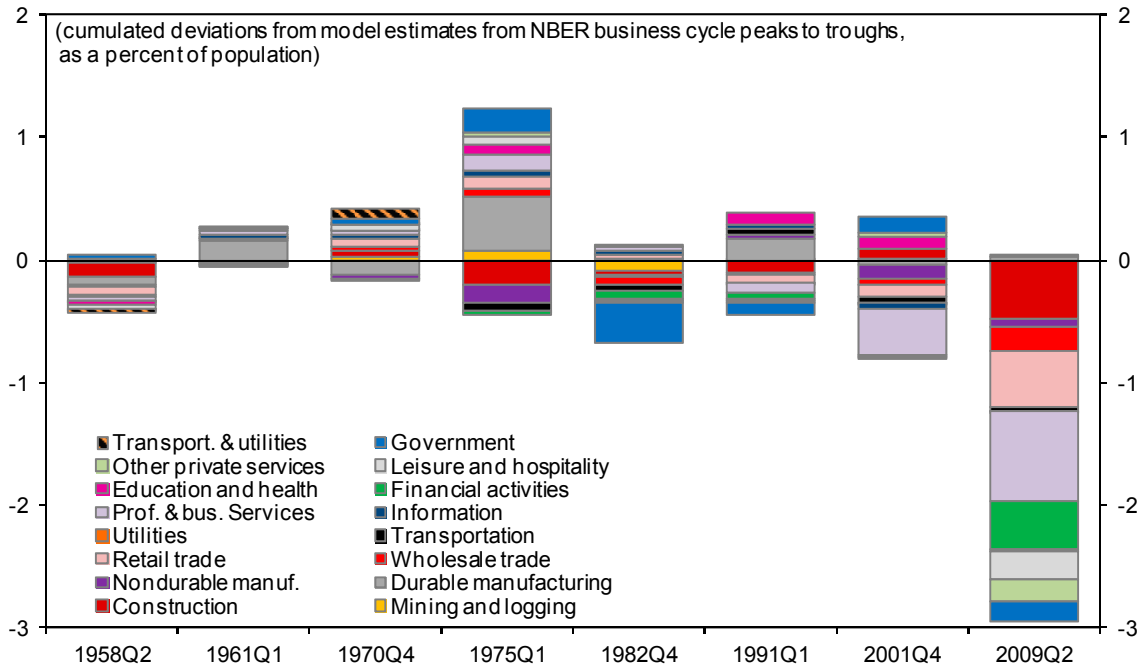
**Figure 1. Cyclical and Structural Changes in Employment across U.S. Sectors**



Sources: Bureau of Labor Statistics; Haver Analytics; and Fund staff estimates.

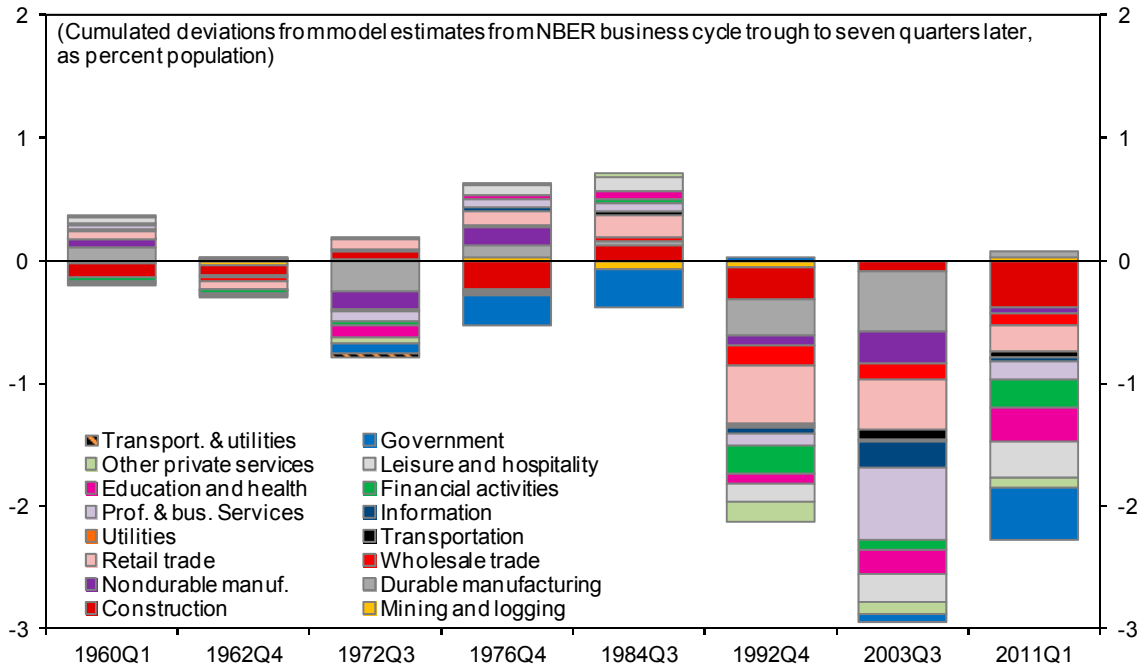
\* The dates of peaks and troughs are those defined by the NBER's Business Cycle Dating Committee, the recovery periods are for the 23 months following the NBER's trough.

**Figure 2. Sectoral Employment Changes Above and Beyond Usual Patterns During Downturns**



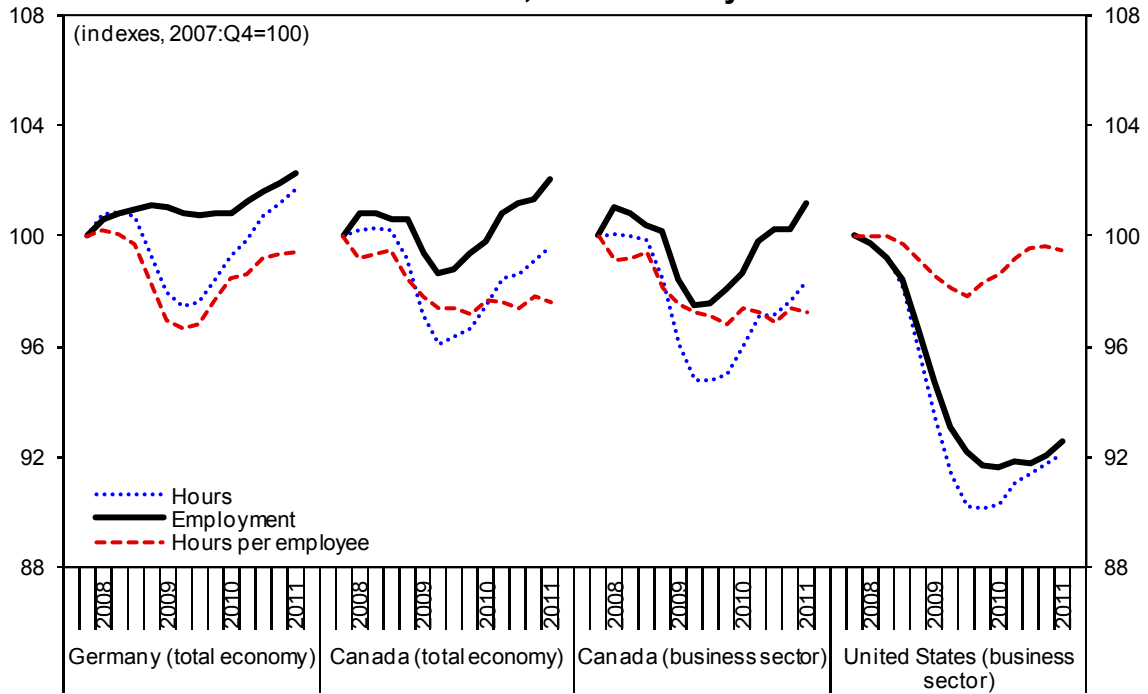
Source: Fund staff estimates.

**Figure 3. Sectoral Employment Changes Above and Beyond Usual Patterns During Recoveries**



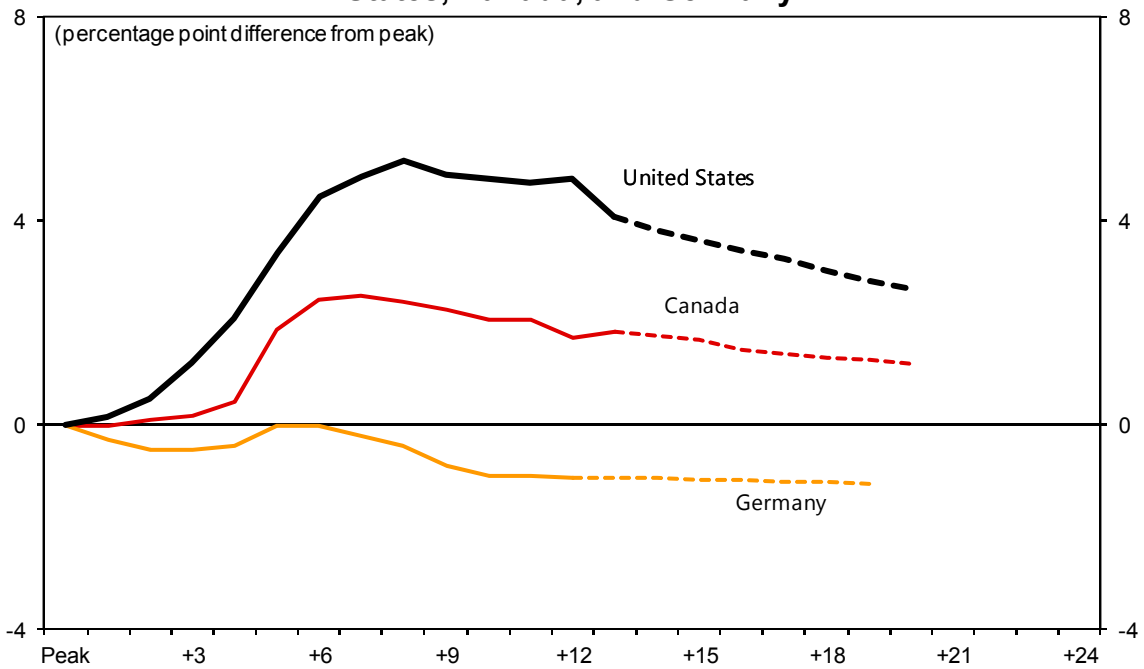
Source: Fund staff estimates.

**Figure 4. Comparison of Labor Cutbacks in the United States, Canada, and Germany**



Sources: Statistisches Bundesamt; Statistics Canada; Bureau of Labor Statistics; Haver Analytics; and Fund staff calculations.

**Figure 5. Cumulative Change in Unemployment Rates in the United States, Canada, and Germany**



Sources: IMF, *World Economic Outlook*.

**Table 1. Industries with Structural Employment Losses, December 2007-May 2011**

(aligning with green triangles in figure 1)

Industry	Change in employment during late 2000s (percent)			Change in employment during March 2001 - October 2003 (percent)		
	Dow nturn	Recovery	Cumulative	Dow nturn	Recovery	Category
Wood Products	-29.1	-4.0	-31.9	-3.3	-4.4	Structural loss
Furniture and Related Product Manufacturing	-26.0	-7.6	-31.6	-7.1	-7.9	Structural loss
Construction of Buildings	-21.8	-10.1	-29.7	-0.4	-0.1	Structural loss
Specialty Trade Contractors	-19.9	-9.2	-27.2	-1.6	1.3	Procyclical
Textile Mills	-24.2	-0.9	-24.9	-12.4	-19.2	Structural loss
Apparel Manufacturing	-21.5	-3.9	-24.5	-15.9	-22.4	Structural loss
Textile Product Mills	-18.8	-6.7	-24.2	-6.8	-12.7	Structural loss
Nonmetallic Mineral Product Manufacturing	-20.1	-4.6	-23.8	-4.1	-7.7	Structural loss
Printing and Related Support Activities	-15.2	-10.1	-23.8	-6.4	-9.0	Structural loss
Furniture and Home Furnishings Stores	-21.6	-2.1	-23.2	-1.8	2.6	Procyclical
Logging	-16.4	-4.4	-20.1	-2.7	-3.1	Structural loss
Rental and Leasing Services	-13.9	-5.7	-18.8	-2.2	-2.8	Structural loss
Telecommunications	-6.3	-10.2	-15.8	-5.5	-16.6	Structural loss
Publishing Industries ex Internet	-11.3	-4.8	-15.6	-4.7	-7.9	Structural loss
Leather and Allied Products	-13.4	-1.0	-14.3	-15.5	-19.9	Structural loss
Electrical Equipment and Appliance Mfg	-13.2	-0.8	-13.9	-8.9	-14.8	Structural loss
Paper Manufacturing	-10.6	-2.5	-12.8	-4.7	-9.7	Structural loss
Building Material and Garden Supply Stores	-9.7	-2.8	-12.3	1.1	3.0	Structural gain
Miscellaneous Store Retailers	-8.9	-2.9	-11.5	-2.9	-5.5	Structural loss
Couriers and Messengers	-7.6	-3.9	-11.3	-3.2	-3.2	Structural loss
Durable Goods (Wholesale)	-10.1	-1.2	-11.2	-3.5	-4.8	Structural loss
Computer & Electronic Product Manufacturing	-10.0	-0.7	-10.7	-11.8	-18.9	Structural loss
Architectural and Engineering Services	-9.1	-1.4	-10.4	-1.1	-3.0	Structural loss
Miscellaneous Manufacturing	-8.5	-2.0	-10.4	-4.0	-6.0	Structural loss
Data Processing, Hosting and Related Services	-6.7	-3.2	-9.7	-3.2	-12.1	Structural loss
Chemical Manufacturing	-6.4	-3.3	-9.4	-2.7	-5.4	Structural loss
Sporting Goods, Hobby, Book and Music Stores	-6.5	-2.9	-9.2	-4.1	-2.7	Structural loss
Credit Intermediation and Related Activities	-7.2	-2.1	-9.2	2.7	6.7	Structural gain
Beverage and Tobacco Products	-5.3	-3.0	-8.1	-0.4	-5.0	Structural loss
Lessors of Nonfinancial Intangible Assets	-4.6	-3.4	-7.9	-2.4	-4.5	Structural loss
Broadcasting ex Internet	-6.1	-1.5	-7.5	-1.4	-5.8	Structural loss
Nonstore Retailers	-6.2	-1.0	-7.2	-8.4	-6.2	Structural loss
Warehousing and Storage	-5.8	-1.4	-7.1	-3.7	6.6	Procyclical
Nondurable Goods (Wholesale)	-5.1	-1.1	-6.1	-0.5	-1.3	Structural loss
Real Estate	-5.4	-0.5	-5.9	0.6	3.4	Structural gain
Amusements, Gambling and Recreation	-5.2	-0.2	-5.4	0.8	0.5	Structural gain
Legal Services	-3.9	-1.2	-5.1	1.9	4.3	Structural gain
Insurance Carriers and Related Activities	-2.1	-2.1	-4.2	0.3	1.2	Structural gain
Performing Arts and Spectator Sports	-3.8	-0.2	-4.0	0.4	-2.1	Countercyclical
Health and Personal Care Stores	-2.1	-1.7	-3.8	0.0	-1.4	Structural loss
Gasoline Stations	-2.9	-0.8	-3.6	-1.3	-4.2	Structural loss
Food Manufacturing	-2.4	-0.4	-2.9	-1.0	-1.4	Structural loss
Personal and Laundry Services	-2.7	0.0	-2.7	-0.2	1.0	Procyclical
Museums, Historical Sites, Zoos & Parks	-2.3	-0.1	-2.3	0.9	-0.4	Countercyclical
Funds, Trusts and Other Financial Vehicles	-1.0	-1.4	-2.3	1.1	-4.1	Countercyclical
Food and Beverage Stores	-0.8	-0.6	-1.3	-1.0	-3.4	Structural loss

Sources: Bureau of Labor Statistics; Haver Analytics; and Fund staff calculations.

**Table 2. Industries with Structural Employment Gains, December 2007 - May 2011**

(aligning with orange circles in figure 1)

Industry	Change in employment during late 2000s (percent)			Change in employment during March 2001 - October 2003 (percent)		
	Down turn	Recovery	Cumulative	Down turn	Recovery	Category
Other Information Services	4.5	15.6	20.7	-14.2	-13.8	Structural loss
Oil and Gas Extraction	4.4	5.9	10.6	0.4	-3.8	Countercyclical
Ambulatory Health Care Services	4.2	5.7	10.1	2.4	6.8	Structural gain
Social Assistance	3.0	5.3	8.5	3.4	5.4	Structural gain
Educational Services	3.9	4.1	8.2	3.2	6.3	Structural gain
Transit & Ground Passenger Transportation	3.4	4.2	7.7	-2.4	7.3	Procyclical
Pipeline Transportation	4.2	2.6	6.9	0.0	-13.8	Countercyclical
Nursing & Residential Care Facilities	3.2	3.4	6.7	2.5	3.0	Structural gain
Hospitals	2.2	1.7	4.0	1.9	3.9	Structural gain
Federal Civilian	2.1	1.3	3.4	0.1	-0.6	Countercyclical

Sources: Bureau of Labor Statistics; Haver Analytics; and Fund staff calculations.

**Table 3. Industries with Procyclical Employment Flows, December 2007 - May 2011**

(aligning with blue diamonds in figure 1)

Industry	Change in employment during late 2000s (percent)			Change in employment during March 2001 - October 2003 (percent)		
	Down turn	Recovery	Cumulative	Down turn	Recovery	Category
Support Activities for Mining	-11.9	28.2	40.1	-2.0	-2.3	Structural loss
Primary Metal Manufacturing	-22.1	9.4	31.5	-10.0	-12.9	Structural loss
Administrative and Support Services	-22.5	3.6	26.1	-5.3	2.3	Procyclical
Computer Systems Design & Related Services	-15.4	8.0	23.4	-8.8	-9.4	Structural loss
Management & Technical Consulting Services	-16.5	4.0	20.6	-1.5	1.8	Procyclical
Clothing and Clothing Accessories Stores	-17.8	1.8	19.6	-2.2	0.7	Procyclical
Scenic and Sightseeing Transportation	-16.2	1.4	17.6	-12.0	-4.4	Structural loss
Fabricated Metal Product Manufacturing	-14.2	2.6	16.8	-7.6	-8.7	Structural loss
Waste Management and Remediation Services	-14.3	2.5	16.8	0.8	0.4	Structural gain
Motion Picture & Sound Recording Industries	-10.6	4.4	15.0	-4.1	1.9	Procyclical
Water Transportation	-11.5	2.5	14.1	-2.4	4.6	Procyclical
Transportation Equipment Manufacturing	-8.4	4.4	12.9	-4.6	-6.4	Structural loss
Rail Transportation	-8.1	4.0	12.1	-2.9	-1.4	Structural loss
Air Transportation	-10.9	0.9	11.8	-10.0	-10.1	Structural loss
Support Activities for Transportation	-7.5	3.9	11.3	-3.6	-1.6	Structural loss
Machinery Manufacturing	-8.0	2.7	10.7	-8.9	-12.7	Structural loss
Motor Vehicle and Parts Dealers	-8.0	2.7	10.7	0.6	1.4	Structural gain
Electronics and Appliance Stores	-6.7	3.4	10.1	-4.7	-6.7	Structural loss
Membership Associations & Organizations	-6.5	2.1	8.6	4.5	3.5	Structural gain
Mining Except Oil and Gas	-6.8	1.4	8.3	-1.6	-7.1	Structural loss
Monetary Authorities: Central Bank	-7.8	0.3	8.1	0.4	-2.6	Countercyclical
Plastics and Rubber Products	-5.0	1.9	6.9	-6.0	-6.9	Structural loss
Accommodation	-5.6	1.3	6.9	-5.6	-1.1	Structural loss
Other professional & technical service	-2.7	4.0	6.7	-2.6	-0.6	Structural loss
Management of Companies and Enterprises	-4.8	1.4	6.2	-2.9	-2.8	Structural loss
Heavy and Civil Engineering Construction	-5.9	0.3	6.2	-0.4	-5.5	Structural loss
Accounting & Bookkeeping Services	-0.1	5.8	6.0	-2.4	-5.6	Structural loss
Food Services and Drinking Places	-0.3	4.8	5.2	0.9	3.5	Structural gain
Truck Transportation	-4.3	0.8	5.1	-3.2	-2.5	Structural loss
Electronic Markets, Agents and Brokers	-2.5	1.4	3.9	1.8	9.0	Structural gain
Securities, Commodity Contracts, Investments	-2.4	1.0	3.3	-2.5	-8.7	Structural loss
Repair and Maintenance	-2.9	0.2	3.1	-0.4	-1.7	Structural loss
General Merchandise Stores	-0.2	2.3	2.5	-0.5	0.3	Procyclical

Sources: Bureau of Labor Statistics; Haver Analytics; and Fund staff calculations.



