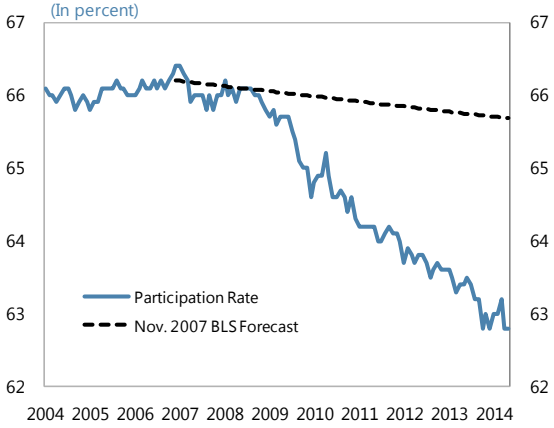
RECENT US LABOR FORCE PARTICIPATION DYNAMICS: REVERSIBLE OR NOT?[1]

A. Introduction

1. **The U.S. labor force participation rate (LFPR) fell dramatically following the Great Recession and has yet to start recovering** (Figure 1). Indeed, the current LFPR of 62.8 percent is the lowest rate since 1978. Taking a longer view of LFPR dynamics yields some important background to the recent decline (Figure 2). In particular, the LFPR increased sharply from just below 60 percent in the early 60s to above 66 percent by 1990, largely reflecting the baby boom generation (especially women) entering the labor force. Over the 1990s, the trend line flattened sharply, with the LFPR reaching a global peak of 67.3 percent in 2000Q3, as participation rates for new cohorts of women stopped increasing. Since the 2001 Recession, the LFPR has been largely on a secular decline.

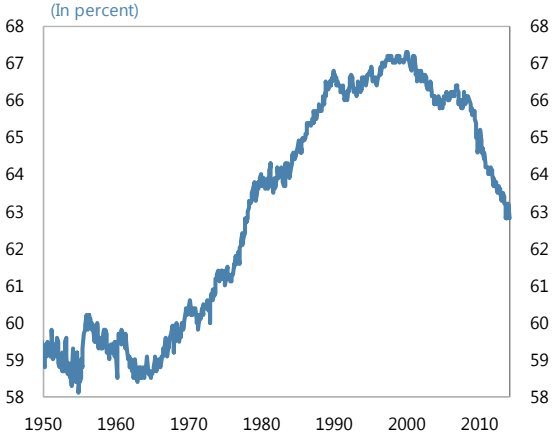
Figure 1. Labor Force Participation Rate
(In percent)



Sources: U.S. Bureau of Labor Statistics, Haver Analytics

2. **A key question is how much of the post-2007 decline is reversible.** LFPR dynamics can be driven by structural factors (e.g. population aging, increased college enrollment as education becomes more accessible, or later retirement due to better health) and cyclical ones related to job prospects. And forecasting is complicated by the fact that some structural factors could be reversible, (e.g. if the trend of increasing college enrollment reversed because the cost of college education for the marginal student became too high relative to the return), while part of the LFPR decline associated with cyclical factors could become irreversible (e.g. if the Great Recession led to more older workers to apply, and get accepted, for

Figure 2. Labor Force Participation Rate
(In percent)



Sources: U.S. Bureau of Labor Statistics, Haver Analytics

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social security disability insurance).

3. **Explaining the post-2007 decline is at the center of the policy debate**. This is because understanding the extent to which the decline is reversible and hence the LFPR's future path is crucial to estimating the amount of slack in the labor market. With the Federal Reserve having a mandate for maximum employment as well as price stability, the degree of labor market slack is a key factor when determining the future course of monetary policy, in particular how gradually interest rates should rise if there is a large amount of slack. The future dynamics of the LFPR are also a key driver of potential output, explaining why labor supply policies are receiving a lot of attention.

4. **Against this background, this chapter addresses the following questions**:

- How much of the decrease since the Great Recession is driven by demographics, cyclical, and other structural forces? How much is reversible?
- What is the baseline forecast for the LFPR over the next few years? What are the risks around this baseline? What is the current and projected level of labor market slack?
- What are the macroeconomic and supply-side policy implications?

5. **The key chapter finding is that while around ¼-⅓ of the post-2007 decline is reversible, the LFPR will continue to decline given population aging**. With participation rates for older workers lower than for prime age workers, demographic models suggest that aging of the baby boom generation explains around 50 percent of the near 3p.p. LFPR decline during 2007-13. State-level panel regression analysis is used to tie down the cyclical effect, which is estimated to account for about 30-40 percent of the decline. The rest is made up of non-demographic structural factors such as increasing college enrollment and fewer students working. With some of the decline triggered by cyclical factors and non-demographic structural factors judged to be irreversible, only around a ¼-⅓ of the post-2007 decline is forecast to be reversed over the next few years as job prospects improve. And as population aging continues to weigh, this reversal only causes the LFPR to flatline in the near term projection, with the secular decline reasserting itself once the cyclical bounceback starts to wane.

6. **Significant remaining slack in the labor market points to an important role for macroeconomic and labor supply policies**. The chapter's measure of the "employment gap", suggests that labor market slack is still high and will only decline gradually in the baseline scenario. This suggests a still important role for stimulative macro-economic policies to help reach full employment. In addition, given the continued downward pressure on the LFPR, labor supply measures will be an essential component of the strategy to boost potential growth. Finally, stimulative macroeconomic and labor supply policies should also help reduce the scope for further hysteresis effects to develop (e.g., loss of skills, discouragement).

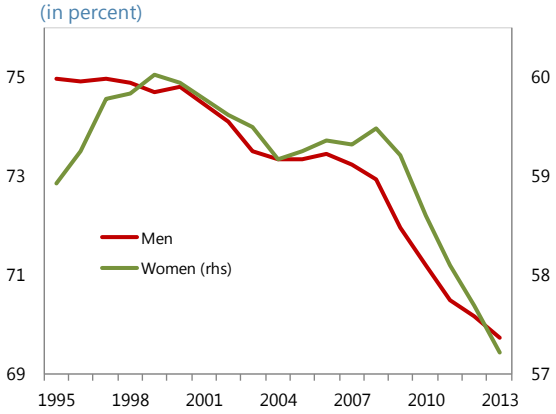
7. **The rest of the chapter is organized as follows**. Section B estimates the structural decline in the LFPR that can be explained by population aging ("the demographic effect") using national

level analysis by different age groups. Section C uncovers the cyclical component of the recent decline in the LFPR by using state-level panel regression analysis. Section D discusses some key demographic and economic groups affecting recent LFPR dynamics, namely youths, social security disability insurance (SSDI) recipients, and older workers. Section E presents forecasts of the LFPR over the forecast horizon and proposes a broad measure of labor market slack. Section F concludes and discusses policy implications.

B. Population Aging and the "Demographic Effect"

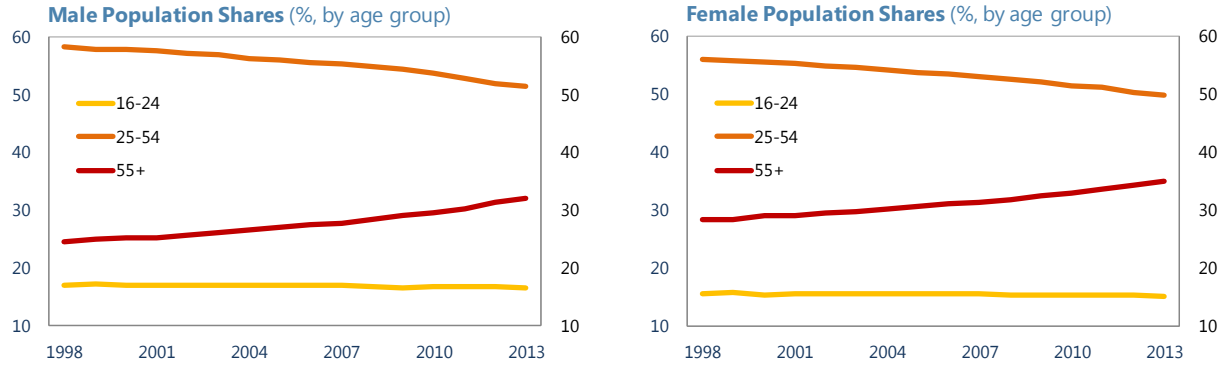
8. **Aging is starting to weigh on participation rates for both males and females, although there are some differences across genders**. Participation rates for males were already on a downward trend starting the mid 1990s (Figure 3), although their rate of decline accelerated markedly in the aftermath of the Great Recession. In particular, the participation rate of males declined by 0.1 percentage points (p.p.) per year between 1995 and 2007, compared to 0.6 p.p. per year between 2008 and 2013. Female participation rates, however, only started declining in the late 1990s, after which they have followed a similar pattern to those for males. The recent pattern of downward pressure on participation rates for both men and women is consistent with population aging (Figure 4).