**Table 4. Industries with Countercyclical Employment Flows, December 2007 - May 2011**  
(aligning with red x's in figure 1)

Industry	Change in employment during late 2000s (percent)			Change in employment during March 2001 - October 2003 (percent)		
	Down	Recovery	Cumulative	Down	Recovery	Category
Petroleum and Coal Products (Manufacturing)	1.2	-2.9	-4.2	0.0	-7.0	Countercyclical
Local Government	0.6	-2.8	-3.4	1.9	1.8	Structural gain
Utilities	0.6	-1.5	-2.1	0.0	-4.5	Countercyclical
State Government	0.6	-1.2	-1.8	2.6	0.2	Structural gain

Sources: Bureau of Labor Statistics; Haver Analytics; and Fund staff calculations.

**Table 5. Estimates of the sensitivity of industrial employment growth to output growth, 1947-2007**

	Output growth		Recession period		Recovery period		Recession*GDP		Recovery*GDP		R <sup>2</sup>
	$\beta$	Std. error	$\beta$	Std. error	$\beta$	Std. error	$\beta$	Std. error	$\beta$	Std. error	
Mining and logging	0.114	0.202	-3.928	1.700 *	-2.411	1.928	-0.558	0.401	0.478	0.324	0.74
Construction	0.419	0.149 **	-6.206	1.296 **	-3.764	1.442 **	0.113	0.313	0.518	0.237 *	0.32
Durable manufacturing	0.856	0.114 **	-8.316	0.994 **	-3.344	1.106 **	-0.402	0.240	0.489	0.182 **	0.66
Nondurable manufacturing	0.212	0.065 **	-3.306	0.568 **	-0.996	0.633	-0.044	0.137	0.201	0.104	0.42
Wholesale trade	0.100	0.054	-3.077	0.468 **	-2.068	0.521 **	-0.091	0.113	0.138	0.086	0.33
Retail trade	0.142	0.052 **	-2.850	0.451 **	-1.431	0.502 **	-0.119	0.109	0.131	0.083	0.38
Transportation	0.347	0.107 **	-5.145	0.904 **	-1.612	0.881	-0.305	0.240	-0.104	0.187	0.45
Utilities	0.000	0.077	0.780	0.666	-1.148	0.689	-0.054	0.179	0.116	0.139	0.24
Information	0.331	0.073 **	-5.675	0.631 **	-4.281	0.702 **	-0.156	0.152	0.354	0.116 **	0.76
Prof. & business services	0.214	0.051 **	-4.027	0.442 **	-1.513	0.492 **	-0.217	0.107 *	0.058	0.081	0.49
Financial activities	0.027	0.045	-1.004	0.388 *	-1.250	0.432 **	-0.026	0.094	0.134	0.071	0.17
Education and healthcare	0.077	0.044	-1.278	0.379 **	-0.478	0.422	-0.025	0.092	-0.009	0.069	0.13
Leisure and hospitality	0.130	0.050 **	-2.658	0.432 **	-0.614	0.481	-0.065	0.104	0.023	0.079	0.42
Other private services	0.124	0.049 *	-1.239	0.429 **	-1.836	0.478 **	-0.089	0.104	0.103	0.079	0.21
Government	0.123	0.054 *	-0.406	0.470	-1.560	0.523 **	-0.184	0.114	0.057	0.086	0.20

Source: Fund staff estimates.

\*, \*\* denotes significance at the 5 percent and 1 percent levels, respectively.

**Table 6. Seven Largest Programs: Estimated Amount Spent on Employment and Training Activities in Fiscal Year 2009 and Estimated Number of Participants Served**

Program (Agency)	Estimated Amount Spent on Employment and Training Activities in FY09 <sup>a</sup>	Estimated Number of Participants	
		Number of Participants	Year Served <sup>b</sup>
Rehabilitation Services –Vocational Rehabilitation Grants to States (Education)	\$2,956,743,700	979,409	2009
WIA Dislocated Worker (Labor)	2,421,340,000	671,786	2008
WIA Youth (Labor)	2,112,069,000	282,426	2008
Temporary Assistance for Needy Families (TANF) (HHS)	1,777,958,939	134,767 <sup>c</sup>	2008
Job Corps (Labor)	1,775,000,000	59,357	2008
WIA Adult (Labor)	1,356,540,000	5,171,158	2008
Employment Service (Labor)	1,203,677,000	13,472,624	2009
<b>Total</b>	<b>\$13,603,328,639</b>	<b>20,771,527</b>	

Source: GAO survey of agency officials.

<sup>a</sup>Estimates may include funds provided by the American Recovery and Reinvestment Act of 2009 (Recovery Act).

<sup>b</sup>Officials provided the estimated number of participants for the most recent year for which data were available.

<sup>c</sup>This number represents the monthly average number of individuals receiving TANF cash assistance who were engaged in work activities such as subsidized employment, work experience, on-the-job training, job search and job readiness assistance, community service, vocational educational training, job skills training, and in certain circumstances education directly related to employment. It does not include the number of individuals engaged in unsubsidized employment. Officials were unable to provide an annual estimate.

## Appendix 1. Data Definitions and Sources

**Our measures of output growth and employment growth are those compiled by the U.S. authorities.** The dependent variable,  $\Delta n_{it}$ , is the seasonally adjusted annualized percent change in quarterly average nonfarm payroll employment in each of 15 broad-based industries. These data come from the Bureau of Labor Statistics' Current Employment Statistics (CES) program and are available for most of the industries back to the late-1930s. The output variable is the percent change in real growth from the previous quarter, also seasonally adjusted and at an annual rate. This series is published by the Bureau of Economic Analysis in their National Income and Product Accounts release. Quarterly output data are available beginning in 1947, which is when our estimation period also begins.

### Definitions of additional variables:

In equations (2) and (3), the recession periods included in  $CON_{it}$  are those defined by the NBER's Business Cycle Dating Committee. The Dating Committee does not provide dates for recoveries from recessions, so we coded the variable  $REC_{it}$  as equal to 1 from the end of the recession to the closing of the gap between the actual unemployment rate and its Hodrick-Prescott filtered trend. We added variables to control for major factors influencing employment growth:

- a) A dummy variable for two major War periods—1950–1953 (Korean War) and 1965–1973 (Vietnam War).
- b) Major strike activity distorted employment growth in mining, information, utilities, and leisure and hospitality industries, due to BLS' convention of leaving striking employees off their counts of payroll employment. When these major work stoppages occurred, employment suddenly dropped, depressing the quarterly average of employment. Then in the quarter following the strike, employment growth jumped, as growth was being calculated from an artificially low base. To capture these differential effects, we coded two variables for each strike event. The first provides a measure of both timing and severity and is coded as the number of months in the quarter during which a strike took place. To capture the artificial employment surge as employees returned to work, we coded a dummy variable, equal to 1 in the quarter following the strike.
- c) We gathered the dates of strike activity from several sources. For months starting in January 1973, archived Employment Situation news releases available on the Federal Reserve Bank of St. Louis' FRASER archive (Federal Reserve Archival System for Economic Research). Some strike data were also gathered from FRASER's archived Economic Report of the President for various years. For mining over 1948–50, we obtained months of mining strike activity from Bernstein and Lovell (1953).

## REFERENCES

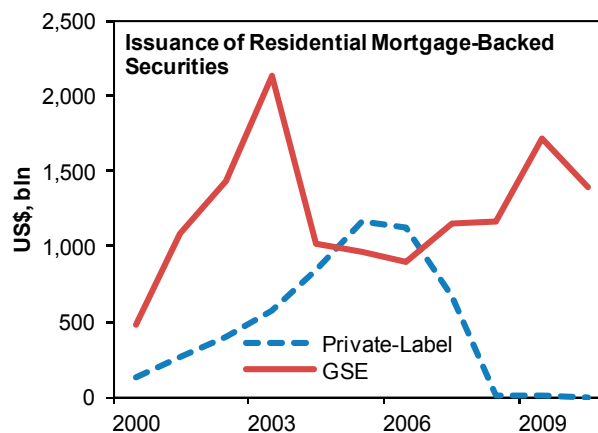
- Abraham, Katharine and Susan Houseman, 1993, *Job Security in America*, The Brookings Institution, Washington, DC.
- Batini, Nicoletta, Marcello Estevão, and Geoffrey Keim, 2010, “Production and Jobs: Can We Have One Without the Other?” *Selected Issues Paper*, Chapter 3, United States—Article IV Consultation, July.
- Bernstein, Irving and Hugh G. Lovell, 1953, “Are Coal Strikes National Emergencies?” *Industrial and Labor Relations Review*, Vol. 6, No. 3, pp. 352–367, April.
- Card, David, Jochen Kluge, and Andrea Weber, 2011, “Active Labor Market Policy Evaluations: A Meta-Analysis,” NBER Working Paper 16173, National Bureau of Economic Research, Cambridge, MA.
- Duscha, Steve and Wanda Lee Graves, “The Employer as the Client: State-Financed Customized Training” Department of Labor,  
[http://wdr.doleta.gov/research/eta\\_default.cfm?fuseaction=dsp\\_resultDetails&pub\\_id=2345&bas\\_option=Title&start=1&usrt=4&stype=basic&sv=1&criteria=customized](http://wdr.doleta.gov/research/eta_default.cfm?fuseaction=dsp_resultDetails&pub_id=2345&bas_option=Title&start=1&usrt=4&stype=basic&sv=1&criteria=customized)
- Estevão, Marcello, 2007, “Labor Policies to Raise Employment,” *IMF Staff Papers*, Vol. 54, No. 1, pp. 113–138, March.
- Estevão, Marcello and Evridiki Tsounta, 2011, “Has the Great Recession Raised U.S. Structural Unemployment?” *IMF Working Paper*, WP/11/105, May.
- Groshen, Erica and Simon Potter, 2003, “Has Structural Change Contributed to a Jobless Recovery?” *Current Issues in Economics and Finance*, Vol. 9, No. 8, Federal Reserve Bank of New York, August.
- Schweitzer, Mark, 2003, “Another Jobless Recovery?” *Economic Commentary*, Federal Reserve Bank of Cleveland, March.
- Valletta, Rob and Katherine Kuang, 2010, “Is Structural Unemployment on the Rise?” *FRBSF Economic Letter*, 2010–34, Federal Reserve Bank of San Francisco, November.

#### IV. STRENGTHENING PRIVATE MORTGAGE SECURITIZATION<sup>1</sup>

*The issuance of private-label mortgage-backed securities (MBS) has fallen sharply following the financial crisis. Reviving its issuance on a robust and sustainable footing is crucial to meeting credit demand as the economy recovers. Hurdles to private securitization span both demand and supply factors. The decline in private-label issuance, along with agency mortgage-backed securities, is in part due to reduced demand for home mortgage credit. The decline is also attributable to reduced investor demand, whose appetite for structured products was badly shaken by losses suffered in the financial crisis. But the sharp decline in private-label MBS, in stark contrast to the relative resilience of agency MBS, underscores the funding advantage of the government-sponsored enterprises (GSEs), which, with explicit government support, have been able to structure securities at costs below those faced by private entities. Reviving private MBS supply, then, must address these supply and demand barriers. Such efforts rest in large part on rebuilding investor confidence in securitized products and leveling the playing field between the GSEs and private entities.*

##### A. The Mortgage-Backed Securities Market After the Financial Crisis

1. **Issuance of private-label residential mortgage-backed securities (RMBS)—the largest of the asset-backed securities (ABS) classes—has declined sharply.** While agency RMBS issuance has remained strong on the back of government sponsorship and the funding advantage of the GSEs, private-label RMBS markets are effectively shut down.<sup>2</sup> Of the private-label RMBS issued in 2010, roughly two third—about \$1.2 billion—was new mortgage supply, while the rest comprised of loans that were either repurchased or bought out of an existing mortgage pool due to non-compliance with investor terms, such as early payment or default.



Sources: Board of Governors of the Federal Reserve System, IMF, J.P. Morgan, and SIFMA.

<sup>1</sup> Prepared by Sally Chen and John Kiff.

<sup>2</sup> Private-label MBS are securitized mortgages that do not conform to the standards of the GSEs and are bundled by private entities. Because they do not carry the GSE's credit guarantees—formerly implicit and currently explicit under government conservatorship—private-label MBS are considered to carry more credit risks.

2. **The decline in RMBS supply is a result, in part, of reduced demand for housing finance, a logical turn of events following the financial crisis.** On net, demand for new mortgages has declined consecutively since 2008. In 2010, home mortgage loans totaled \$10 trillion, compared to \$10.5 trillion in 2007. As a result of the decline in mortgage lending, the supply of RMBS collateral has fallen as well.

3. **Ample liquidity and historically-low funding rates have also reduced banks' incentives to securitize loans.** One of securitization's traditional roles is to serve as a funding tool. However, the Federal Reserve's long period of policy accommodation has provided funding to banks at historically-low rates, reducing the attractiveness of securitization. Instead, banks have been holding mortgages on their balance sheets to realize the difference between their low funding costs and the relatively high rates on mortgage loans.

4. **In addition, the decline in private-label RMBS supply reflects the funding advantage of the GSEs and their yet-to-be-resolved future landscape.** Low capital requirements and government guarantees to the GSEs, made explicit since the financial crisis, reduce these institutions' effective financing costs, thus crowding out the private sector. This government support was all the more valuable at a time when investor risk aversion to structured products reached a historically-high level. Currently, the GSEs structure roughly 65 percent of residential mortgage-backed securities.<sup>3</sup> Although a policy discussion on reducing the GSEs' presence in housing finance has started, the structure of the GSEs going forward—public, private or a hybrid of both—remains uncertain; this uncertainty has muddied incentives for private-sector involvement.

5. **Meanwhile, investor appetite for structured securities was badly shaken by the financial crisis,** which laid bare the information asymmetry, opacity and incentive misalignment along the securitization chain in some market sectors. Legislations that seek to address these inefficiencies could boost investor confidence and revive securitization, but they have also made the securitization process more expensive.

#### **B. The Magnitude of Mortgage Credit Shortfall as the GSEs Shrink**

6. **Reviving private sector involvement in MBS issuance—and ensuring that the new issuance model is robust and sustainable—is needed to meet credit demand.** Bank supply alone may not be sufficient to meet mortgage credit demand should the economy returns to its long-run trend growth.<sup>4</sup> If the GSEs' presence in housing finance were to be

---

<sup>3</sup> GNMA (a government owned corporation) structures about 25 percent of the RMBS market. Together, these "government-controlled entities" structure about 90 percent of the RMBS market.

<sup>4</sup> Although mortgages are almost always originated by banks, funding for mortgage origination is dependent on several sources, including income from mortgage lending as well as selling loans to security bundlers, such as banks (i.e., private-label issuers) and the GSEs. In fact, structured finance has historically provided a useful role in credit provision.

trimmed, their role in new home mortgage securitization will likely be much smaller relative to their traditional share of 55 percent, requiring banks and private securitization to shoulder a greater share of the new home mortgage credit provision. An illustrative example outlines the possible gap private securitization would need to fill. Rough estimates suggest that by 2018, net new private sector mortgage credit supply—from banks and private-label securitization—would need to reach around \$525 billion (Table below). Relative to a total supply of less than \$2 billion in 2010, private-label RMBS supply would need to rebound to around \$65 billion in 2018 to meet the expected demand. Based on historical levels of private-label mortgage credit provision, such a contribution is well within the realm of possibility.

Table 1. Potential Scenario for Financing New Home Mortgage in 2018 1/

	2018 Estimate (US\$, bln)	Assumptions	Source
Net new home mortgage	700	Based on historical average of 3.4% of nominal GDP 2/	OCC
New agency mortgage securitization	175	Reduce GSEs' share of new mortgage market from 55% to 25%	Staff assumption
Bank net new mortgage loans	457	Based on OCC projection of \$1.1 trillion in total net acquisition of financial assets in 2011, asset growth rate going forward at historical average of 0.11% since 1980; 20% of new assets are new home mortgages.	OCC, Haver
Private label	68	Difference between the first line above and the following two	Staff estimate

Source: Staff estimate, based on OCC Working Paper 2009-6, *The US Financial System in 2011: How Will Sufficient Credit Be Provided?*

Note1: In 2018, the GSEs' retained portfolios are expected to fall to a "lower, less risky size" as suggested by Treasury Secretary Paulson.

Note2: Nominal GDP is calculated from IMF WEO forecasts and based on 4.5 percent growth rate per year.

## Impact of New Incentive Structure on Securitization

7. **In response to mortgage securitization incentive misalignments between originators and investors, authorities are putting in place new regulations that will force securitizers to retain economic exposure to the assets that they securitize.**<sup>1</sup> The *Dodd-Frank Wall Street Reform and Consumer Protection Act* (“Dodd-Frank Act”) imposes a five percent minimum credit risk retention rate (“skin in the game”) on securitizers (Box 1). By mandating “skin in the game”, the Dodd-Frank Act—the regulations for which are yet to be finalized—is supposed to reduce a sponsor’s incentive to securitize poor-quality assets, and in turn, boost investor confidence in structured products.

8. **The impact of the five percent risk retention requirement on mortgage rates is generally expected to be modest.** In addition to the expected loss on the underlying loans, risk

<sup>1</sup> Securitizers or sponsors are typically intermediaries that buy individual mortgage loans from originators—entities that initiate the loans—and bundle them together into securities sold to investors. In many cases, securitizers and originators are affiliated or the same entities.

retention can be considered as an additional cost, reflecting the expected higher capital costs imposed on the risk retainer. Together, these costs can affect the price of loans. By one estimate, if one were to assume the same 25 percent loss rate on foreclosed properties once the housing market normalizes, and given the five percent risk retention, the implied loss on the mortgage value would be 1¼ percent. If one further assumes that one in ten mortgages were to go into foreclosure, then the expected loss on loans would be 0.125 percent. Were these losses to be fully passed on to borrowers, they would be the equivalent of raising the mortgage rate by 13 basis points (Baker, 2011). Most of other estimates converge around 20 basis points, with a few noting that new rates could be 50 basis points higher. In general, the new interest rates, while higher, are not expected to materially affect the cost of mortgages. **By contrast, market participants see the proposed “premium capture cash reserve account” as a bigger hurdle to securitization as many believe it would reduce or eliminate up-front profit realization and cost recovery.** That said, these accounts are meant to prevent deal sponsors from circumventing the risk retention rules, effectively preventing them from structuring deals in ways that negate or reduce the economic exposure to the securitized assets. In effect, the premium capture regulations, stipulate that if securitizers sell the unretained securities at a premium (i.e., for an amount greater than par), they must place some of this premium into the cash reserve accounts.<sup>2</sup> These accounts would be used to absorb potential losses and be subordinate to all other tranches; it is in effect, the first loss tranche on a deal.<sup>3</sup> Additionally, the captured amounts would not be released to the deal sponsor until all the interests are paid and the entity is resolved, usually upon the loan’s maturity. As a result, they could reduce potential upfront profitability. Additionally, the recovery of the costs of origination and hedging of risks would be prohibited.

9. **MBS backed by the government and its agencies, or by “qualified residential mortgages” (QRM), are proposed to be exempted from risk-retention requirements.** All MBS backed by the housing GSEs would be exempt while they are operating under the conservatorship of the Federal Housing Finance Authority. In any case, the GSEs already retain 100 percent of the credit risk of their securitization activity because they fully guarantee the securities. Hence, the near-term impact of the retention requirement on housing finance is expected to be limited, because over 90 percent of current residential mortgage origination is being done

---

<sup>2</sup> If the securitizer retains exactly five percent, all of any premium is captured.

<sup>3</sup> In a typical asset- or mortgage-backed security, the underlying loan portfolio cash flows are divided into several slices (or “tranches”) according to their risk-return characteristics. Tranche holders are paid in a specific order, starting with the “senior” tranches (least risky) down to the “equity” tranche (most risky). Holders of the “equity” tranche would be the first to suffer losses if some of the expected cash flows are not forthcoming (e.g., some loans default). They are in essence, buffers against losses for the more senior tranches. Once the equity tranche is depleted, then payments to the “mezzanine” tranche holders are reduced, and so on up to the most senior tranches.



under the umbrella of the GSEs and the fully government-guaranteed Federal Housing Administration. In any case, the QRM underwriting criteria are very strict, so that few private-label RMBS will be exempt from the retention requirements. In fact, only about 30 percent of mortgages securitized by the GSEs in 2010 would have qualified.

### C. The Impact of Winding Down the GSEs

10. **The GSEs' funding advantage has allowed them to structure securities at costs below those faced by private entities, enabling them to dominate mortgage securitization.** Such advantage mainly takes the form of lower funding costs to finance their debt issuance. This advantage, relative to other financial firms' costs of corporate debt issuance, averages around 40 basis points (Passmore, 2005). To reduce the systemic risks posed by the GSEs and to ensure that securitization will be on a robust and sustainable footing, authorities have introduced proposals to level the playing field between the GSEs and private entities. Uncertainties over the future of the GSEs are muddying the outlook for private-label housing finance. In the meantime, efforts to bolster private securitization, including reducing the GSEs' conforming loan limits and raising their guarantee fees could have a moderate impact on raising private entity participation.

#### The Impact of Reducing Conforming Loan Limits on Mortgage Volume

11. **Although reducing the conforming loan limits will expand the volume of quality loans for private securitization, the expansion will only be marginal.** The maximum loan amount that qualifies for Fannie Mae and Freddie Mac purchase is scheduled to fall from \$729,750 to \$625,500 after September. By some estimates, this scheduled reduction will shave roughly 3 percent off the mortgage loans eligible for GSE purchase, or roughly \$33 billion, based on the total amount of mortgages purchased by the GSEs in 2010 and the portfolios' growth rate in 2011<sup>4</sup>. Lowering the loan limits further to \$417,000 would expand the pool by a total of 8 to 10 percent or \$80 to \$100 billion (Amherst, 2011, and JP Morgan, 2011). Relative to new home mortgage credit demand, estimated at around \$520 billion for 2011<sup>5</sup>, the new supply of quality loans for private securitization is modest.

#### The Impact of Raising the GSEs' Guarantee Fees

12. **Raising the GSEs' guarantee fees to a level commensurate with capitals held by banks could raise mortgage rates by 50 to 60 basis points.** If the GSEs were to gradually raise the guarantee fees as suggested by the Administration's housing finance whitepaper, "as if they were held to the same capital standards as private banks or financial institutions", guarantee fees could have to rise (U.S. Treasury/HUD, 2011). By one estimate, if capital held

---

<sup>4</sup> In 2010, GSE mortgage purchases totaled \$1.16 trillion. Based on year-to-date 2011 statistics, Fannie Mae's purchase activity is expected to slow by 15 percent in 2011, while Freddie Mac's, 4 percent.

<sup>5</sup> New mortgage demand estimated is based on the historical average rate of 3.4 percent of nominal GDP, as per Office of the Comptroller of the Currency analysis in Hickok and Nolle (2009), and IMF GDP forecast.

by the GSEs against credit risk were to rise from 45 basis points currently—as mandated by their charters—to roughly 400 basis points, a level banks would have to hold against their safest mortgages, guarantee fees would have to be around 80 basis points.<sup>6</sup> By comparison, the historical average is roughly 20 basis points. The expected net increase in mortgage rates of 50 to 60 basis points is in line with current observations; the difference between GSE conforming mortgage rates and jumbo mortgage rates has been hovering around 50 basis points since April. For reference, the spread was 25 basis points during the halcyon days before the financial crisis before widening to 100 basis points during the financial crisis.

#### D. Conclusion

13. **Reviving private mortgage securitization and ensuring that it stays on a sustainable footing needs to restore investor confidence without excessively increasing intermediation costs.** In their current form, proposed risk retention rules could reduce the attractiveness of securitization as a risk-transfer mechanism for the issuer. And, with diminished capital relief, incentives for securitization may be reduced as well. As a result, mortgage rates could rise. On the other hand, the increase in rates is expected to be modest, ranging from 10 to 50 basis points. Furthermore, should risk retention rules restore investor confidence in structured products, securitization activities may be far more sustainable than those seen leading up to the financial crisis. Preliminary analysis suggests that the impact of proposals to trim GSEs' footprint in housing financing—including lowering conforming loan limits—could spur a moderate increase in private securitization of quality prime mortgages, while the effect of raising guarantee fees on mortgage rates is expected to be limited, between 50 to 60 basis points. On net, analysts suggest that mortgage rates could rise as a result of risk retention rules and efforts to reduce the GSEs' dominance in housing finance, but the new rates are not likely to restrict consumers' access to credit.

---

<sup>6</sup> Analysis in Deutsche Bank (2011) assumes that the GSEs would have to price in the same 15 percent after-tax return on equity that banks pursue in healthy markets.

**Box 1. Dodd-Frank Act Securitization Risk Retention Options**

The proposed retention regulations provide for five retention options, although only three of them are applicable to RMBS:

- Private-label RMBS issuers are likely to opt to retain an equal interest in each tranche (a “vertical” slice) to avoid consolidation under accounting rules, which would wipe out any regulatory capital relief (IMF, 2009). Also, vertical retention will likely result in lower regulatory risk charges, because the lion’s share of a typical transaction is made up of lower risk-weighted tranches rated AA/Aa and higher.
- RMBS issuers are not likely to opt to retain just the first-loss or equity tranche (a “horizontal” slice), because it is the last tranche to be paid down (aside from scheduled principal payments), which could lead to long retention cost recovery delays..
- A combination of vertical and horizontal slices that add up to the total required retention (A “L-shaped interest”).

**REFERENCES**

- Amherst Securities, April 2011, Presentation to IMF, “Outlook and Opportunities in the US RMBS Market”.
- Baker, Dean, 2011, “Applying Arithmetic to the Mortgage 5 Percent Retention Rule”, <http://www.cepr.net/index.php/blogs/beat-the-press/applying-arithmetic-to-the-mortgage-5-percent-retention-rule>
- Deutsche Bank, 2011. “The Outlook”, May 25.
- J.P. Morgan, April 2011, Presentation to IMF, “The Impact of new Regulations and Reforms on the Securitized Products Market”.
- Hickok, Susan, and Daniel Nolle, 2009, “The U.S. Financial System in 2011: How Will Sufficient Credit Be Provided,” Office of the Comptroller of the Currency Working Paper No. 2009-6, November.
- Passmore, W., S. Sherlund and G. Burgess, 2005 “The Effect of Housing Government Sponsored Enterprises on Mortgage Rates”, *Real Estate Economics*, 33(3): 427–463
- U.S. Department of the Treasury (U.S. Treasury) and Department of Housing and Urban Development (HUD), 2011, “Reforming America’s Housing Finance Market: A Report to Congress” (February).

## V. WHY ARE U.S. FIRMS HOARDING MONEY?<sup>1</sup>

*U.S. non-farm non-financial corporations are holding almost \$2 trillion in liquid assets, and they continue to report impressive earnings. What does this mean for investment? To answer this question, we estimate a model of corporate demand for money, where money is held mainly for transaction purposes. The model fits well, suggesting that much of the recent rise in liquid assets is likely to be spent within the next two years to boost firms' capital expenditure, rather than kept as precautionary balances.*

1. **U.S. non-farm non-financial corporations (NFCs) are holding record amounts of liquid assets.** According to the Federal Reserve, NFC holdings of liquid assets amounted to around \$1.9 trillion in the first quarter of 2011, equivalent to about one-seventh of GDP and roughly  $\frac{1}{4}$  more than at the beginning of the recession. For some individual firms holdings are extremely high: reports indicate that Microsoft has \$43 billion in money and short-term investments; Cisco Systems is holding \$39 billion; and Google \$33 billion.<sup>2</sup> And as major firms continue to report impressive earnings, the money keeps flowing into their coffers.

2. **There is a lively debate over the causes of such hoarding.** While some argue that firms are not investing because they are uncertain about the future course of consumer spending, others point to a potential “crowding out” of private investment—were interest rates to increase from their historically low levels—as a result of hefty government spending. Still others have argued (based on anecdotal evidence) that much of the money is held overseas. All these interpretations, however, assume that money is held as an alternative to spending, and thus that cash accumulation is bad news for capital expenditure and the U.S. recovery.<sup>3</sup> (Call these the “hoarding” or “precautionary demand” hypotheses.) But it is possible that firms are building up their money balances precisely because they plan to spend it in the future. (The “transactions demand” hypothesis.) In that case, growing money balances should actually be interpreted as a positive sign, as an indication that investment is set to rise sharply over the coming quarters.

3. **This paper tries to understand whether firms' large money holdings are a positive or negative signal for future investment.** It does so by fitting a model of corporate demand for money balances to U.S. data. In the model, the stock of liquid assets held by firms depends on the level of transactions (i.e., investment) and several other standard

---

<sup>1</sup> Prepared by Nicoletta Batini (WHD) and Joshua Felman (RES).

<sup>2</sup> See, for example, “Profits on an Overseas Holiday”, Business Week, March 21, 2011.

<sup>3</sup> Throughout this paper, money and liquid assets are used interchangeably and refer to the Federal Reserve definition of « total liquid assets ». This includes a wide variety of liquid assets held by corporations, e.g., currency, checking, time and saving deposits at banks, shares of money market funds, and U.S. government securities of various maturities (including maturities above 1 year).

determinants—but not on uncertainty or other variables that would capture a precautionary demand for money. The model fits remarkably well, suggesting that the current “excess” money holdings are likely to be corrected through a rise in investment within the next 8 quarters or so.

### A. Motives for Money Holdings

4. **The build-up of corporate money balances is not a new phenomenon—it follows a trend that began in the 1980s.** The trend has accelerated over the past decade, with holdings rising from around 6 percent of GDP in 1990 to around 11 percent of GDP in the mid-2000s. The build up over the past two years seems broadly in line with this trend, essentially reversing a dip in balances that occurred during the depth of the financial crisis.

5. **A number of authors have concluded that the trend stems from precautionary motives** (see for example Bates, Kahle, and Stulz, 2009; Barnes and Pancost, 2010). However, a rising precautionary demand is difficult to square with the low-shock environment that prevailed before the financial and economic crisis. Moreover, its tenets clash with the strong positive relationship between holdings of liquid assets and capital expenditure observed in the data. Granger causality tests support what the data seems to suggest, namely that liquid assets lead capital expenditure (Table 1). In other words, firms accumulate liquid assets because they plan to spend them in the future—they are driven by transactions demand.

Table 1: Pairwise Granger Causality Tests (c)

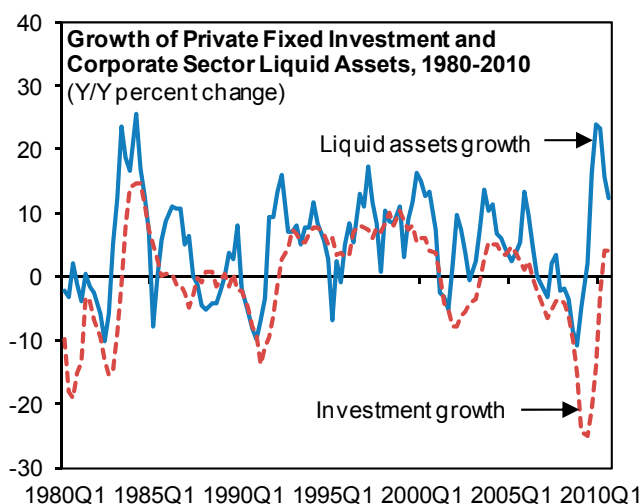
Sample: 1980Q1 2010Q3 Lags: 4	
Null Hypothesis:	Prob.
DM (a) does not Granger Cause DI	0.0001
DI (b) does not Granger Cause DM	0.1772

Note:

(a) DM is the first difference of the log of quarterly total liquid assets held by U.S. NFCs deflated by the GDP

(b) DI is the first difference of the log of quarterly private fixed capital investment deflated by the GDP deflator.

(c) The test indicates that we cannot reject the hypothesis that DI does not Granger cause DM, but we do reject the hypothesis that DM does not Granger cause DI. Therefore it appears that Granger causality runs one-way from DM to DI and not the other way.



6. **This explanation may account for the cash build-up of the past several years.** The wake of the crisis has created an exceptionally attractive environment for issuing bonds. As interest rates on government bonds declined to historically low levels, so did rates of corporate bonds, notwithstanding initially elevated spreads. As a result, starting in early

2009, NFCs have decided to issue significantly more debt than they did in the pre-crisis era, even though their spending needs have diminished. Proceeds have been used to buy back equity, but also to build up cash balances. This financing behavior suggests that firms did not just accumulate cash balances “as a residual,” because they were earning profits and did not want to spend the funds on investment. Rather, it suggests that they deliberately took steps to build up their cash holdings, perhaps on the premise that they would need the funds later, for future investment.

## **B. Money and Investment**

7. **To throw light on the ultimate drivers of firms’ demand for money we estimate a model of broad money holdings of the NFC sector.**<sup>4</sup> (The Appendix provides details about the econometric methodology and the empirical results.) In line with standard theory, the model postulates that money demand is largely motivated by the need to carry out transactions that is by its command over goods and services. Money is valued for its purchasing power. The implication is that the demand for money is a demand for real money, not the nominal face value. In the corporate sector context, the model thus captures the interactions between money holdings, a relevant measure of corporate transactions, which we identify with investment,<sup>5</sup> and the cost of capital. Consistent with theory, in our set up money demand by corporates also depends on the opportunity cost of holding wealth in the form of money, which we proxy by the relative return between the average yield on liquid assets, adjusted for risk, and the yield on less liquid assets, outside the set of assets that we define as money, also adjusted for risk.<sup>6</sup> Finally, money also acts as a store of wealth, and therefore it depends additionally on a wealth variable that we proxy with real net worth. In this sense, the

---

<sup>4</sup> There is a body of literature that provides empirical results of the non-financial corporations demand for money for the United States, but, at best, it is based on data ending in the early 1990s (see for example Goldfeld, 1973; Jain and Moon, 1994; Butkiewicz and McConnell, 1995). Also none of this uses the rigorous approach by Hendry and Mizon (1993) used here. Empirical evidence on firms’ money demand can be found the United Kingdom in Thomas, 1997, and Brigden and Mizen, 2004; for Germany in Read (1996); and more recently, for the euro area in von Landesberger, 2007, and in Martinez-Carrascal and von Landesberger, 2010.

<sup>5</sup> Our measure of investment is total private fixed investment, including residential, instead of business fixed investment or business fixed investment plus inventories. Although it would be interesting to strip out residential investment (which is very depressed and has behaved anomalously over the past cycle) from total investment in the model, procedurally it is more reasonable to use a more comprehensive measure of expenditure when we restrict in the money equation expenditure rather than output (investment rather than GDP) to act as the scale variable for money demand.

<sup>6</sup> Technically, the relative return on risk-adjusted yields inside and outside the total liquid assets aggregate captures not only the opportunity cost of holding wealth in liquid asset form but also the term spread. This is not problematic for the interpretation of our results, since a positive and large term spread is usually interpreted as a sign that investors expect a recovery—and hence some future monetary policy tightening—in the not-too-distant future. Thus, finding that the demand for liquid assets depend positively on (or also on) the term spread—as we do—is consistent with our interpretation that the demand for money is transactionary rather than precautionary.

model abstracts from precautionary motives for money demand, assuming that money demand is largely motivated by the need to carry out transactions.

8. **The model has both a short-run and a long-run specification.** As such it can quantify firms’ “long-run” demand for real money balances (and investment) and establish whether NFCs are currently holding liquid assets that are above/below their long-run demand level given fundamentals. The model can also tell us how fast such gap from the long-run level will be closed, predicting a path for money balances (and investment) over the next quarters conditional on the existing gap. The model fits the data well—an indication that the pattern of U.S. NFCs’ money balances accumulation can be well explained without resorting to precautionary motives. Importantly, the long-run money demand and investment relationships look plausible. Money is held partly as a transactions balance and partly as a store of value by NFCs and is increasing in the relative rate of return on short-term deposits and declining in the real cost of capital.<sup>7</sup> In the second long-run relationship the investment-to-GDP ratio depends on the real cost of capital, but nominal interest rates do not appear to be important in determining investment in the long run. In short, the estimates indicate that firms have both a transactions and a portfolio motive for holding money. Results also suggest the existence of a corporate sector liquidity channel whereby firms’ “excess” money balances have a negative impact on the cost of capital and a positive impact on investment spending.

9. **Two key messages emerge from the analysis:**

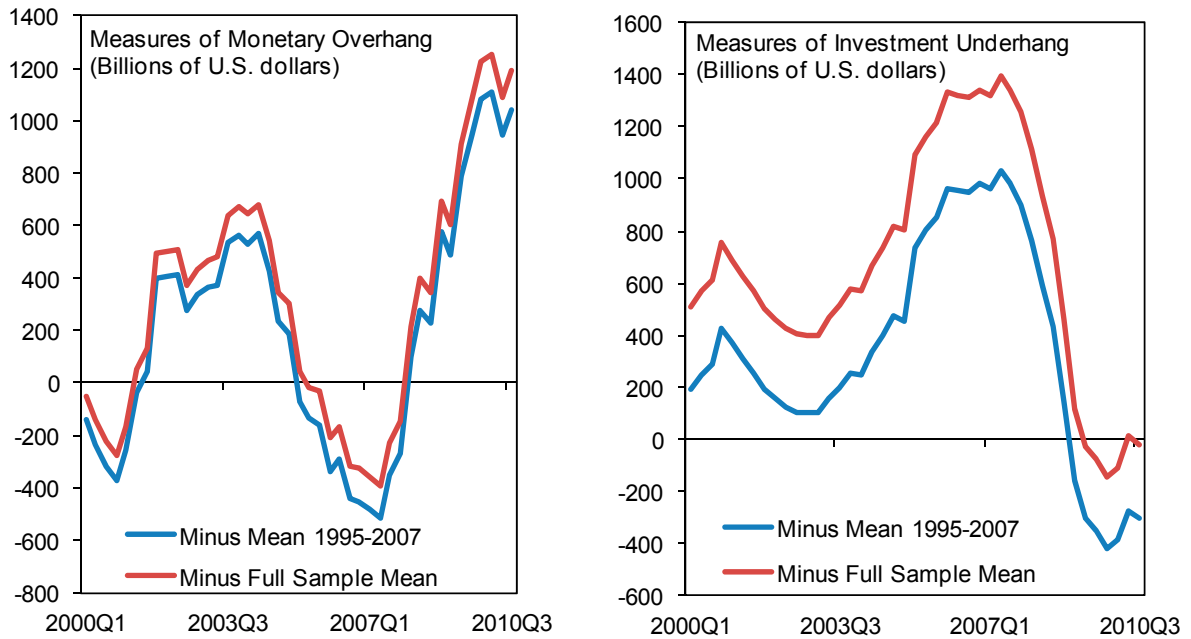
- Investment by firms is below the level suggested by our model and holdings of liquid assets are considerably above their long-run demand level. In 2010 Q3 the amount of “excess liquidity” held by firms was around 60–70 percent of their total holdings of liquid assets (Figure 1). Such “overhang” is accompanied by an investment shortfall—in the same quarter, our estimates suggest that firms’ investment was below its fitted level at this time in the cycle by 1 to 18 percent (depending on the sub-sample used to represent a “normal” period). The estimates also show that firms reduced their liquid assets below the fitted level prior to the crisis—a sign of excess leveraging—and started rebuilding these holdings as the crisis erupted, as their transactions demand came to a halt with the precipitous drop in consumer spending.