Figure 3. Labor Force Participation Rates
(in percent)



Sources: U.S. Bureau of Labor Statistics, Haver Analytics

Figure 4. Population Shares

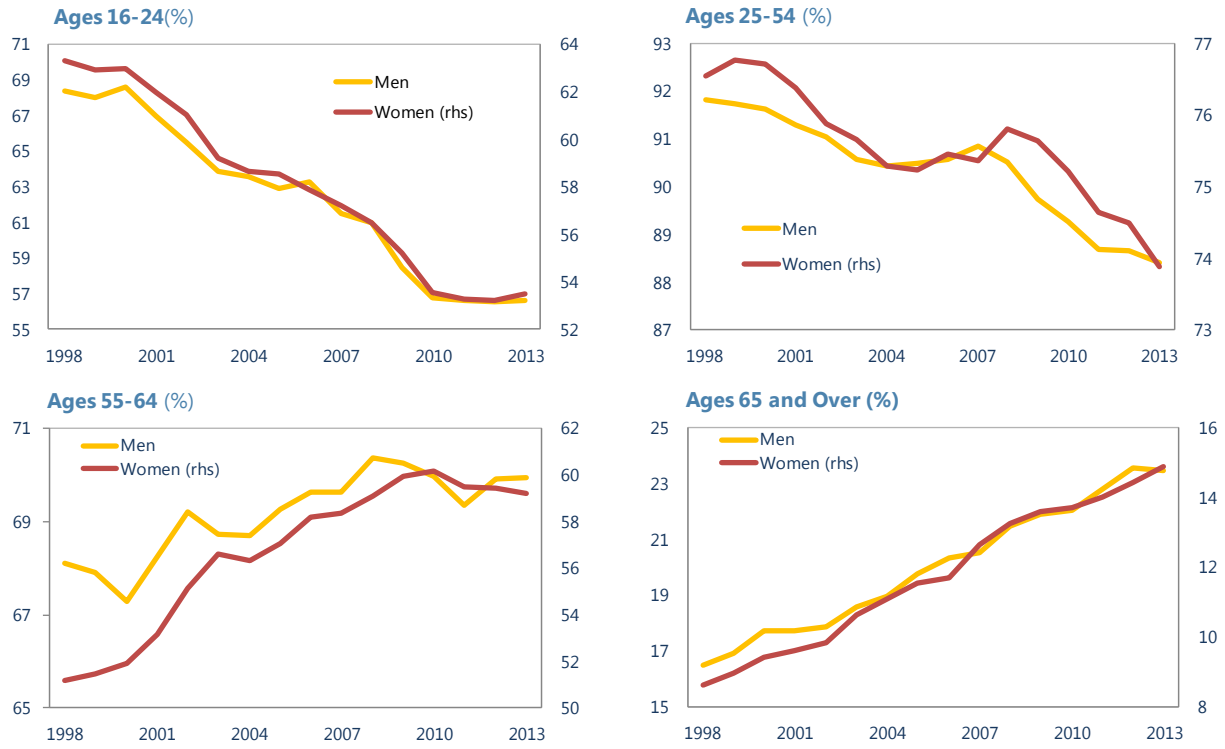


Sources: U.S. Bureau of Labor Statistics, Haver Analytics

9. **Older workers have increased their participation rates, whereas youths and prime-age workers have reduced them**. 16-24 year-olds have been steadily reducing their participation rates since 2000. Similarly, although to a lesser extent, prime-aged workers have also reduced their participation rates (Figure 5). Older workers, however, have increased their attachment to the labor force: most notably those aged 65 and above, for whom participation rates have increased by almost 50 percent for males and nearly doubled for females since the late 1990s.

10. **To estimate the total demographic effect of these changes, population models and "shift share" analysis are used**. Both approaches utilize detailed census and BLS data on population and labor force by age group and gender. Below we present the results of the shift share analysis, but the population models (which estimate the "demographic effect" by holding the participation rate of each age group constant at 2007 levels) deliver similar results, and are discussed in Annex 1 along with a more detailed description of the methodology and robustness checks.

Figure 5. Participation Rates



Sources: U.S. Bureau of Labor Statistics, Haver Analytics

11. **Shift share analysis quantifies the relative importance of changes in the population shares and participation rates of each age group**.[2] The total change in the participation rate with respect to a base year can be approximated as the sum of (a) changes in the population share of each group weighted by their base-year participation rate (the so-called population share shift or "demographic effect"); and (b) changes in the participation rate of each group weighted by their base-year population share (the so-called participation rate shift):

$$(1)\quad p_t - p_0 \approx \sum_g \{\, p_0^g (s_t^g - s_0^g) + s_0^g (p_t^g - p_0^g) \,\},$$

[2] The decomposition uses data on population and labor force from the Household Employment Survey (*cf.* Annex I for more details).

where p_t stands for the aggregate participation rate, and p_t^g and s_t^g stand for the participation rate and the population share of age group *g* in year *t*, respectively.

12. **The population shift ("demographic effect") explains around 50 percent of the drop in the aggregate participation rate during 2007-2013, but this masks important differences by gender and age group** (Tables 1-2). During 2007-10, the decline in male participation is largely explained by falling participation rates rather than the effects of aging, whereas during 2010-13 population aging is the main driver. For women, the decline in the LFPR was much smaller during 2007-10 and, interestingly, declining participation rates were more important than aging during 2010-13. Decomposing by age group, for males, both the young (16-24) and middle-aged (25-54) left the labor force in 2007-10, whereas during 2010-13 mostly the latter dropped out. For women, the young abandoned the labor force in 2007-10, whereas during 2010-13 middle aged and older workers started leaving.

Table 1. Shift Share Analysis: Deviations from Base Year

Total Population	Total LFPR Change	Population Shift	Participation Shift
2007-10	-1.3	-0.6	-0.8
2010-13	-1.5	-0.8	-0.7
Men			
2007-10	-2.0	-0.6	-1.5
2010-13	-1.5	-1.0	-0.4
Women			
2007-10	-0.7	-0.5	-0.2
2010-13	-1.4	-0.6	-0.8

Sources: U.S. Bureau of Labor Statistics, Haver Analytics and IMF staff calculations
Note: The total LFPR change equals the sum of the population shift, the participation shift, and the interaction term (cf. Annex I).

Table 2. Shift Share Analysis: Deviations from Base Year

	Men		Women	
	2007-10	2010-13	2007-10	2010-13
Total LFPR Change	-2.0	-1.5	-0.7	-1.4
Pop. Shift 16-24	-0.1	0.0	0.0	0.0
Pop. Shift 25-54	-1.4	-2.1	-1.2	-1.3
Pop. Shift 55-64	0.7	0.6	0.6	0.5
Pop. Shift 65+	0.2	0.4	0.1	0.3
Part. Shift 16-24	-0.9	-0.1	-0.6	-0.1
Part. Shift 25-54	-0.9	-0.5	-0.1	-0.7
Part. Shift 55-64	0.1	0.0	0.3	-0.2
Part. Shift 65+	0.2	0.1	0.1	0.1

Sources: U.S. Bureau of Labor Statistics, Haver Analytics and IMF staff calculations
Note: The total LFPR change equals the sum of the population shift, the participation shift, and the interaction term (cf. Annex I).

C. Estimating the "Cyclical Effect" Using State Level Data

13. **To uncover the cyclical effect on the participation rate, we exploit the variation across states**. Essentially, this section is focused on what share of the participation rate shift identified in Tables 1-2 can be attributed to cyclical factors, while Section D looks at the share related to structural factors other than the demographic effect.