---

<sup>7</sup> Which is in effect the alternative rate of return on real assets. For example, a high cost of capital may be reflecting an undervalued stock market, which might induce firms to spend deposits in acquiring undervalued firms. Thus the cost of capital is effectively proxying for the incentives of firms to engage in M&A activity.

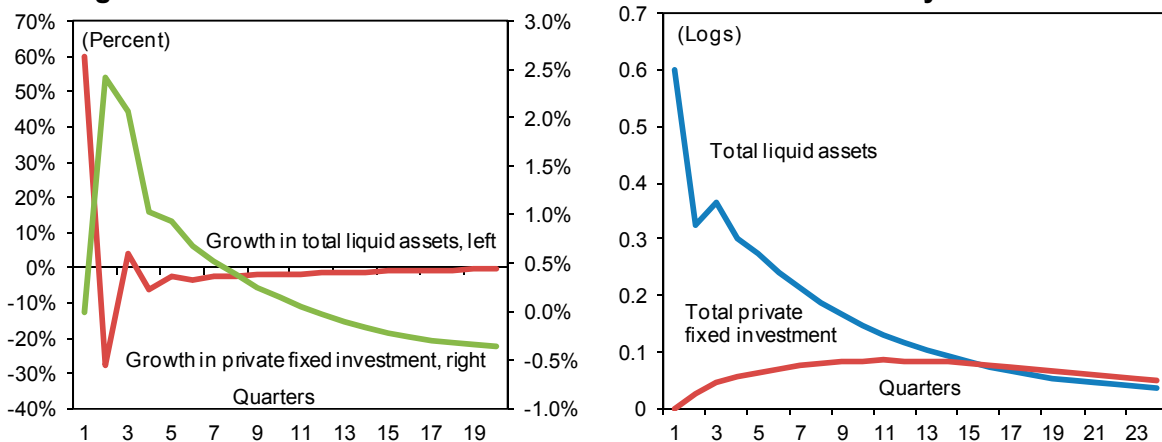


**Figure 1. Money Holdings and Investment Deviations from Desired Values**



- However, the large “overhang” of liquid assets is a good omen for future investment. Model estimates suggest that a positive shock to firms’ money holdings is associated with an increase in firms’ capital expenditure. When the shock is calibrated to mimic the recent excess growth in money holdings (i.e. +60 percent—red line, LHS, left panel), investment (green line, RHS, left panel) accelerates with a lag of 2–3 quarters and investment growth remains persistently above baseline for around 10 quarters (Figure 2). This indicates that investment could increase substantially over the next year or two.

**Figure 2. How Does Investment React to an Increase in the Money Stock Held?**



## REFERENCES

- Barnes, M. L. and N. A. Pancost, 2010, "Internal Sources of Finance and the Great Recession", Federal Reserve Bank of Boston WP No. 10–15.
- Bates, T. W. and K. M. Kahle and R. Stulz, 2009, "Why Do U.S. Firms Hold so Much More Cash than They Used to?", *Journal of Finance*, 64(5): 1985–2021.
- Boswijk, H P (1995), 'Efficient inference on cointegration parameters in structural error correction models', *Journal of Econometrics*, 69(1): 133–158.
- Brigden, A, and P. Mizen, 2004, "Interactions between Money, Lending and Investment in the UK Private Non-Financial Corporate Sector", *The Manchester School*, 72(1): 72–99.
- Butkiewicz, J. and M.M. McConnell. (1995). "The Stability of the Demand for Money and M1 Velocity: Evidence from the Sectoral Data", *Quarterly Review of Economics and Finance*, 35(3): 233–243
- Goldfeld, S. (1973). "The Demand for Money Revisited", *Brookings Papers on Economic Activity* 1973, Vol. 4, p. 577–646.
- Jain, P. and C-G Moon (1994). "Sectoral money demand: A cointegration approach", *Review of Economics and Statistics* Vol. 76, No 1, p. 196–202.
- Johansen, S. (1988), 'Statistical analysis of cointegrating vectors', *Journal of Economics, Dynamics and Control*, pages 231–54.
- Hendry D F and Mizon G E (1993), 'Evaluating dynamic models by encompassing the VAR', in *Models, methods and applications of econometrics* (ed. P Phillips) Basil Blackwell.
- Read, V. (1996). "Sectoral Disaggregation of German M3", Discussion Paper 1/96, Deutsche Bundesbank.
- Thomas, R (1997). "The Demand for M4: A Sectoral Analysis Part 2-The Corporate Sector", Working Paper, No 62, Bank of England.
- von Landesberger, J. (2007). "Sectoral money demand models for the euro area based on a common set of determinants", Working Paper, No. 741, European Central Bank.
- Martinez-Carrascal, C. and J. von Landesberger, 2010, "Explaining the Money Demand of Non-Financial Corporations in the Euro Area: A Macro and A Micro View" ECB Working Paper Series No 1257.
- Urbain, J-P (1992), 'On weak exogeneity in error correction models', *Oxford Bulletin of Economics and Statistics*, 54: 187–208.

## APPENDIX 1. METHODOLOGY AND DATA

### 1. *Methodology and Data Description*

To measure companies' long-run level of cash holdings, we estimate a model of broad money holdings of the U.S. non-financial corporate sector. The model stylizes the behavior of companies demand for money holdings jointly with that of other real and financial variables. To this end we estimate a three-equation vector error correction model of money, investment and the cost of capital. It uses the encompassing VAR approach of Hendry and Mizon (1993) to derive structural models from a congruent statistical representation of the data.

Historically corporate sector money holdings have been more volatile than households' money holdings and thus they have been difficult to model. This is mainly due to the fact that the types of liquid assets which the corporate sector typically holds can be close substitutes of other real and financial assets and that changes in the rate of return expected on these assets may trigger large changes in firms' money holdings. Crucially, a large variety of real and financial assets can act as a store of value. Bearing this in mind we start by estimating a closed system of nine variables (plus a dummy) of which 3 endogenous and 6 exogenous:

#### *Endogenous Variables:*

- Real money holdings by NFCs ( $m_t$ ),
- Real gross fixed capital formation ( $i_t$ ),
- A measure of the real cost of capital ( $wacc_t$ , an indicator of the desirability of expanding capital which should also act as an alternative rate of return on money over and above its role in explaining investment). This is measured by combining the cost of debt (proxied by the rate on triple-A corporate debt) and the cost of equity (proxied by the formula:  $1/(p/e) + \text{expected future growth}$ , where  $p/e$  indicates the price-to-equity ratio from S&P and expected future growth is proxied by historical long-term growth. For example, if S&P P/E is 19 and expected future growth is 1.3 percent, the cost of equity is  $1/19+1.3$  percent = 6.6 percent) using time-varying weights that reflect the share of NFC's liabilities in equity and debt at each point in time. (Weights are around 0.7 on equity finance and 0.3 on debt finance, respectively over the sample).

*Exogenous Variables:*

- Real GDP ( $y_t$ ), measuring general real business cycle conditions that affect the demand for investment goods and the demand for money;
- A measure of the differential between the average yield on riskless liquid assets (proxied here by the LIBOR rate) and the return on the 20-year U.S. Treasury bond rate—a proxy for the riskless return on “outside money.
- NFCs’ net worth ( $w_t$ )
- A measure of the utilization of the capital stock ( $capu_t$ )
- A term capturing firms’ perceived adequacy of inventories (invt, proxied via the Institute for Supply Management inventory diffusion index, ‘PMI’)—essentially a measure of unwanted stocks and has the advantage that it does not rely on some arbitrary means of extracting the trend in stocks evident in U.S. data. The ISM survey is treated as a ‘barometer’ of confidence in prevailing economic conditions relating to the cycle since it records the extent to which firms consider themselves overstocked and therefore less likely to embark in more investment in fixed capital.
- Inflation (first difference in the GDP deflator)
- A dummy to capture the transition between Burns and Volker (a period of rapid disinflation). The dummy took the values of 1 in 1980Q4–1982Q1 respectively, followed by -1 in the subsequent quarter, marking the break in U.S. monetary policy that accompanied the well-known transition in price stability implicit objectives and Fed’s reaction function between Chairman Burns and Chairman Volcker.

*Sample:* 1980Q1–2010Q3, all variables are seasonally adjusted, and are expressed in natural logs apart from rates of return which are expressed in percent

## 2. *The Estimated Long-run Relationships*

To determine the number of long-run relationships among the variables we applied the cointegration analysis developed by Johansen (1988). We begin by testing the variables for stationarity. Univariate unit root tests suggested that some of the variables, notably capital stock utilization and the ISM inventory diffusion index were either stationary or close to being stationary. Inflation in the GDP deflator was also found to be borderline stationary. We thus estimated a closed VAR model with all variables endogenous but these three (and the

1981 dummy).<sup>1</sup> A lag length for the VAR of 2 was chosen on the basis that there appeared to be no residual autocorrelation. This was confirmed by Akaike and Schwarz information criterion tests. Additionally a constant was added. Results of a co-integration test with both a restricted and unrestricted constant (the dummy variable, capital stock utilization, inflation and ISM inventory diffusion index are treated as unrestricted in both cases) suggested at least two but possibly three co-integrating vectors. We proceed on the basis that there are three co-integrating vectors.

To identify the long-run relationships we partitioned the six I(1) variables into endogenous variables and exogenous variables and then assumed as in Boswijk (1995) that there are the same number of endogenous variables as co-integrating vectors, as this simplifies the identification of both the short and long-run structure. Hence we partitioned the original vector in line with results from the closed VAR that suggested that money, investment and the real cost of capital should be treated as endogenous. Identifying restrictions based on theory were then made on the co-integrating vectors. These are shown in Appendix Table 1. Conceptually the interpretation of the restrictions is as follow:

*9 just-identifying restrictions (in bold):* We imposed 3 “normalizing” restrictions; then: (i) in the money demand equation investment rather than GDP is restricted to act as a scale variable; (ii) the risk-adjusted relative return on total liquid assets was excluded from the investment equation leaving a simple investment ratio dependent on weighted cost of capital; (iii) in the investment equation, the level of real money balances is restricted so as not to affect the long-run relationship for investment; (iv) investment is restricted to be homogenous of degree one in output; (v) and (vi) in the cost of capital, neither real balances or investment affect the cost of capital in the long run.

*2 over-identifying restrictions (in italics):* (i) the coefficients on investment and (ii) wealth in the money demand equation are restricted to be close to their estimated value (-0.1 and -0.9, respectively). This allows us to interpret the relationship as consisting of both an error correction in velocity and an integral control in the wealth-income ratio.

The likelihood ratio test shows that the two over-identifying restrictions could not be rejected even at the 10 percent level. The signs and size of the freely estimated parameters are a further indication of how suitable these identifying restrictions are. The resulting over-identified co-integrating vectors for money and investment were given as follows:

---

<sup>1</sup>  $r_w$ , the wedge between the risk-adjusted own-rate of return on NFCs’ money stock and the risk-adjusted return on alternative assets outside the total liquid assets aggregate, is stationary too.

Looking at Appendix Table 1, the long-run money demand and investment relationships look plausible. Money is held partly as a transactions balance and partly as a store of value by NFCs and is increasing in the relative rate of return on liquid assets and declining in the real cost of capital (which is in effect the alternative rate of return on real assets. For example a high cost of capital may be reflecting an undervalued stock market, which might induce firms to spend deposits in acquiring undervalued firms. Thus the cost of capital is effectively proxying the incentives for firms to engage in M&A activity.) In the second long-run relationship the investment-to-GDP ratio depends on the real cost of capital, but nominal interest rates do not appear to be important in determining investment in the long run.

Appendix Table 1. Test of Identifying Restrictions on the Co-integrating Vectors

<i>Identified Co-integrating Vectors</i>			
	$\beta_1$	$\beta_2$	$\beta_3$
<i>m</i>	<b>1.00</b>	<b>0.00</b>	<b>0.00</b>
<i>i</i>	-0.10	<b>1.00</b>	<b>0.00</b>
<i>wacc</i>	0.77	0.73	<b>1.00</b>
<i>y</i>	<b>0.00</b>	<b>-1.00</b>	0.43
<i>rw</i>	-0.16	<b>0.00</b>	-0.06
<i>w</i>	-0.90	1.33	0.02

*Over-identifying restrictions imposed (two over-identifying restrictions):*

$$\beta_{12} = -0.1; \beta_{16} = -0.9;$$

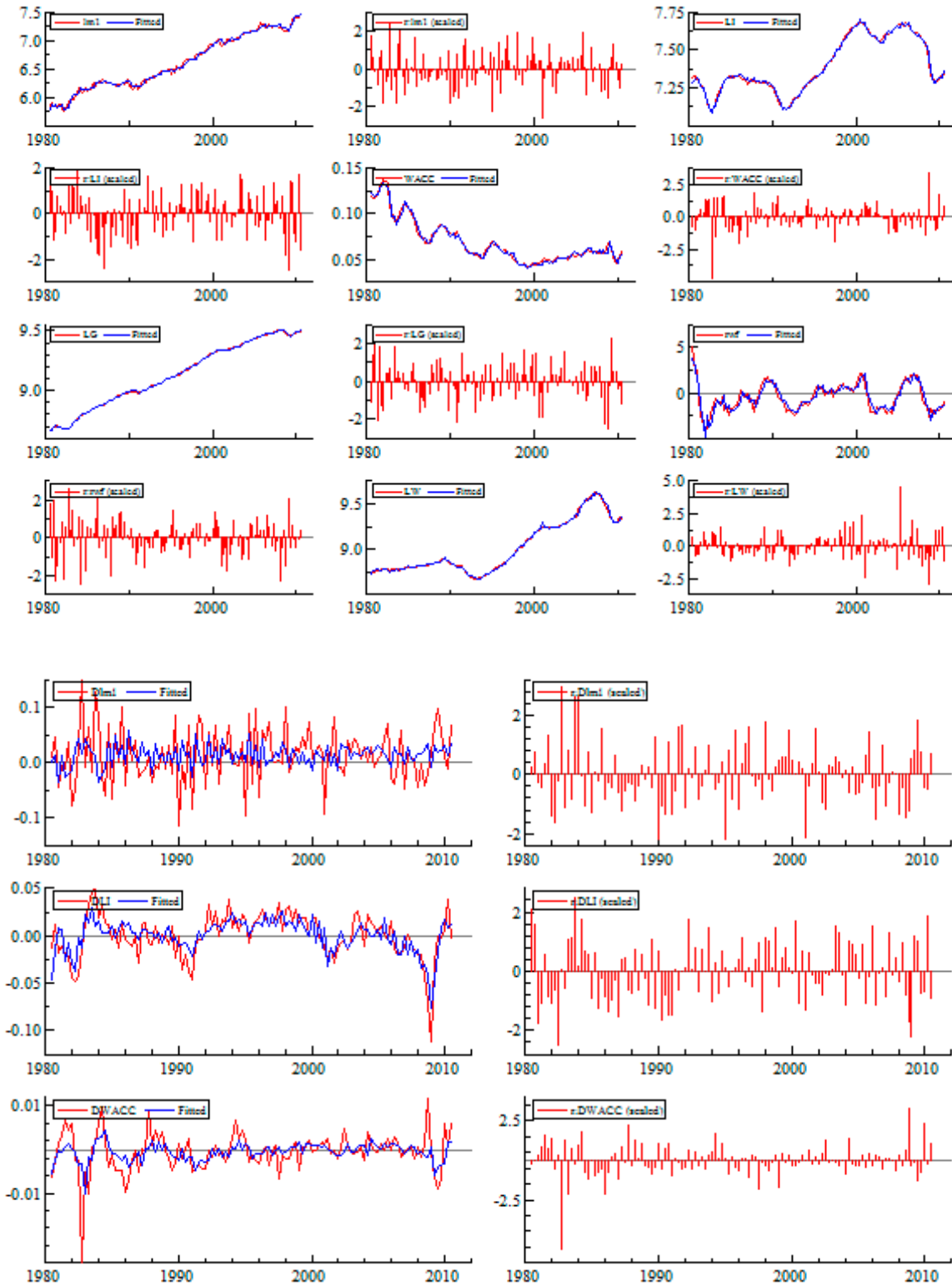
$$LR \text{ test of restrictions: } \chi^2(2) = 0.10894 [0.9470]$$

Together these relationships imply a general portfolio model of firms' behavior. A higher cost of capital induces NFCs to reduce investment in fixed capital and increase their purchases of other financial assets, which is likely to imply higher M&A activity. They become net purchasers of equity rather than net issuers. Part of the purchase of equity is financed through the running down of firms' other financial assets which implies a fall in the asset demand for money. The fall in investment spending will also reduce the transactions demand for money by NFCs.

### 3. *The simplified conditional VAR*

The next step is to map the conditional VAR into I(0) space and analyze the conditional VECM (Vector Error-Correction Mechanism). To this end we first defined three error correction terms  $m_t - m^*$ ,  $i_t - i^*$  and the level of *wacc*. Employing tests suggested in Urbain (1992) we found that weak exogeneity assumptions seem legitimate and we could proceed with an analysis of a conditional VECM. We thus simplified the conditional VECM by excluding some of the variables that are jointly insignificant. Fitted values (against actual) from the resulting parsimonious VECM are shown in Appendix Figure 1 below, bottom panel. (Dlm1 indicates qoq growth in total liquid assets held by NFCs; DLI is the qoq growth in investment and DWACC indicates changes one quarter to another in the weighted cost of capital).

Appendix Figure 1. Fitted Versus Actual Values of the I(I) and I(0) Representations

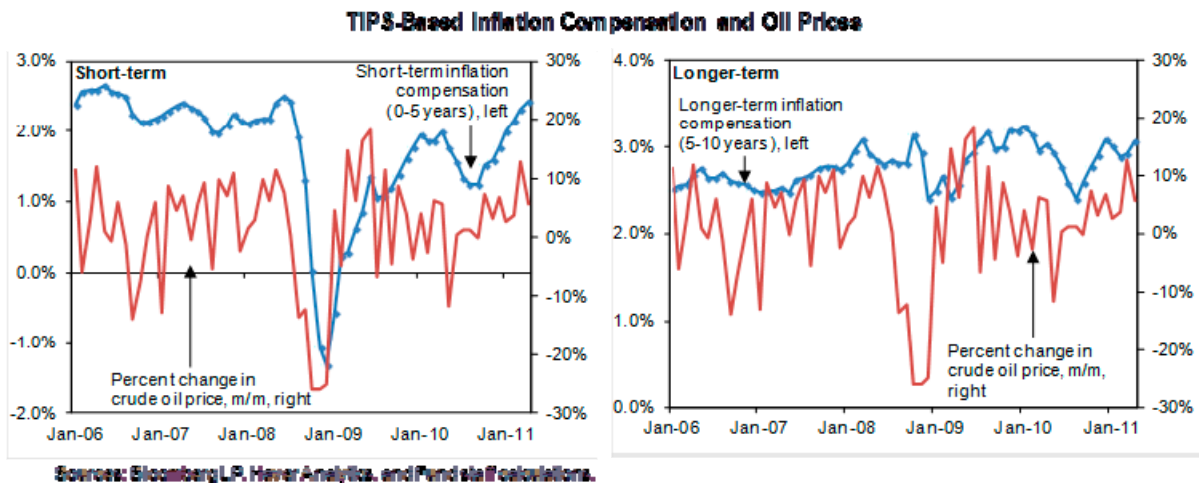


## VI. HOW DO COMMODITY PRICE SHOCKS AFFECT TIPS-BASED INFLATION COMPENSATION?<sup>1</sup>

*This chapter examines the sensitivity of TIPS-based inflation compensation to commodity prices. The findings suggest that the Fed needs to remain vigilant in the face of potential further commodity price shocks that could add to inflation uncertainty, even if past correlations suggest that the risk of longer-term inflation expectations becoming unmoored due to commodity price shocks of the magnitudes observed in recent months appears modest.*

### A. Introduction

1. **The recent months have seen significant increases in commodity and consumer prices as well as volatility in inflation expectations.** The prices of crude oil and several food commodities rose sharply, and headline consumer price inflation increased from 1.2 to 2.2 percent SAAR between 2010Q4 and 2011Q1. Inflation expectations for the next one to five years have also gone up, consistent with estimates that commodity price shocks take up to 4–5 quarters to feed into domestic prices. Moreover, in March 2011 there was a noticeable jump from 2.9 percent to 3.2 percent in the closely watched longer-term expected inflation measure in the University of Michigan survey, which has been reversed since then.<sup>2</sup>



2. **A temporary rise in commodity prices should not have a persistent effect on core inflation if longer-term inflation expectations and wage inflation remain stable.**

<sup>1</sup> Prepared by Oya Celasun, Roxana Mihet (RES), and Lev Ratnovski (RES).

<sup>2</sup> The University of Michigan survey asks consumers about their expectation of average inflation over the next five to ten years, that is, over a horizon that includes the near term. Expected inflation in the longer term—for instance over the five year period that starts five years from now—can be derived from the Treasury inflation protected securities (TIPS) yield curve.



Accordingly, the Fed continues to signal that, given elevated resource slack, U.S. monetary policy is poised to remain accommodative for an extended period, as long as the outlook for inflation over the medium-term remains subdued.

3. **A natural question at this juncture is whether potential further commodity price shocks could affect longer-term inflation expectations**—which reflect the public’s perceptions of the Fed’s underlying inflation target and its ability to achieve that target. To help answer this question, we examine the sensitivity of inflation compensation embedded in Treasury securities—given by the difference between nominal (coupon) and inflation-protected Treasury yields—to commodity price shocks. Inflation compensation is not a perfect measure of expected inflation, since it also captures time varying liquidity and inflation risk premia. For subsamples where we can adjust inflation compensation for liquidity and inflation risk premia (the pre-crisis part of the sample), we find that adjusted and unadjusted inflation compensation respond very similarly to commodity price shocks. This finding suggests that the estimated response of inflation compensation to shocks mainly reflects the response of inflation expectations.<sup>1</sup>

## B. Results

4. **We regress daily changes in near-term (zero to five years ahead) and longer-term (five to ten years ahead) inflation compensation on oil and food price shocks, and the surprise component of macroeconomic data releases.** Controlling for macroeconomic shocks is necessary to isolate the impact of commodity prices; for instance pressures on longer-term expectations from commodity prices in the recent months may have been offset by expectations of weaker medium-term aggregate demand (given intensified talks of a process of medium-term fiscal consolidation and lower observed near-term growth momentum). We also control for VIX as a measure of overall economic uncertainty.

5. **As expected, oil and food price changes have a significant impact on near-term (0–5 year) inflation compensation** (Table 1). Using daily data, we find that a ten percent increase in spot oil prices increases near-term inflation compensation by 0.09 percentage point. Similarly, a ten percent increase in food prices increases near-term inflation

---

<sup>1</sup> Inflation compensation is defined as coupon minus TIPS yields. It captures inflation expectations and time-varying liquidity and inflation risk premia associated with holding TIPS. We verify that the estimation results are robust to controlling for the time-varying liquidity risk. Liquidity risk is corrected by taking residuals from regressing inflation compensation on two of its proxies: (1) the spread between Treasury bonds and Treasury-backed but less liquid Resolution Funding Corporation bonds, and (2) the volume of TIPS transactions as a share of coupon transactions by primary dealers. We are able to control for liquidity risk only during 2003–08, as measures of liquidity during the crisis were contaminated flight to quality and the Fed’s large-scale asset purchases. Changes in inflation rate risk can be inferred from survey-based data using Kalman filtering, but the approach is not useful for high-frequency data. See the discussion in Gürkaynak et. al., 2010, "The TIPS Yield Curve and Inflation Compensation." *American Economic Journal: Macroeconomics* 2(1): 70–92.

compensation by 0.04 percentage point. From August 2010 to April 2011, 0–5 year inflation compensation increased by 1.40 percentage point, of which 0.42 percentage point can be attributed to a 60 percent increase in spot oil prices, and 0.10 percentage point to a 30 percent increase in spot food commodity prices. We also find that the daily change in the oil price *inflation rate* expected for the year ahead has a statistically significant impact on 0–5 year inflation compensation.

6. **Importantly for the design of monetary policy, shocks to oil prices also impact longer-term inflation compensation, although the estimated effect is considerably smaller** than the effect on near-term compensation. A ten percent increase in spot oil prices increases 5–10 year inflation compensation by 0.02 percentage point. From August 2010 to April 2011, 5–10 year inflation compensation increased by 0.94 percentage point, of which only 0.09 percentage point can be attributed to the 60 percent increase in spot oil prices. Somewhat surprisingly, we don't find any statistically significant effect of the change in expected one-year ahead oil price inflation on 5–10 year inflation compensation. Similarly, we do not find a significant effect of food commodity price shocks on longer-term inflation compensation.

### C. Conclusion

7. **There are three possible channels for the estimated effect of spot oil price shocks on longer-term inflation compensation.** One is that markets perceive a higher chance of a sustained price rally when they observe a spot oil shock. This is not supported by the finding that changes in the expected oil price inflation for the year ahead have no impact on longer-term expectations. The second channel is that expectations of medium-term core inflation go up. The third is that commodity price volatility makes the monetary policy environment more complex, and hence increases perceptions of inflation rate uncertainty. This requires a higher inflation risk premium in nominal bonds, which increases our measure of inflation compensation. Our results suggest that both of the last two channels could be at work.

8. **Even if past correlations suggest that the risk of longer-term inflation expectations becoming unmoored due to commodity price shocks is modest, the stability of longer-term expectations cannot be taken for granted.** The findings of the regression analysis suggest that commodity price shocks have not shifted inflation expectations to a degree that would threaten medium-run inflation dynamics. However, the Fed needs to remain vigilant if the risk of potential further commodity price shocks increases, since these may have larger effects than in the past if inflation uncertainty increases or headline inflation remains higher than desired for a prolonged period.

Explanatory Variable	(1)	(2)	(3)	(4)
	0-5 Inflation Expectations	5-10 Inflation Expectations	0-5 Inflation Expectations	5-10 Inflation Expectations
	Jan, 2003 - Apr, 2011		Jan, 2003 - Oct, 2008	
	Controlling for TIPS liquidity risk			
Food Commodity Index Price Change, (F <sup>I</sup> -F <sup>I</sup> )/F <sup>I</sup> , percent	0.0040*** (p=0.000)	0.0009 (p=0.236)	0.000005 (p=0.997)	0.0008 (p=0.253)
Oil Spot Price Change, (S'-S)/S, percent	0.0090*** (p=0.000)	0.0022*** (p=0.000)	0.0082*** (p=0.000)	0.0018** (p=0.007)
Oil One-Year Ahead Forward Inflation Change, (F'-S')/S'-(F-S)/S, percent	0.0095*** (p=0.000)	-0.0016 (p=0.213)	0.00052* (p=0.040)	0.0013 (p=0.366)
No. Observations	1860	1860	1236	1236
R-squared	0.21	0.06	0.06	0.05

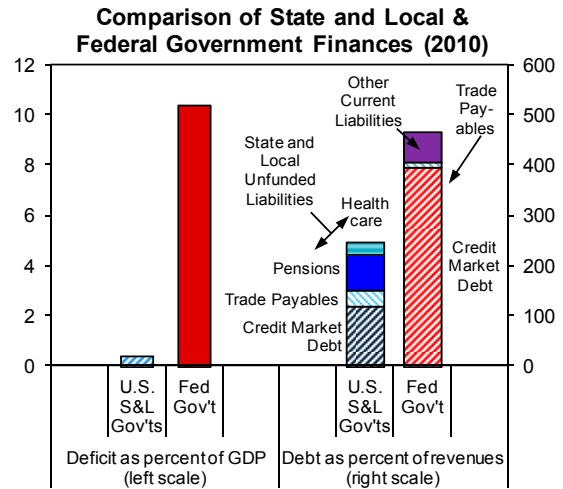
Note: p-values in parentheses; \*, \*\*, and \*\*\* denote significance at the 5, 1, and 0.1 percent levels, respectively. The explanatory variable is the daily difference in inflation compensation in percentage points. Oil and food commodity price shocks are expressed in percentages. S and S' denote the spot oil price on consecutive trading days, F and F' denote the price of the crude oil future contract a year ahead on two consecutive trading days, and F<sup>I</sup> and F<sup>I</sup> denote the spot food commodity price index on consecutive trading days. All regressions control for surprise components of key macroeconomic news releases: capacity utilization, CPI excluding food and energy, changes in nonfarm payrolls, current account, FOMC interest rate decisions, home sales, initial jobless claims, the ISM non-manufacturing survey, monthly budget, personal consumption, retail sales ex autos, and the unemployment rate, as in Gürkaynak et. al., 2005, "The Sensitivity of Long-Term Interest Rates to Economic News: Evidence and Implications for Macroeconomic Models", American Economic Review 95(1): pp. 425-36. We also control for the daily percent changes in VIX.

## VII. FISCAL CHALLENGES FACING THE U.S. STATE AND LOCAL GOVERNMENTS<sup>1</sup>

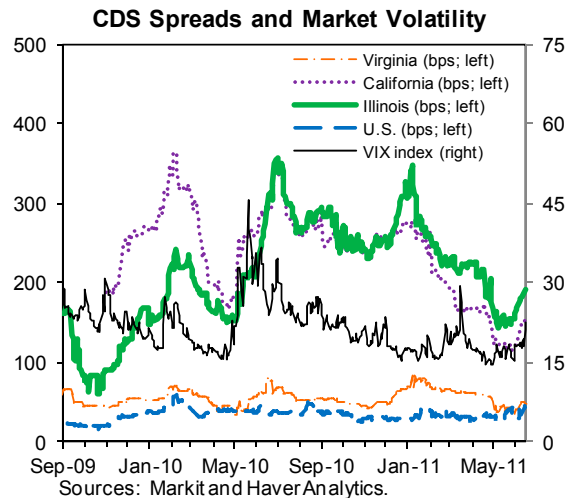
*With balanced budget rules, the deficits of U.S. state and local governments (SLGs) have remained low in the aftermath of the Great Recession, but the resulting fiscal contraction has partially offset the positive effects of federal stimulus. While tax receipts are now recovering, SLGs will need to continue their fiscal adjustment due to the expiration of federal emergency aid. The main medium-term challenges include unfunded pension and other retirement benefits, and rising health care costs.*

1. **SLGs have so far managed to cope with the fallout from the Great Recession, but at a considerable social cost.** The recession hit tax collections very hard given the significant exposure to very weak housing and labor markets and consumer spending. Aggressive spending cuts, some revenue measures, and reserve drawdown have kept the operating budgets roughly balanced as required by law, with a significant federal emergency aid smoothing adjustment to lower revenues. However, the involuntary fiscal consolidation at the state and local level has imparted considerable social costs, with cuts in education, health, transport, and welfare systems, which together account for the majority of SLG outlays. The state and local governments account for almost 20 percent of GDP in terms of total expenditures (on a GFSM-2001 basis), about 12 percent of aggregate purchases (on the national accounts basis) and 15 percent of total civilian employment.

2. **Although the tax receipts are now recovering, state and local governments will need to continue fiscal adjustment, while addressing unfunded long-term commitments.** Emergency federal aid will be phased out soon, and the renewed declines in house prices pose risks especially to local



Sources: Bureau of Economic Analysis; Board of Governors of the Federal Reserve System, *Flow of Funds Accounts of the United States*; Collins and Rettenmaier (2010); and Fund staff calculations.  
 Notes: Deficit outturns are reported here on the NIPA basis, with financial liabilities reported on the Federal Reserve's Flow of Funds basis. The chart does not include federal unfunded liabilities for Social Security, Medicare, and other programs.



<sup>1</sup> This chapter was prepared by Martin Sommer with research assistance from Geoffrey Keim.

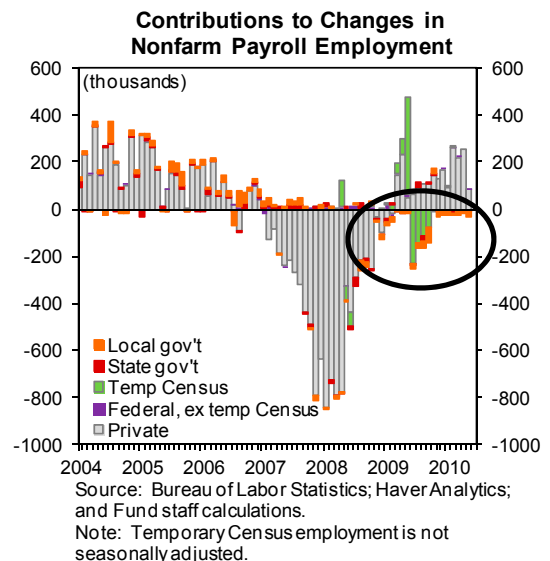
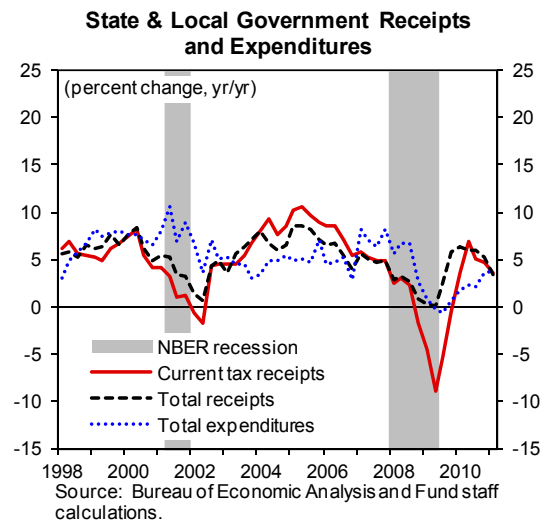
governments. Rainy-day funds which have been depleted in almost half of the states will need to be replenished to rebuild room for maneuver. The state and local governments will also need to continue addressing their unfunded entitlements, especially pensions, which remain the long-term risk for a number of states due to strong legal protections of the already-accrued pension benefits. The SLGs will also face structural spending pressures from health care, both through higher Medicaid outlays and health benefits for government retirees.

3. **Following a spell of risk aversion in the state and local government bond markets late last year, the situation has calmed down significantly.** Lower bond supply following the expiration of the Build-America-Bond program, improved tax collections, and adjustment measures adopted by the lowest-rated states (California, Illinois) helped improve the market sentiment. More generally, defaults are unlikely at the state level given low debt, balanced budget rules, and statutory protections for investors. The last state default occurred during the Great Depression in 1933. Defaults at the local level have remained rare, mostly associated with mismanagement or high-risk projects by quasi-government institutions.

#### A. Fiscal Adjustment in the Aftermath of Great Recession

4. **The balanced budget rules impose fiscal discipline but lead to pro-cyclical policies.** By statute, almost all state governments (except Vermont) are obliged to maintain balanced operating budgets. During the Great Recession, the available rainy-day reserves proved insufficient and the SLGs were forced to sharply cut back their spending, with the SLG gross debt remaining low around 20 percent of GDP. The involuntary fiscal consolidation has had modest macroeconomic—but more significant social—side effects.

- Spending cuts have affected all expenditures, including primary and secondary education, health, transport, and welfare systems. Demand for social services such as Medicaid (health insurance for the poor) has increased, further exacerbating budgetary pressures. Since fall 2008, the SLGs have eliminated



over 500,000 jobs, with more aggressive layoffs prevented by furloughs. The cumulative reduction in state operating spending during FY2008–10 was about ½ pct of GDP with only a partial recovery during FY2011, according to the NASBO (National Association of State Budget Officers) data.

- *Impetus for revenue measures has been more limited.* Together with greater compliance efforts, the states raised about ¼ pct of GDP in new revenue over the last two years with a significant proportion coming from just a handful of states including California, according to NASBO. Many states have aimed for “low-hanging fruits” such as higher fees, excises on alcohol, tobacco, and gambling, and temporary revenue measures. Notably, Illinois raised its personal income taxes in early 2011.
- *The federal government has helped to ease the SLG fiscal stress considerably.* Emergency transfers for Medicaid and education spending amounted to ¼ pct of GDP in FY2009 and ½ pct of GDP in FY2010, covering over one-third of the total state shortfalls in those two years.<sup>2</sup> According to a CBPP (Center on Budget and Policy Priorities) report, the non-Medicaid portion of federal funds directly supported roughly 300,000 SLG jobs last year.
- *The states have also tapped their rainy day reserves, while opting for other temporary measures.* Excluding the oil-rich states of Alaska and Texas, the cash balances have dropped by ¼ pct of GDP to roughly 0.1 pct of GDP at present. The states with remaining reserves are not willing to tap these resources in light of the uncertain outlook and concerns about a rating downgrade. Meanwhile, the SLGs continued to underfund pension funds, increasing further their long-term contingent liabilities (see Section B).

**5. Despite the recovering economy, the SLG budgets will remain under pressure for some time given the phase-out of federal aid.**

- *Tax collections have started to recover, but will remain below the pre-crisis trend.* Consumer deleveraging is expected to keep sales taxes structurally weak, while the sluggish labor market will mute PIT collections. In some cases, property taxes have not fully caught up to the decline in house prices (the tax base is usually calculated as the 3-year moving average of house values), while a number of states have caps on property tax rates. Many state legislatures resist further revenue measures.
- *Meanwhile, the federal aid will drop off at the end of FY2011.* The administration has provided over ¼ pct of GDP of emergency aid in FY2011, but the aid is coming to an

---

<sup>2</sup> Additional federal funds have been provided for infrastructure spending which however cannot be used to balance the operating budget.

end. Federal fiscal consolidation could lead to future cuts in other federal transfers. At the local level, there is a risk of domino effect from fiscal consolidation at both federal and state levels, as the local governments receive more than 1/3 of revenue from transfers.

- *All told, the ex ante funding gaps of the state governments will remain sizeable during FY2012, bringing the prospect of additional spending cuts—an unwelcome drag on the ongoing recovery.* On the national account basis, the staff estimates that the SLG consumption and investment will subtract around 0.1–0.2 pct from GDP growth during 2011. The SLG layoffs are currently proceeding at the annual rate of about 300,000 workers, with some analysts expecting a temporary acceleration of job cuts given the expiring federal aid.

### B. Medium-Term Challenges

6. **The longer-term challenges include unfunded pension liabilities and other retirement benefits, and rising health care costs.** The unfunded pension liabilities are the main medium-term policy issue facing the SLGs given legal impediments to their resolution and concentration of the problem among certain states. Almost 90 percent of the full time SLG employees have a defined-benefit pension plan—in contrast with about ¼ of workers in the private sector.