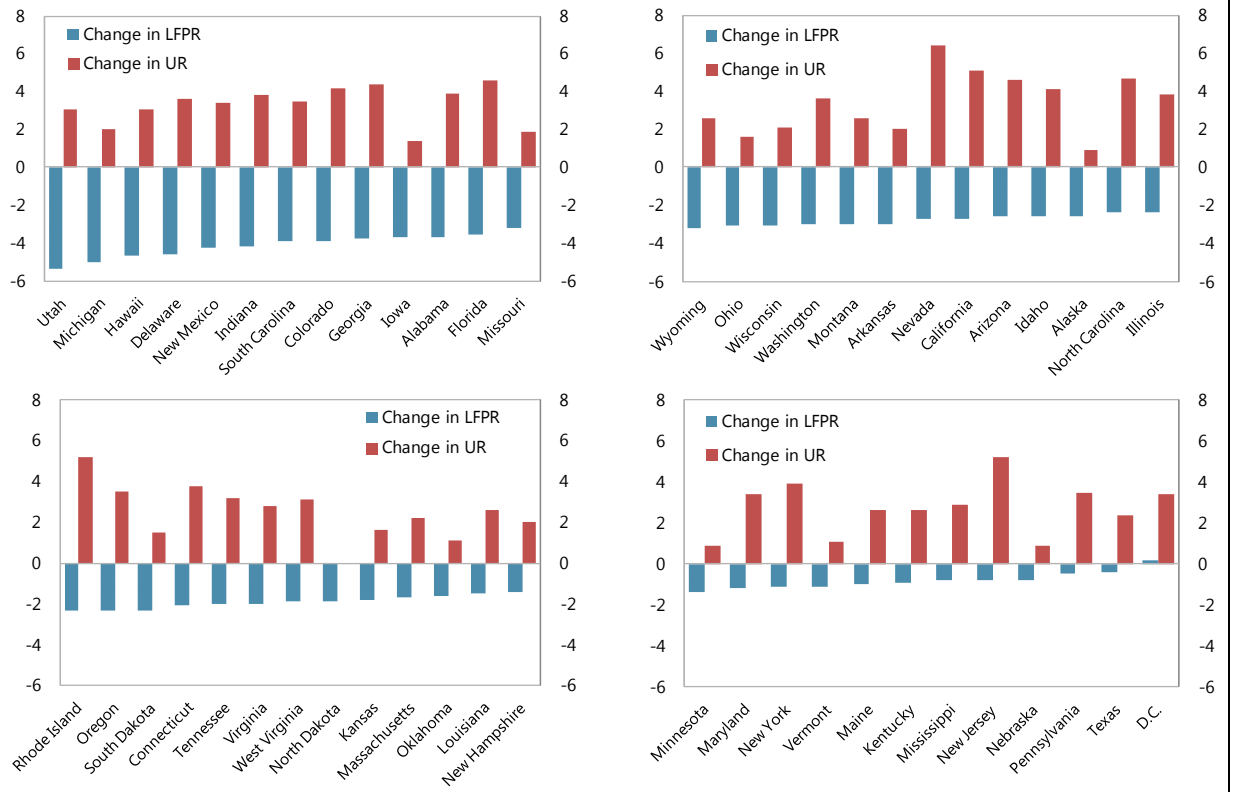
Panel Regression Analysis Across States

14. **To uncover the cyclical effect on the participation rate, we use an instrumental variable approach to identify state-specific business cycles**. The basic model pools the data across states into a panel regression as follows:

(2)
$$\Delta PR_{st} = \delta_{1s} + \delta_{2s} * trend_t + \sum_{k=0}^{l} \beta_k * \Delta cycle_{s,t-k} + \xi_{st}$$

The constant and time trend are allowed to be state specific, reflecting state-specific linear and quadratic trends in levels of the LFPR, and hence capture differences in demographic and other structural trends across states. We measure state labor demand or the cyclical position using measures of the employment gap at the state level. To take account of short-term shocks to labor supply (e.g. reactions to policy such as unemployment insurance benefit extensions or temporary tax changes) and other sources of endogeneity, equation (2) is estimated by both OLS and 2SLS, where the employment gap is instrumented by a measure of predicted employment growth based on each state's industry mix (see Annex II for details).

Figure 6. State Changes in LFPRs and Unemployment Rates (2007-2012)



Sources: U.S. Bureau of Labor Statistics, Haver Analytics
Note: States are ordered by the magnitude of change in the Labor Force Participation Rate.

15. **The importance of taking account of endogeneity is evidenced by the lack of a clear relationship between state unemployment and participation rates since the Great Recession** (Figure 6). The unemployment rate is often thought of as a good measure of cyclical slack. Hence, the relationship between the change in the unemployment rate and the change in the participation rate should illustrate how job prospects influence the decision to participate in the labor force. Strikingly, the participation rate change is only weakly correlated with the unemployment rate change (correlation coefficient of -0.16). For example, New Jersey and California experienced

roughly the same increase in unemployment rate. Yet, the fall in participation rate in California was almost three times larger than in New Jersey. The participation rate fell by 2 p.p. in North Dakota and Virginia but relative to 2007, the unemployment rate was 2.8 p.p. higher in Virginia in 2012 but unchanged in North Dakota. The weak correlation could be the result of either: i) the unemployment rate not being a good proxy for cyclical slack, or ii) the participation rate being driven by other forces apart from cyclical ones, or both.

16. **A significant cyclical effect is estimated, with some important lags of adjustment**. Table 3 summarizes the regression results using the payroll employment gap as independent variable for the period 1976-2012. Similar results using state-level household employment are given in Annex II. The lower half of the table shows that the first stage coefficient is large, positive, and statistically significant (with very high F-statistics), making the industry mix variable a strong and appropriate IV for state-level labor demand. The 2SLS estimate is larger than with OLS, and the difference is statistically significant as implied by the p-value of the Hausman test.[3] They imply that a 1 percent increase in the employment gap leads to a 0.1 percentage point increase in participation rate in the same year, and another 0.1 percentage point increase in the subsequent two years. Weighting the states by their average population does not change the results substantially, suggesting that the average effect is not driven by peculiarities in some small or large states. While the estimates are relatively stable in the years prior to the crisis (not shown here), the dynamics during the Great Recession and recovery differ: the contemporaneous cyclical effect on the participation rate is reduced by half, and the adjustment is more persistent. The total effect of a 1 percent higher employment gap is still around 0.2 p.p., but distributed roughly evenly across 4 years.

[3] The endogeneity is much more evident in the difference between OLS and 2SLS using household employment (see Table A2 in Annex II). This is not surprising, household employment, comes from the household survey and encompasses self-employment, which is more responsive to labor supply variation than payroll employment.

Table 3. State Level Regression Results

	OLS	Dependent variable: Δpr_t 2SLS				
			with lags	pop. weighted	1978-2007	2007-2012
$\Delta egap_t$	0.08***	0.11***	0.11***	0.11***	0.14***	0.07**
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.03)
$\Delta egap_{t-1}$			0.03***	0.03***	0.02	0.07***
			(0.01)	(0.01)	(0.01)	(0.02)
$\Delta egap_{t-2}$			0.04***	0.06***	0.06***	0.05***
			(0.01)	(0.01)	(0.02)	(0.01)
$\Delta egap_{t-3}$						0.05***
						(0.02)
Hausman test (p-val.)		0.000	0.004	0.004	0.005	0.925
1st stage:				Dependent variable: $\Delta egap_t$		
$imix_t$		0.76***	0.73***	0.77***	0.70***	0.91***
		(0.02)	(0.02)	(0.03)	(0.03)	(0.05)
F-stat.		1432.8	985.5	841.7	668.5	413.1
N	1785	1734	1632	1632	1428	306
R^2	0.241	0.241	0.227	0.255	0.167	0.346

Sources: IMF staff calculations

Note: Column 1 estimates equation (2) with OLS and no lags in the employment gap variable. Column 2 instruments the contemporaneous employment gap with the industry mix based employment growth in equation (3). Columns 3 to 6 introduce further lags in the employment gap variable. Columns 4 to 6 weight the data by the average working-age population in each state. Column 5 and 6 splits the sample to sub-samples before and following the Great Recession. The Hausman test result reports the p-value of the null hypothesis that the contemporaneous employment gap is exogenous. The 1st stage panel reports the first stage coefficient for the contemporaneous employment gap and the first stage F-statistics. All specifications also include state-specific intercepts and trends (not shown). Standard errors are robust to heteroskedasticity and auto-correlation (using Newey-West kernel). ***, ** denote 1 and 5 percent statistical significance respectively.