- *The contingent pension liabilities amounted to around \$660 bn in FY2009 according to the Pew Center estimates.* With assets estimated at \$2.3 trillion, the state pension plans were on average 78 percent funded in FY2009, with the preliminary FY2010 data pointing to another slight decline in the funding ratio. While lower asset values after the Great Recession have clearly hit the pension fund finances, underpayments to the system prior to the crisis were prevalent, with roughly ½ of the states paying less than the actuarially-sound contributions during the previous cyclical expansion (2003–06).
- *The actual unfunded liabilities could be even higher according to some analysts, with alternative estimates in the wide range of up to \$3 trillion.* The differences in estimates are often attributable to alternative assumptions about future returns, discount rate, and longevity. A recent study by Collins and Rettenmaier (2010) reports the SLG unfunded pension liabilities at \$1.5 trillion using the Social Security Trustees parameters, while the Pew Center reports the underfunding at \$1.8 trillion using parameters typical for corporate pensions.
- *The degree of underfunding varies greatly among the states and localities* (Figure 13 in the Staff Report). On the positive side, the New York state has a 101 percent funding ratio, but Illinois, West Virginia, Kentucky, and New Hampshire have funding ratios of just above 50 percent. Overall, 31 states have a funding ratio below

80 percent, a threshold for pension funds to be considered sound. The states contributed about \$73 billion to their pension plans in FY2009—well below the actuarially-sound contribution of nearly \$115 billion. Some researchers have suggested that certain states and cities could run out of their pension trust funds already by the end of this decade (Rauh, 2010, and Novy-Marx and Rauh, 2011), facing the risk of a cliff adjustment.

- *State constitutions often protect pension benefits of the existing employees.* Almost all parametric changes require statutory amendments, with exemptions for employee contributions in some states. Three states have attempted to cut their commitments by modifying the price-indexation formula—these decisions have been challenged in courts, but judges in Colorado and Minnesota have recently dismissed these lawsuits. In the meantime, many states have streamlined benefits for new employees, raised contribution rates, and introduced hybrid plans with greater risk sharing (NCLS, 2011). In principal localities could use the risky strategy of Chapter 9 restructuring (a municipal equivalent of Chapter 11 for corporations) to reduce their unfunded liabilities despite the high costs of losing access to capital markets. However, Chapter 9 is generally considered an unattractive option by municipalities given its high cost and unpredictable results—the city of Vallejo, CA has been the case in point.<sup>3</sup>

7. **The SLGs also have unfunded retirement health care commitments.**<sup>4</sup> These liabilities have been estimated at over \$600 bn by the Pew Center, but are easier to resolve than the pension liabilities in most states—for example through tighter eligibility or higher co-pays—due to less strict regulations. That said, most states have made minimal contributions to their dedicated trust funds, which means there is no potential upside from rising asset prices. Trust fund assets were valued at \$31 billion in FY2009, with Alaska and Ohio making up for than ½ of the total. Nearly twenty states continue to finance the health care benefits for their retirees on a pay-as-you-go basis. Overall, the states contributed about \$30 bn less than the actuarially-recommended amount in FY2009, according to the Pew Center.

8. **Similarly as the federal government, the SLGs finances will need to accommodate rising health care costs.** While the recent health care reform is expected to bend the cost curve, the residual cost growth will keep pushing up the cost of state and local Medicaid program as at the federal level.

---

<sup>3</sup> Weighed down by union contracts, Vallejo filed for a Chapter 9 bankruptcy in 2008. The city has renegotiated agreements with the key unions, but the process has been protracted and associated with significant legal costs and severe cuts to services. The municipality will likely continue the existing pension payouts, although the pension benefits have been cut for new employees.

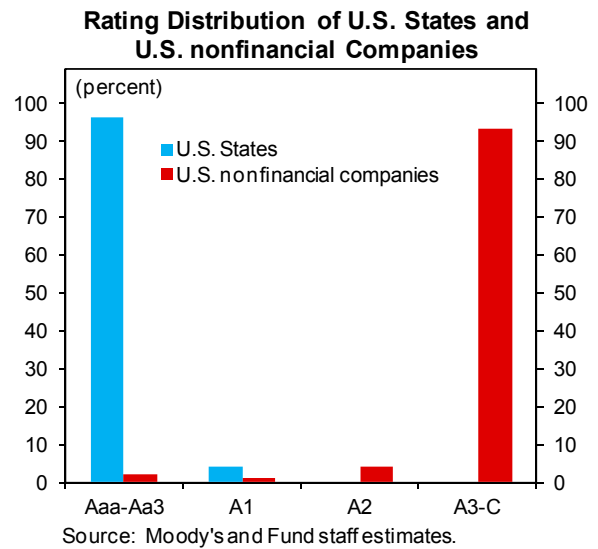
<sup>4</sup> These benefits accrue to SLG retirees before they become eligible for Medicare—a federal program.



### C. Financial Market Developments

9. **Although the state and local finances remain under pressure, investors are well-protected compared with other stakeholders—vendors, employees, residents—who are being affected more directly.**

- *At the state level, defaults are unlikely.* The balanced budget rules have kept the debt and servicing costs low. Most debt is for infrastructure projects, has a long maturity (20- and 30-year bonds are common), and is often backed by the taxing power of the state (general obligation bond) or a specified revenue stream (revenue bond). Debt repayments on general obligation bonds are often prioritized by state constitutions over other spending—notably, the two states with the lowest ratings put the debt service either on top of the priority list (Illinois), or second in line (California). As a result, even the most troubled states have retained high ratings, providing them with relatively cheap finance.<sup>5</sup> After the last state technical default—an Arkansas highway bond during the Great Depression in 1933—investors were eventually repaid in full.



- *Defaults on municipal debt have been rare and the default rates are likely to remain low.* The past defaults were typically associated with project mismanagement or inherently risky projects by quasi-government institutions in housing or health care. If in financial difficulties, cities and counties can in principle opt for a Chapter 9 restructuring but this does not automatically imply a default on their bonds.<sup>6</sup> There were only 54 total municipal defaulters among Moody's-rated municipal issuers during 1970–2009, mostly among below investment-grade securities.<sup>7</sup>

<sup>5</sup> The frequently-discussed case of California's IOUs in 2009 was good news for bondholders to the extent the scheme helped conserve cash for debt service.

<sup>6</sup> After the bankruptcy of Orange County, CA in 1994, the creditors were eventually paid off fully using revenue from bonds backed by car registration fees, sales taxes, and other collateral.

<sup>7</sup> According to Moody's, the average 5-year historical cumulative default rate for investment-grade municipal debt is 0.03 percent, compared to 0.97 percent for corporate issuers, while for speculative-grade debt the rates are 3.4 percent and 21.4 percent for municipals and corporate issuers, respectively. Historical recovery rates for defaulted US municipal bonds are higher, on average, than those for corporate bonds. The average historical 30-

(continued...)

10. **Limited exposure of financial institutions and foreign investors to the U.S. state and local debt limits financial spillovers.** The bulk of the \$2.9 trillion state and local credit market is owned by the retail sector—often high net worth individuals who benefit from the tax breaks on municipal securities, mutual funds, and insurance companies. The direct commercial bank and dealers’ exposure is about \$300 bn, with another over \$300 bn held by money market funds. The recently-expired taxable Build America Bonds program broadened the investor base, but overall foreign holdings of municipal bonds remain small (\$75 bn).

11. **Despite the inherent stability of the state and local debt market, investors perceive even AAA-rated SLG paper as riskier than the Treasuries.** Notably, the SLGs have failed to fully benefit from safe haven flows amid the European debt crisis, with their spreads widening during bouts of risk aversion. In fall 2010, spreads have been pushed higher by uncertainty over the extension of tax breaks for the Build American Bond program, and concerns about the long-term unfunded liabilities. However, the situation has calmed down significantly as the bond supply dropped off, tax collections improved, and the least-rated states took measures to balance their budgets.

#### D. Conclusions

12. **The SLG fiscal adjustment is likely to continue in the near term.** The SLGs will put a modest drag on the ongoing recovery, with downside risks from renewed declines in house prices and a phase-out of federal aid.

13. **The SLGs should consider improving their budgetary frameworks, including the rainy day strategy.** Rainy day funds could be allowed to accumulate beyond the pre-recession levels to limit pro-cyclicality and consideration could be given to saving revenue overperformance from highly cyclical revenues such as capital gains taxes (as in the case of Massachusetts). Many states remain on a one-year budget cycle, with only about 20 states having reported their FY2013 projections to NASBO. A move toward multi-year frameworks would be welcome. Some states are pursuing deeper institutional changes—notably, in California.<sup>8</sup>

14. **The SLGs need to focus on gradually reducing their unfunded liabilities.** The SLGs face a difficult trade-off between spending on social services for their residents (such as education) and their commitments to the employees. The SLGs should start making actuarially-sound contributions to their pension systems, continue their push toward more risk sharing, streamline benefits when warranted, and avoid bets for resurrection through

---

day post-default trading price for municipal bonds is \$59.91 relative to a par of \$100 for the period 1970–2009, much higher than the \$37.50 average recovery for corporate senior unsecured bonds over the same period.

<sup>8</sup> Voters approved a Proposition which allows passage of the state budget with a simple majority of votes, down from the previous 2/3. The 2/3 majority is still needed for tax and fee increases.

high-risk/high-expected return strategies. The states should also strive to base their projections on realistic assumptions. Any remaining states financing their retirement health care benefits pay-as-go should preferably start saving into dedicated trust funds.

**REFERENCES**

- Center on Budget and Policy Priorities (CBPP), 2010, “An Update on State Budget Cuts”, Washington, D.C.
- Collins and Rettenmaier, 2010, “Unfunded Liabilities of State and Local Government Employee Retirement Benefit Plans”, National Center for Policy Analysis, Dallas, TX.
- Moody’s Investors Service, 2010, “Why U.S. States are Better Credit risks Than Almost All U.S. Corporates?”.
- National Association of State Budget Officers (NASBO), “The Fiscal Survey of States”, June 2011.
- National Conference of State Legislatures (NCLS), 2011, “Pensions And Retirement Plan Enactments in 2011 State Legislatures”.
- Novy-Marx, Robert and Joshua D. Rauh, 2011, “The Crisis in Local Government Pensions in the United States”, forthcoming in *Growing Old: Paying for Retirement and Institutional Money Management after the Financial Crisis*, Robert Litan and Richard Herring, eds., Brookings Institution, Washington D.C.
- Rauh, Joshua D., 2010, “Are State Public Pensions Sustainable?” Why the Federal Government Should Worry About State Pension Liabilities” *National Tax Journal (Forum)* 63(10).
- The Pew Center on the States, 2010 “The Trillion Dollar Gap: Underfunded State Retirement Systems and the Roads to Reform”, Washington, D.C.
- The Pew Center on the States, 2011, “The Widening Gap: The Great Recession’s Impact on State Pension and Retiree Health Care Costs”, Washington, D.C.

## VIII. BUDGET INSTITUTIONS FOR FEDERAL FISCAL CONSOLIDATION<sup>1</sup>

*Fiscal consolidation efforts will need to be sustained over many years and could therefore be supported by targeted reforms of budgetary institutions. Endorsement of clear medium-term objectives by Congress would anchor expectations, multi-year expenditure caps for non-security discretionary spending would help keep consolidation on track across the annual budget cycles, and a carefully designed failsafe mechanism could help protect against deficit overruns. Using a realistic macroeconomic framework is essential.*

1. **The U.S. faces a large multi-year fiscal adjustment which could be helpfully supported by reforms of budgetary institutions.** In some relevant areas, the quality of federal budgetary institutions is excellent. For example, fiscal reporting and forecasting are comprehensive, timely, and of outstanding quality; the available background analysis provides policymakers with ample information on the long-run fiscal challenges and policy options; and there are firm controls in the budget execution:

- *Budget forecast.* The Office of Management and Budget (OMB) and the nonpartisan Congressional Budget Office (CBO) prepare 10- and 75-year budget projections under alternative scenarios. Risks are generally well disclosed, including through dedicated reports on the cost of financial bailouts (TARP) and risks from the conservatorship of Fannie Mae and Freddie Mac.
- *Policy analysis.* The CBO and the Joint Committee on Taxation (JCT) estimate budgetary implications of all major policy proposals, with the OMB and Treasury preparing such estimates for internal use within the administration. The OMB (based on inputs from the Office of Tax Analysis in Treasury) and JCT regularly publish comprehensive reports on tax expenditures, including five-year projections of foregone revenues. The CBO also publishes detailed analyses of policy options for deficit reduction. The Government Accountability Office (GAO), an independent nonpartisan agency, assesses how government programs meet their objectives.
- *Budget execution.* There are strong restrictions on overspending during budget execution. OMB apportions spending into allotments by time period, project, or activity and there are strong penalties for exceeding allotments. There are also restrictions on carrying over appropriations.

2. **However, some existing federal budgetary processes are not well suited for dealing with the current key policy issues.** These require a sustained effort spanning many

---

<sup>1</sup> This chapter was prepared by Martin Sommer. The author would like to thank Andrea Schaechter, Teresa Curristine, and Jiri Jonas for helpful discussions.

years—stabilizing medium-term public finances while addressing the longer-term pressures from population aging and rising health care costs. The weaknesses include:

- *Lack of a medium-term framework in Congress.* While the administration has committed to meeting the Toronto G-20 deficit and debt targets, and the President has proposed a new framework for putting the federal debt ratio on a downward path in the medium term, Congress has had no fiscal anchor since the Budget Enforcement Act expired in 2002.<sup>2</sup> Neither the OMB’s 10-year projections for federal outlays, nor projections in the Congressional budget resolution provide binding multi-year restrictions on total spending. The statutory pay-as-you-go (PAYGO) rules for revenue and mandatory spending reinstated last year are subject to several important exemptions.<sup>3</sup>
- *Long and unpredictable annual budget cycle.* The cycle focuses on discretionary spending appropriations—a small portion of total outlays (\$1.2 trillion compared with \$3.7 trillion). Underfunded mandatory spending programs such as Medicare or Social Security are not included in the annual budgetary process, pushing difficult choices into the future. Meanwhile, reflecting the constitutional arrangements, the Congress is free to adopt appropriations bills that differ considerably from the President’s proposals, loosening the link between administration’s policy intentions and outcomes.<sup>4</sup> In case of disagreement over discretionary spending, Congress needs to agree on a short-term continuing resolution, or risk a shut-down of nonessential government functions.
- *Optimistic macroeconomic framework.* The administrations’ macroeconomic projections have recently been significantly more optimistic than the Consensus Forecast and CBO forecasts, raising questions about the official estimate of fiscal consolidation needs (Figure 1).<sup>5</sup> In particular, policies proposed in the President’s February budget stabilize the debt-to-GDP ratio over the medium-term, but in the CBO and IMF projections, the debt ratio does not stabilize, largely due to more

---

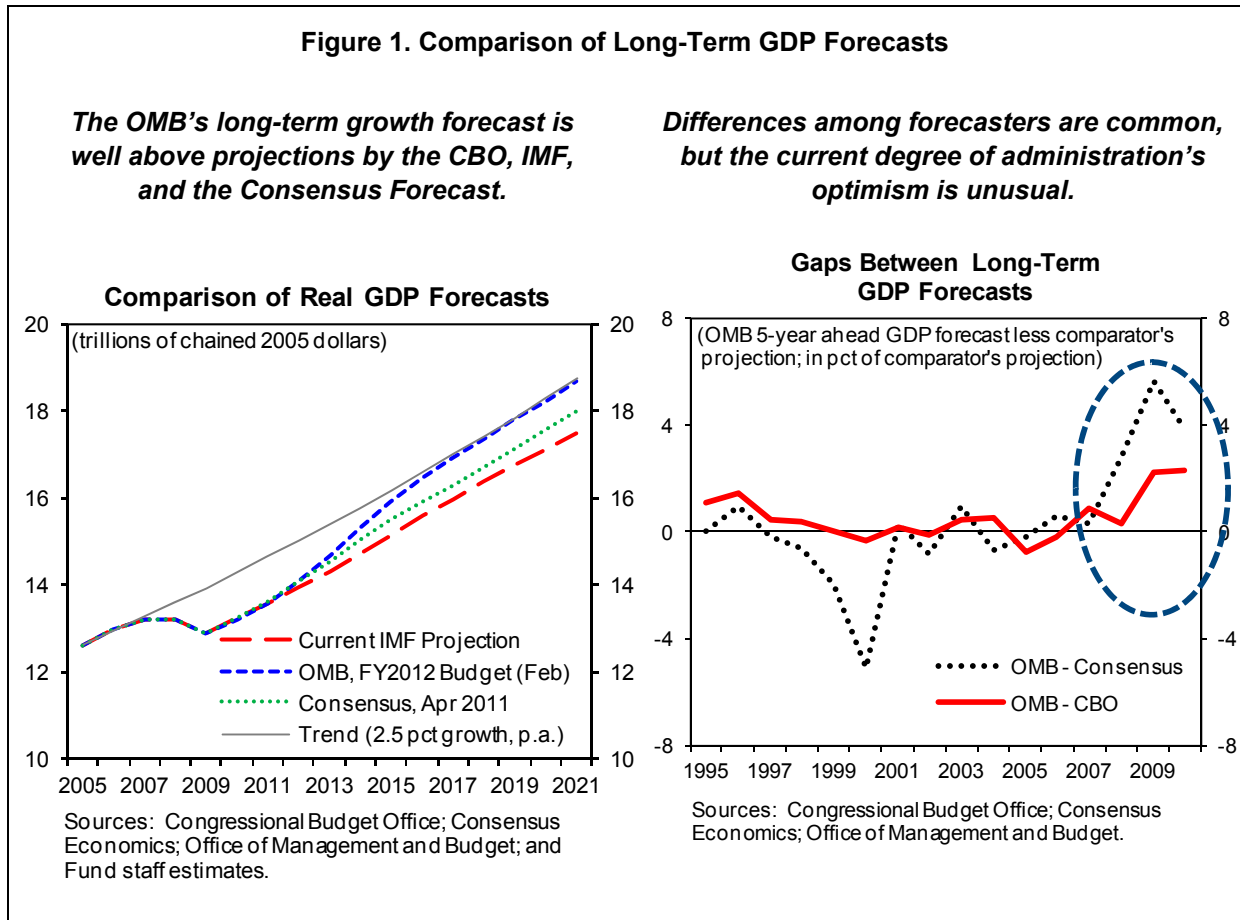
<sup>2</sup> The Budget Enforcement Act of 1990 (BEA) established statutory caps on discretionary appropriations and a pay-as-you-go mechanism for revenue and mandatory spending. Both rules were later revised, expiring in 2002.

<sup>3</sup> The pay-as-you-go (PAYGO) rules stipulate that new deficit-raising policies must be financed by other measures over a specified time period. Certain programs (for example, legislation with an “emergency” designation, Social Security, or the Bush tax cuts for the middle class) were exempt from these rules.

<sup>4</sup> Some cross-country research suggests that, even during the pre-crisis period, the United States experienced unusually large deviations of budgetary outcomes relative to the administration’s plans (Muhleisen et al, 2005), which is unlikely to be explained by macroeconomic surprises.

<sup>5</sup> As of last November (when the administration prepared its macroeconomic framework), the administration’s 2012 growth forecast of 4 percent (Q4-on-Q4) was in the middle of the Federal Reserve FOMC members’ central tendency. The administration’s 2013 growth projection of 4.5 percent was at the upper bound of the central tendency. Longer-term comparisons are not possible due to limited data availability.

conservative macroeconomic assumptions. While all institutions have over time made sizeable forecast errors and no institution is a much better forecaster than another (Appendix Figure), a fiscal consolidation strategy should not be built on a set of assumptions which are close to the upper end of available projections.