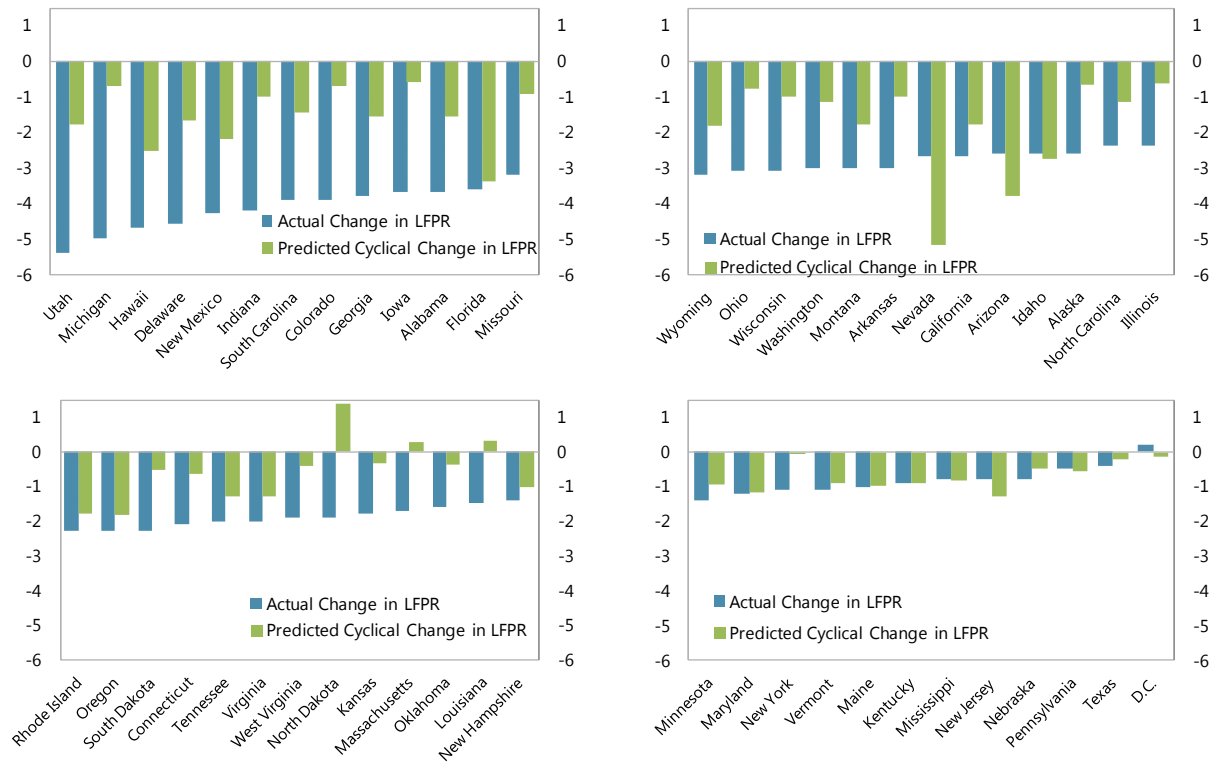
Table 4. Decomposition of Aggregate LFPR Change Based on Regression Estimates

Period	Total Change in LFPR	*Model using:*	Cyclical Contribution in ppt	Cyclical Contribution in percent of total	Structural + Residual in ppt	Structural + Residual ppt per year
2000-2013	*-3.8*		*-0.8 ~ -1.2*	*21% ~ 32%*	*-2.6 ~ -3.0*	*-0.2*
2000-2007	-1.0		0 ~ 0.1	-13% ~ 0%	-1 ~ -1.1	-0.1 ~ -0.2
2007-2013	-2.9		-0.9 ~ -1.2	33% ~ 44%	-1.7 ~ -2.0	-0.3
2007-2010	-1.4	*payroll emp*	-0.7	53%	-0.6	-0.2
		household emp	-0.7	49%	-0.7	-0.2
2010-2013	-1.5	*payroll emp*	-0.5	35%	-0.9	-0.3
		household emp	-0.3	20%	-1.1	-0.4

Sources: IMF staff calculations

17. **Recasting the regression results to decompose the actual change in the aggregate LFPR gives a cyclical effect of 33-43 percent of the near 3 p.p. drop during 2007-13** (Table 4). Using the model from the last column of Table 3, owing to the size of the shock, cyclical conditions explain about 50 percent of the 1.4 p.p. drop in LFPR during the Great Recession. Post 2010, cyclical conditions still explain 20-35 percent of the LFPR decline. The latter reflects delayed adjustment as seen in the lag structure of the estimated regression model.