3. **These considerations have been reflected in the ongoing discussions about the U.S. consolidation strategy.** Policymakers intend to establish broad medium-term fiscal objectives accompanied by institutional mechanisms such as spending caps, balanced budget requirements, and “failsafe” rules. The failsafe would trigger automatic spending and/or revenue adjustments should fiscal policy fail to achieve a pre-set target.<sup>6</sup> The recent focus on budget institutions has also reflected the high degree of political polarization as documented, for example, by Orszag (2011). Given the difficulty of agreeing on a full set of specific revenue and spending measures, the institutional clauses are seen as a commitment to

<sup>6</sup> See a website by the Committee for a Responsible Federal Budget for a detailed description of alternative fiscal plans, including proposed institutional mechanisms: <http://crfb.org/compare/index.php?id=01>.

continued fiscal consolidation, with the threat of broad-based sequesters should the policymakers fail to agree on future steps. It is important to keep in mind, however, that similar institutional protections and triggers have in the past had mixed success, with sequesters often modified or overridden when they became binding—the Gramm-Rudman-Hollings Act and the Medicare Sustainable Growth Rate mechanism are notable examples (Table 1).

4. **The following institutional enhancements could play a useful role in supporting fiscal consolidation**, taking as given the strong constitutional role of Congress in formulating budget policy:

- *Clear medium-term objectives.* Endorsement of specific medium-term objectives (these could include debt or deficit targets) by both chambers of Congress is essential to anchor expectations and achieve consistency with the administration’s plans.
- *Realistic macro framework.* The administration’s macroeconomic framework could explicitly include inputs from the private sector forecasters. Participation by outside participants in the forecasting process is common—notably, Canada has closely adhered to the consensus forecast marked down with an additional prudence factor since embarking on an ambitious consolidation strategy in the 1990s. Australia and Germany also consult widely on their macroeconomic framework. More recently, the United Kingdom created an independent agency to guide the forecasting process (Table 2).
- *Multiyear expenditure restraint.* Multi-year expenditure caps on non-security discretionary spending could help keep consolidation on track across the annual budget cycles. Cross-country evidence suggests that compliance with spending targets improves when the limits are more legally binding. In the United States, constraints on discretionary expenditures during the 1990s facilitated a faster-than-expected improvement in the fiscal balance amid strong growth and asset price boom; France and the United Kingdom also benefited from spending caps (Mauro et al., 2011).



Table 1. United States: Selected Institutional Reforms to Support Fiscal Adjustment.

Adjustment Plan	Objectives / Design	Comments / Outcome
Gramm-Rudman- Hollings Act of 1985 (GRH)	<ul style="list-style-type: none"> <li>• President to submit budgets consistent with GRH targets each year with balanced budget by 1991.</li> <li>• If policy projected to result in higher deficits, automatic spending sequestration.</li> </ul>	<p>According to IMF (2011), did not achieve targets but deficit would have been larger in the absence of GRH.</p> <p>According to Peterson-Pew (2011), two sequesters were required but one was reduced by legislation, and the other was overridden by a subsequent budget agreement.</p>
Budget Enforcement Act of 1990 (BEA)  (revised 1993 and 1997; effective 1991- 2002)	<ul style="list-style-type: none"> <li>• Sets statutory limits on discretionary spending</li> <li>• A pay-as-you-go (PAYGO) requirement for mandatory spending and revenues. Sequestration rules for both categories.</li> </ul>	<p>According to IMF (2011), deficit reduction well in excess of targets post 1993 given stronger-than-expected economic growth and effective spending caps.</p> <p>According to Peterson-Pew (2011), sequestration was triggered three times: twice for discretionary spending (once overturned by enacted legislation) and once for PAYGO violation (overturned by enacted legislation).</p>
Sustainable Growth Rate mechanism - 1997 (SGR)	<ul style="list-style-type: none"> <li>• Controls Medicare spending on physicians' services. Cuts payments when spending above target.</li> </ul>	<p>Initially, spending below targets.</p> <p>Congress has overridden the SRG cuts every year since 2003.</p> <p>If SGR implementation were allowed in 2012, the payments to physicians would fall by 30 percent, according to CBO (2011).</p>
Statutory Pay-As-You-Go Act of 2010 (PAYGO)	<ul style="list-style-type: none"> <li>• Budget neutrality of new revenue and mandatory spending legislation over 5- and 10-year windows.</li> <li>• Automatic cuts in selected mandatory programs if legislation does not meet the PAYGO rules.</li> </ul>	<p>Multiple exemptions, including for Social Security, extension of the Bush tax cuts for middle-class families, and legislation with an emergency designation.</p> <p>The emergency designation used during the December 2010 tax deal.</p>

Sources: Concord Coalition, 2011; Congressional Budget Office, 2011; Congressional Research Service, 2010; IMF, *Fiscal Monitor*, April 2011; Mauro et al., 2011; Peterson-Pew Commission on Budget Reform, 2011.

- *Failsafe mechanism.* Given the mixed experience with automatic spending rescissions in the past, the mechanism would need to be carefully designed. The failsafe mechanism should be underpinned by clear debt or deficit objectives and applied continuously. The automatic spending cuts and revenue increases (possibly through cuts in tax expenditures) should apply broadly. The implied annual rescissions must

not be too big to become implausible as in the case of the Medicare SGR and the GRH Act. Any escape mechanisms should be clearly defined and reserved for truly exceptional circumstances such as a recession or national emergency. To ensure credibility, any forecasts should be prepared under realistic macroeconomic assumptions, possibly with inputs from outside of the administration.

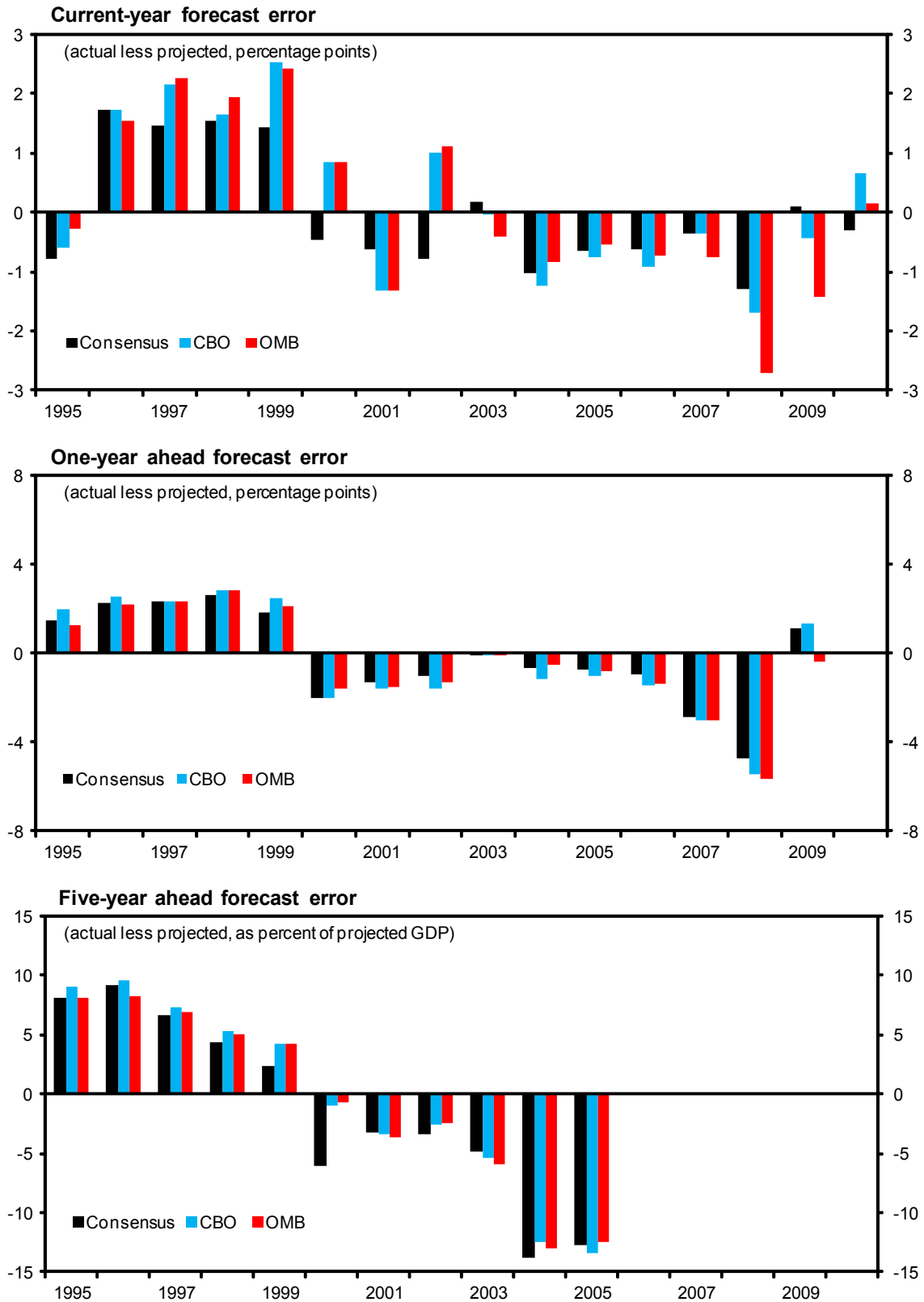
5. **It is important to keep in mind that improved budgetary institutions are no substitute for the willingness to pursue good policies and public support for tough choices.** International experience suggests that public support is crucial for the successful implementation of large fiscal consolidation (IMF, 2011). For example, opinion polls ahead of the mid-1990s consolidation in Canada showed broad public support for debt reduction. The authorities took advantage of this to put in place a communication strategy to reinforce support for their adjustment plan. In the United States, the public recognition of fiscal challenges has grown and the issue of rising public debt has become central to the policy debate. That said, some evidence suggests that the sources of long-term fiscal challenges are still not well understood by the public, with survey participants frequently calling for maintaining entitlement spending, while resisting tax increases.

Table 2. Key Institutional Characteristics of the Fiscal Forecasting Process

	Budget Authority	Forecasting Horizon	Characteristics of the Forecasting Process	
			Macro-Economic Forecast	Revenue-Spending Forecast
Australia	Treasury, Department of Finance and Deregulation	Rolling three years	Treasury internal with inputs from extensive consultation process including through a Business Liaison Program	Government internal, revenue: derived from interaction between spreadsheet based forecast and econometric model; expenditure supplied by spending agencies
Canada	Finance Department and Treasury Board Secretariat	Five year rolling budget forecasts	Average of private forecasters; for planning purposes in Budgets 2010 and 2011, the private sector average nominal GDP outlook was adjusted downward to account for risk related to the elevated level of economic uncertainty.	Revenue and expenditure: five-year budget forecast prepared internally; expenditure forecast includes data inputs from various federal departments and agencies.
Germany	Ministry of Finance	Five year (SGP)	Interministerial Working Group after consultation with research institutes and central bank	Revenue: based on independent tax estimation working group; expenditures: government internal supplied by spending agencies
Netherlands	Ministry of Finance	Rolling three year budget forecast, five years at aggregate level (SGP)	Independent public agency	Revenue and expenditure by independent public agency, based on inputs from the Ministry of Finance, with those on the expenditure side informed by dialogue with the spending agencies
Switzerland	Ministry of Finance	Rolling four year budget forecast	Forecast by Group of Experts led by the State Secretariat for Economic Affairs including representatives from the Federal Finance Administration, Customs, the Federal Statistical Office and the Swiss National Bank	Government internal revenue iterative process between different departments in the MoF; expenditure: supplied by spending agencies
United Kingdom	Treasury	Five year budget forecast: aggregate long-term projections	Forecast by independent public agency, based on iterative process between agency's macro model and revenue/spending departments' micro based fiscal forecasts	Revenue: prepared by independent public agency, based on iterative process between agency's macro model and micro based expert models in revenue department. Expenditure: prepared by independent public agency based on inputs from spending agencies.
France	Ministry of Finance	Five year (SGP)	Ministry of Finance: Forecasting Directorate	Government internal revenue: iteration between various departments in the MoF. Expenditure: forecasts made the MoF Budget Directorate in coordination with spending ministries
Italy	Ministry of Finance and Economy	Five year (SGP)	Ministry of Finance	Revenue and expenditure forecasting: iteration between various departments within the MoF.
Japan	Ministry of Finance	Four year budget forecast (central government only). Separately, Cabinet Office makes five year forecasts (general government basis).	Cabinet Office	MoF internal. Revenue: projection by applying the standard tax/growth elasticity (1.1). Expenditure: projection based on existing commitments.
New Zealand	Treasury	Four year budget forecast	Iterative spreadsheet and model-based forecasts including views of expert panel, business, and senior staff from Treasury	Government internal. Two revenue forecasts prepared and published separately by Treasury and revenue administration; based on micro and macro-models with consistency check with macroeconomic forecasts and assessment against views of practitioners (tax talks); treasury forecast used in budget. Expenditure forecasts prepared by spending agencies based on the Treasury macroeconomic outlook
United States	Office of Management and Budget	Ten year budget forecast	Jointly developed by CEA, OMB, and Treasury.	President's draft budget makes projections for revenue and spending on current and proposed policies using the administration's macroeconomic framework. Congress adopts policies with technical inputs from CBO and JCT.

Sources: Muhleisen et al. (2005); and updates by IMF desk economists and country authorities.

### Appendix Figure. Real Output Forecast Errors



Sources: Congressional Budget Office; Office of Management and Budget; Consensus Economics; Haver Analytics; and Fund staff estimates.

**REFERENCES**

- The Concord Coalition, 2011, "Process Reform as Deficit Reduction: A First Step, But No Substitute for Policy". Washington, D.C.
- Congressional Budget Office, 2011, "Medicare's Payments to Physicians: The Budgetary Impact of Alternative Policies". Washington, D.C.
- Congressional Research Service, 2010, "Federal Budget Process Reform in 111<sup>th</sup> Congress". Washington, D.C.
- International Monetary Fund, 2011, *Fiscal Monitor*, April edition. Washington, D.C.
- Mauro, Paolo, ed., 2011, "Chipping Away at the Public Debt: Sources of Failure and Keys to Success in Fiscal Adjustment" (Wiley, forthcoming).
- Muhleisen, Martin, Stephan Danninger, David Hauner, Kornelia Krajnyak, and Bennett Sutton, 1995, "How Do Canadian Budget Forecasts Compare With Those of Other Industrial Countries,?" IMF Working Paper 05/66 (Washington, International Monetary Fund)
- Orszag, Peter R., 2011, "Health Care, Political Polarization, and Our Fiscal Future", Presentation at the Peterson Institute for International Economics.
- Peterson-Pew Commission on Budget Reform and The Committee for a Responsible Federal Budget, 2011, "Peterson-Pew Fiscal Targets: Ten Issues in Designing a New Debt Failsafe" Washington, D.C.

## IX. THE CHALLENGE OF DEALING WITH MORTGAGE DELINQUENCIES<sup>1</sup>

*Foreclosure mitigation policies, which have had limited success so far, could have a measurable impact on economic activity by avoiding undershooting of house prices. In order to increase sustainable modifications, principal writedowns could be pushed harder in the Home Affordable Modification Program (HAMP). There is already a Principal Reduction Alternative (PRA) program under HAMP, but it could be aimed at bringing loan-to-value (LTV) ratios below 100 percent and requiring that back-end debt-to-income (DTI) ratios are taken into consideration. In addition, the government-sponsored enterprises could be encouraged to participate in the HAMP-PRA program. Also, mortgages on principal residences could also be subject to court-ordered modifications (“crammed down”) in Chapter 13 bankruptcy proceedings—a long-standing Fund recommendation. Additional incentives could also be provided for deed in lieu and short sales.*

### A. Introduction

6. **The design and implementation of mortgage modification programs have been daunting tasks.** There are coordination problems among the various players in the mortgage industry, and parties may have competing objectives. In addition, the initial design for most programs focused on affordability issues, rather than on the needs of the unemployed and underwater homeowners (the biggest proportion of borrowers in default at the moment). In addition, given the emphasis on minimizing moral hazard, most policies included stringent participation requirements. Given these factors, participation has been limited with only 610,000 permanent modifications taking place compared to a target of 3–4 million by 2012 under the HAMP.<sup>2</sup> This small success rate partly reflects high re-default rates on modified loans given the limited consideration to back-end DTI ratios as well as (i) a stubbornly high unemployment rate and (ii) homeowners’ negative equity.<sup>3</sup> So far, the programs have been underutilized; out of the \$45.6 billion committed for housing under the Trouble Asset Relief Program (TARP), only \$1.4 billion has been disbursed, with the Congressional Budget Office (2011) estimating that the eventual cost would amount to \$13 billion.<sup>4</sup>

---

<sup>1</sup> Prepared by John Kiff (MCM) and Evridiki Tsounta (WHD).

<sup>2</sup> Before a modification becomes permanent, there is a typical “trial” period of three months which allows the loan servicer to test the borrower's ability to make the modified loan payment before finalizing the modification.

<sup>3</sup> Back-end DTI is calculated by dividing all debt-related payments (not just mortgage payments) by the homeowner’s gross income.

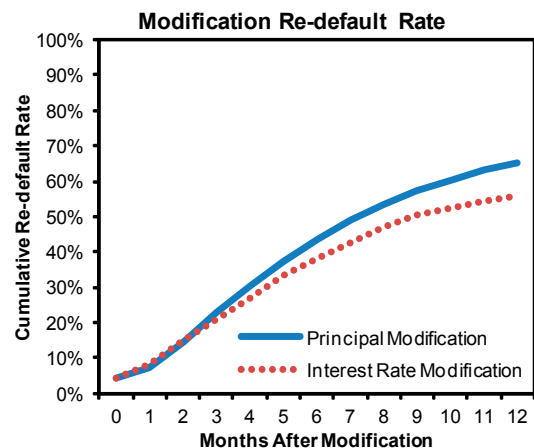
<sup>4</sup> TARP investment authority expired on October 3, 2010; Treasury can only use the funds to administer existing housing programs (SIGTARP, 2011).

## B. Current Federal Foreclosure Mitigation Efforts

7. **The Administration has adopted a multi-faceted approach to tackle the foreclosure epidemic.** Most programs (including HAMP) re-amortize mortgage payments so that the front-end DTI ratio decreases to 31 percent (by applying interest rate reduction, term extension and/or principal forbearance), with some programs also targeting underwater homeowners (HAMP-PRA, Federal Housing Administration’s Short Refinance Program (FHASRP) and Hope for Homeowners (H4H)).<sup>1</sup> In most cases, monetary incentives are provided to servicers and investors to undertake modifications and/or principal writedowns, since in their absence, servicers often find foreclosures more profitable.<sup>2</sup> To tackle the rising unemployment rate, the Administration has also introduced some foreclosure forbearance programs for the unemployed, some in collaboration with states (Box 1 discusses some of these foreclosure mitigation efforts).

8. **Several reasons explain the limited participation and success:**

- *Most foreclosure mitigation policies focus on affordability issues.* There is a limited array of programs that focus on unemployed and/or underwater borrowers—the largest proportion of delinquent homeowners. In addition, some programs, such as HAMP do not consider back-end DTIs which is rather problematic. With the average back-end DTI on HAMP-modified loans exceeding 62 percent, it is not surprising that re-defaults are considerable. Indeed, there is growing evidence that re-default rates are much lower for modified loans with large declines in principal and interest (Amherst Securities, 2011, Julapa and Lang, 2010, Mayer et al., 2010, OCC, 2011).
- *LTV parameters are “tight.”* For example, the HAMP-PRA program applies only to loans with LTV ratios above 115 percent, and only lowers the LTV to 105–



Sources: Amherst Securities as of May 2011, CoreLogic, and Fund staff calculations.

<sup>1</sup> Front-end DTI is calculated by dividing all mortgage-related payments (including insurance and property taxes, but excluding mortgage insurance premia) by the homeowner’s gross income.

<sup>2</sup> Most loans that are securitized in the United States are managed by third-party servicers as agents for the trusts that represent the interests of the MBS investors. For a comprehensive discussion of servicing economics see Box 3.7 in IMF (2011) and Levitin and Twomey (2011).

115 percent, leaving the borrower underwater post-modification. Similarly, even though FHASRP gets LTVs down to 97.75 percent, it allows lenders to maintain a second lien for up to 17.25 percent of the property value, implying that the homeowner could still be 15 percent underwater after the refinancing.

- *The Government-Sponsored Agencies (GSEs) have not undertaken any principal writedowns.* This decision has large effects on outcomes as they control the servicing of almost 60 percent of outstanding U.S. mortgages.
- *There continues to be loan servicing under-resourcing.* Servicers still do not have the capacity or knowledge infrastructure to deal expeditiously with a mounting number of defaults, while fears that modified loans will slip back into delinquency (“redefault”), or that delinquent loans will become current (“self cure”) without loan modifications might discourage them from investing additional resources (Adelino, Gerardi, and Willen, 2009; Das, 2010; Haughwout and Okah, 2009).
- *All programs face a complex coordination problem among industry participants with potential incentive conflicts, including for second lien mortgages.* Servicers, investor/lenders, homeowners and (except for HAMP-PRA) FHA lenders have to coordinate effectively during the modification process. Particularly problematic to all modification efforts have been second lien mortgages that lenders have been reluctant to write off. In addition, in many cases, the servicers do not have an incentive to undertake modifications, since they are fully compensated for all legal costs when a delinquent mortgage enters foreclosure—not when it is modified (Kiff and Klyuev, 2009). In this regard, Agarwal et al. (2011) show that securitized seriously delinquent mortgages are less likely to be modified than are (“portfolio”) loans held on lender balance sheets.
- *FHASRP requires that the loans are not delinquent* which may be binding given that one in eight mortgages is already delinquent or in foreclosure.

### **C. What More Can be Done?**

9. **There is no easy solution to the foreclosure problem.** In the remaining section, we provide some suggestions (some more radical than others) on other alternative policies that could be enacted to address the foreclosure problem. However, each suggested policy always entails some risks, typically in the form of encouraging moral hazard, assisting undeserving homebuyers and prompting otherwise current borrowers to intentionally default.

#### **Parametric Changes to Existing Programs**

10. **Programs could tackle negative equity more forcefully and take into account back-end DTIs.** The FHASRP program could remove the second lien component that takes the 97.75 percent LTV to as high as 115 percent, while HAMP-PRA could be adjusted so that a borrower does not remain underwater post-modification. Also, the back-end DTI ratio



that the FHASRP and H4H refinancing programs have could usefully be applied to the whole HAMP program to minimize re-default risk.

11. **Investor/lender house price appreciation sharing (as in H4H) could also be included in all principal writedown options, in order to mitigate moral hazard risk.** Such agreements are mentioned in the HAMP-PRA guidelines, but they are not required. Another option would be to impose on homeowners who benefit from principal writedowns a special tax on future appreciation. In addition, the writedown could be phased in over time (for example, one-third each year for three years), which would have the added benefit of incentivizing the homeowner to stay current (Amherst, 2011). Such arrangements would also minimize the risk of having borrowers strategically default, in fear of losing future capital gains.

12. **The fiscal cost of scaling up principal writedowns would not be insurmountable.** We estimate that in a scenario where all negative equity is written down, the fiscal cost—given the parameters of the current HAMP-PRA—would amount to \$130 billion.<sup>1</sup> This is an upper bound, corresponding to all eleven million underwater mortgages defaulting, implying that the average cost of foreclosure prevention is around \$12,000. We also ignore income considerations in eligibility for the program (for simplicity).

#### **Allowing All Mortgages to be Modified in Bankruptcy Proceedings (“Cram downs”)**

13. **Under current law, debtors can “cram down” mortgages on vacation homes, investor properties, and multifamily residences in which the owner occupies a unit** (White and Zhu, 2009). Cramdowns, however, are not allowed in Chapter 13 Bankruptcy proceedings for single family principal residences. Debtors can also currently modify wholly unsecured second mortgages on principal residences, but the law forbids modifications on first lien mortgages. All other secured claims that are underwater can be “crammed” down to their collateral value, instead. In 2009, Congress rejected a proposal for cramdowns on principal residences (the House passed the bill, but it was defeated in the Senate).

14. **Having cramdowns on principal residences could have a central role.** This could be a partial solution to the foreclosure crisis that would reduce foreclosures and encourage sustainable modifications, at no fiscal cost to the taxpayers. Cramdowns would not be free

---

<sup>1</sup> The calculations are based on the following observations: Corelogic (2011) reports that negative equity amounted to \$750 billion at end-2010, of which \$460 billion, is severely underwater, i.e., it would receive 10 cents on a dollar based on the HAMP-PRA’s servicer’s incentive scale. The remaining \$290 billion negative equity would receive somewhat larger incentives per dollar, estimated at most at around \$52 billion. In addition, for each foreclosure \$3,000 would be provided as servicers’ and investors’ incentives (the latter amounts to around \$1,000 based on actual data disbursed thus far to capture 50 percent of the difference between the mortgage servicing fees pre-and post-modification) bringing the aggregate fiscal cost for around 11 million principal writedowns to \$130 billion. On average, each writedown would thus cost \$12,000.

for households—they affect one’s credit score and public records—and thus would minimize moral hazard (Levitin, 2009a).<sup>1</sup> However, there are some possible drawbacks from having cramdowns including: (i) higher borrowing costs, though the literature has been inconclusive as to whether this effect is large;<sup>2</sup> capacity constraints at the court level in dealing with cramdowns; (iii) the risk of giving too much discretion to bankruptcy judges;<sup>3</sup> and (iv) the risk of creating legacy problems by changing the rules governing primary residence mortgages after the terms have been agreed upon.

**15. Evidence from the farm foreclosure crisis in the 1980s highlights the merits of cramdowns.**<sup>4</sup> The agricultural lending crisis of the early 1980s was a typical boom-bust scenario with farm land values skyrocketing accompanied by large increases in agricultural debt. Many farmers, just like in today’s crisis, were underwater and in risk of losing their houses. After much deliberation (that lasted nearly 2½ years), Congress established on a trial basis Chapter 12 Bankruptcy in 1986. The legislation—which allowed cramdowns on primary residences of family farms—included a sunset provision to allow time for the study of its impact before it would become permanent; it was extended twice and became permanent in 2005. The law ended up being extremely effective: (i) the cost and availability of credit was essentially unaffected, while (ii) Chapter 12 drove the interested parties to make voluntary private modifications; out of the 30,000 bankruptcy filings that the U.S. General Accounting Office was expecting, only 8,500 were filed in the first two years.

### **Further Incentives for Short Sales/Deed in Lieu**

**16. Additional monetary incentives could be provided to servicers/banks so that short sales and deed in lieu are undertaken instead of foreclosures.**<sup>5</sup> For example, more funds could be given to servicers to cover administrative and processing costs and to

---

<sup>1</sup> In order to reduce any remaining moral hazard risk, Posner and Zingales (2009) suggest including a variation of the H4H future home price appreciation clawback.

<sup>2</sup> For example, the Mortgage Bankers Association has predicted that mortgage interest rates would jump by between 150–200 basis points and down payment requirements would increase to 20 percent or more if the exemption is removed (Kittle, 2007). In contrast, Dubitsky et al. (2009) and Levitin (2009a) find that the mortgage markets are virtually indifferent to cramdown risk, and Levitin and Goodman (2008) find that for high-risk borrowers, the exemption may be worth 12 to 16 basis points; the latter two analyses, however, have been vigorously criticized in Scarbery (2010).

<sup>3</sup> To alleviate clogs in bankruptcy courts and minimize judge’s discretionary power, Levitin (2009b) and Blackrock (2009) suggest creating a special, streamlined and standardized mortgage bankruptcy Chapter.

<sup>4</sup> For a more detailed discussion of the farm foreclosure crisis, please refer to Fitzpatrick and Thomson (2010).

<sup>5</sup> A short sale is a home sale at a price insufficient to cover the outstanding mortgage, where the lender agrees to accept the receipts from the sale in exchange for releasing the lien. In the deed-in-lieu arrangement, the borrower transfers the title to the house to the lender, and the lender drops the claim against the borrower. In these cases, the houses are typically sold at a discount of around 13 percent.

investors to allow short sales. As noted in Tsounta (2011), foreclosed properties are usually sold at a discount of up to 27 percent while short sales/deed in lieu—which are often associated with less personal hardship for homeowners and less physical deterioration for the properties—are sold at a much smaller discount.

### **GSEs and Principal Writedowns**

17. **Encouraging GSEs to participate in principal write-downs would increase the scope for modifications.** Data from the Office of the Comptroller of the Currency and Office of Thrift Supervision (2011) indicate that modifications which significantly reduce monthly principal and interest payments consistently perform better. From a general equilibrium perspective, it would thus be advisable that GSEs also undertake writedowns; in 2010 there have been 29,300 private principal writedowns, of which 13,700 were under HAMP. It is estimated that around 600,000-800,000 of the GSE-guaranteed mortgages are currently underwater and in default.<sup>6</sup> While there is the risk that principal writedowns might induce strategic defaults, the large scale of GSE's operations and thus the large positive externalities from lowering the housing uncertainty induced by the large shadow inventory of houses would likely outweigh these costs, especially taking into account the large fiscal contingent liability by the U.S. Treasury.<sup>7</sup> To mitigate the moral hazard risk, writedowns could be complemented with some equity sharing arrangement.

---

<sup>6</sup> In general, GSE loans are less likely than non-GSE loans to be underwater, and those that are underwater are more likely to be current and have mortgage insurance and/or second liens.

<sup>7</sup> The GSE participation in writedowns would of course have a direct and immediate cost to the GSEs and ultimately a fiscal cost, given their status under conservatorship. In addition, there would be initial costs associated with operationalizing such writedowns.

## Box 1. Selected Federal Foreclosure Mitigation Policies

### Tackling Underwater Borrowers

#### *Hope for Homeowners (H4H)*

**Under H4H eligible borrowers may refinance their first-lien mortgage loans into new 30-year or 40-year fixed-rate FHA-insured mortgage loans.** The holder of the first-lien mortgage is required to accept writedowns to bring the loan-to-value (LTV) ratio to 96.5 percent. The lender also has to extinguish any junior liens, but in return they get an upfront payment of between 3 and 50 percent of the junior lien unpaid principal balance. After the refinancing, the borrower's front-end DTI must typically not exceed 31 percent, and the back-end DTI must be less than 43 percent. Servicers can receive a \$2,500 up-front incentive payment for each successful H4H refinancing, and lenders who originate H4H refinancings are eligible for incentive payments of up to \$1,000 per year (up to three years) for each refinanced loan so long as the loan remains current.

**Importantly, to minimize moral hazard, an equity sharing arrangement is included in the event of house price appreciation.** If the homeowner sells the house or refinances the new mortgage, the FHA claws back some of the "instant" equity (100 percent in the first year, declining to 50 percent after five years), plus, if the property is sold, 50 percent of any net property value appreciation is taken over by the FHA. Also, borrowers are prohibited from taking out new junior liens during the first five years, except when necessary for property maintenance.

#### *HAMP-Principal Reduction Alternative (HAMP-PRA)*

**The program applies only to loans with LTVs above 115 percent,** and only lowers the LTV to 105–115 percent, leaving the borrower underwater. The mortgage, which has to be delinquent for at least 90 days to be eligible, is then modified so that after the refinancing, the borrower's front-end DTI must typically not exceed 31 percent; no consideration is given to the back-end DTI ratio. Servicers typically receive \$2000 for each modified mortgage, as well as scaled incentives for the writedowns.<sup>1</sup> Around 13,700 HAMP modifications involved principal writedowns in 2010.

#### *FHA-Short Refinance Program (FHASRP)*

**This program converts underwater mortgages that are not FHA-insured into above-water FHA-insured mortgages, provided that at least a 10 percent writedown is undertaken.** To be eligible for an FHASRP refinancing the loan must not be delinquent, and the (first lien) LTV ratio must be above 100 percent. The program requires that first-lien investors forgive principal that exceeds 115 percent of the home value in return for a cash payment from the FHA for 97.75 percent of the home value, and maintaining a subordinate second lien for up to 17.25 percent of the value. Existing second-lien holders may receive incentive payments to extinguish their loans in accordance with the same payment schedule used for the HAMP-PRA. After the refinancing, the borrower's front-end DTI (including payments on the second lien loan) must not exceed 31 percent, and the back-end DTI (including all recurring debt payments) must be less than 50 percent. SIGTARP (2011) reports that FHASRP has not made any incentive payments and no second liens have been extinguished through March 2011.

## **Box 1. Selected Federal Foreclosure Mitigation Policies (continued)**

### **Tackling the Unemployed**

The **Home Affordable Unemployment Program (UP)** provides unemployed borrowers a temporary forbearance period of up to three months. As of end-March 2011, only 7,400 borrowers were actively participating, despite close to 14 million being unemployed (SIGTARP, 2011).

The **Hardest Hit Fund** provides targeted aid to families in states hit hard by the economic and housing market downturn (less than \$170 million out of the \$7.6 billion has been disbursed at end-March, SIGTARP, 2011). The Fund supports state-specific programs designed to meet the distinct challenges struggling homeowners in certain states face—the states were chosen either because they are struggling with unemployment rates at or above the national average or steep home price declines greater than 20 percent since the housing market downturn.

The **Emergency Homeowner Loan Program** complements the Hardest Hit Fund by serving the remaining states and assists homeowners who have experienced a reduction in income or a medical condition.

### **Other Programs**

The **Second Lien Modification Program (2MP)** modifies second-lien mortgages when a corresponding first lien is modified under HAMP. In addition, the **Home Affordable Foreclosure Alternatives Program (HAFA)** encourages short sales and deeds-in-lieu for borrowers for whom HAMP modifications do not work.<sup>2</sup> However, neither program has had much of an impact. As of April 2011, only 25,500 homeowners in first-lien HAMP modifications had received assistance through the 2MP and 14,900 had taken advantage of the HAFA. So far, according to SIGTARP (2011), \$19 million has been spent on HAFA incentives (out of \$4.1 billion allocated). The **FHA-HAMP program**, which provides assistance to eligible homeowners with FHA-insured mortgages, also had a slow start, with just 2,700 permanent modifications starting until end-April.

<sup>1</sup> The incentives' scale includes a payment of 21 cents on the dollar for writedowns between 105–115 percent LTV, 15 cents for 115 and 140 percent and 10 cents for over 140 percent LTV.

<sup>2</sup> The program provides \$3,000 for borrower relocation assistance; \$1,500 for servicers to cover administrative and processing costs; up to \$2,000 for investors who allow a total of up to \$6,000 in short sale proceeds to be distributed to subordinate lien holders, on a one-for-three matching basis.

## REFERENCES

- Adelino, M., K. Gerardi, and P.S. Willen, 2009, “Why Don’t Lenders Renegotiate More Home Mortgages? Redefaults, Self-Cures, and Securitization,” *Boston Federal Reserve Bank Working Paper 09–04* (July 6).
- Agarwal, S., G. Amromin, I. Ben-David, S. Chomsisengphet, and D.D. Evanoff, 2011, “The Role of Securitization in Mortgage Renegotiation,” *Charles A. Dice Center for Research in Financial Economics Working Paper 2011–2* (January).
- Amherst Securities, 2011, “The Case for Principal Reductions,” Amherst Securities Group LP MBS Strategy Group *Mortgage Insight*, March 24.
- BlackRock, 2009, “Keeping Homeowners in Their Homes: A Proposal for Judicial Mortgage Restructuring,” *BlackRock ViewPoints*, December.
- Congressional Budget Office, 2011, *Report on the Troubled Asset Relief Program—March 2011*, available at: [www.cbo.gov/ftpdocs/121xx/doc12118/03-29-TA RP.pdf](http://www.cbo.gov/ftpdocs/121xx/doc12118/03-29-TA RP.pdf).
- Corelogic, 2011, *Negative Equity Report*.
- Das, S.R., 2010, “The Principal Principle: Optimal Modification of Distressed Home Loans,” paper presented at the *Federal Reserve System and the Federal Deposit Insurance Corporation Conference on Mortgages and the Future of Housing Finance Conference* (October 15).
- Dubitsky, R., L. Yang, and T. Suehr, 2009, “Bankruptcy Law Reform – A New Tool for Foreclosure Avoidance,” *Credit Suisse Fixed Income Research*, January 26.
- Fitzpatrick, T.F., and J.B. Thomson, 2010, “Stripdowns and Bankruptcy: Lessons from Agricultural Bankruptcy Reform,” *Economic Commentary, No. 2010-9*, Federal Reserve Bank of Cleveland.
- International Monetary Fund, 2011, *Global Financial Stability Report, Durable Financial Stability: Getting There from Here*, Washington, DC: International Monetary Fund.
- Julapa J. and W.W. Lang, 2010. “Strategic Default on First and Second Lien Mortgages During the Financial Crisis,” *Working Papers 11-3*, Federal Reserve Bank of Philadelphia.
- Kiff, J. and V. Klyuev, 2009, “Foreclosure Mitigation Efforts in the United States: Approaches and Challenges,” *International Monetary Fund Staff Position Note Available*, Washington, DC: International Monetary Fund.

- Kittle, D.G., 2007, “Straightening Out the Mortgage Mess: How Can We Protect Home Ownership and Provide Relief to Consumers in Financial Distress?—Part II,” *Statement before the United States House of Representatives Committee on Judiciary Subcommittee on Commercial and Administrative Law*, October 30.
- Levitin, A.J., 2009a, “Resolving the Foreclosure Crisis: Modification of Mortgages in Bankruptcy,” *Wisconsin Law Review*, p. 565.
- Levitin, A.J., 2009b, “Home Foreclosures: Will Voluntary Modification Help Families Save Their Homes? Part II?” *Written Testimony before the U.S. House of Representatives Committee on Judiciary Subcommittee on Commercial and Administrative Law*.
- Levitin, A.J., and J. Goodman, 2008. “The Effect of Bankruptcy Strip-Down on Mortgage Markets,” *Georgetown University Law Center Business, Economics and Regulatory Policy Working Paper Series, Research Paper No. 1087816*.
- Levitin, A.J., and T. Twomey, 2011, “Mortgage Servicing,” *Georgetown Public Law and Legal Theory Research Paper No. 11-09*.
- Mayer, C., E. Morrison, T. Piskorski and A. Gupta, 2010, “Mortgage Modification and Strategic Default: Evidence from a Legal Settlement with Countrywide,” *Columbia University Business and Law Schools*, July 20.
- Office of the Comptroller of the Currency and Office of Thrift Supervision, 2011, *OCC and OTS Mortgage Metrics Report Fourth Quarter 2010*, available at: <http://www.occ.gov/news-issuances/news-releases/2011/nr-ia-2011-38.html>
- Office of the Special Inspector General for the Troubled Asset Relief Program (SIGTARP), 2011, *Quarterly Report to Congress*, April 28.
- Posner, E.A. and L. Zingales, 2009, “Loan Modification Approach to the Housing Crisis,” *American Law and Economics Review, Vol. 11(2)*, pp. 575–607.
- Scarberry, M.S., 2010, “A Critique of Congressional Proposals to Permit Modification of Home Mortgages in Chapter 13 Bankruptcy,” *Pepperdine Law Review*, vol. 37, pp. 635.
- Treasury, 2011, *Making Home Affordable, Program Performance Report Through April 2011*.
- Tsounta, E., 2011, “U.S. Housing Market—Excessive Price Weakness?” in *United States—Selected Issues Paper*, Washington, DC: International Monetary Fund.
- White, M.J., and N. Zhu, 2009, “Saving Your Home in Chapter 13 Bankruptcy,” *Unpublished University of California Working Paper*, March.