Figure 7. State Changes in LFPRs: Actual vs. Predicted (2007-2012)



Sources: U.S. Bureau of Labor Statistics, Haver Analytics and IMF staff calculations
Note: States are ordered by the magnitude of change in the Labor Force Participation Rate. Predictions are based on the state-level model using the payroll employment gap (instrumented).

18. **The cyclical effect can explain a significant amount of the drop in the LFPR for certain individual states, although there is substantial heterogeneity.** Using the regression results for the average response of the participation rate to cyclical forces (Table 4, column 6), we can predict the cyclical change in state-level participation based on each state's change in its employment gap since the onset of the Great Recession (Figure 7). Overall, the predicted cyclical change in LFPR is correlated with the change in unemployment across states, although not perfectly (correlation coefficient -0.6). Thus the low correlation between changes in the unemployment rate and the LFPR shown in Figure 6 suggests that the unemployment rate by itself is not a good measure of labor market slack, particularly during and after the Great Recession (as it is endogenous to changes in LFPR itself). The model predicts much of the drop in LFPR in states that were hardest hit by the crisis, notably Nevada, Arizona, Florida, and California. It also correctly predicts either no change or even a rise in LFPR in states that were least affected by the crisis: DC, New York, and especially North Dakota.

19. **In most cases, the model predicts a smaller fall in LFPR than actually occurred, consistent with demographic and other structural forces additionally impacting the LFPR**. In a few cases, most notably Nevada and Arizona, the model actually over-predicts the decline in LFPR. A detailed look at the data shows that in these two states, the decline in LFPR was dampened by an increase in participation among the older age groups (55 years and above). This could be a response

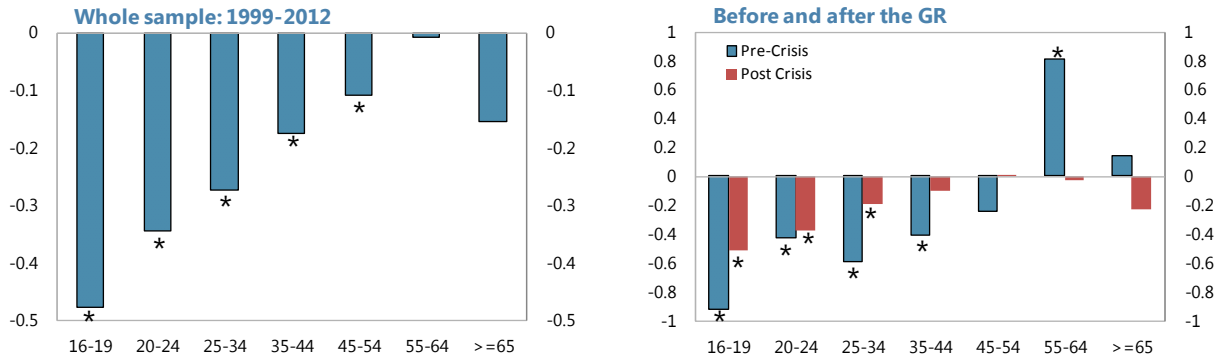
to the housing bust and the associated loss in wealth for people in or close to retirement, who may have had to return or prolong their stay in the labor market.

Cyclical Effect by Age Group

20. **The impact of the cycle on participation generally declines with age** (Figure 8).[4] The youngest groups (teenagers and youth in their early 20s) are by far the most sensitive to cyclical conditions. Cyclical sensitivity declines as participants mature into prime working age (25-54) and become more attached to the labor force. During the crisis and recovery (right chart), the cyclicality actually decreased for young and prime-age groups (a result consistent with other findings in the literature, e.g., Shimer (2011) and Elsby et al. (2013)).[5]

21. **For older age groups, the cyclical sensitivity coefficients are volatile**. The right hand chart in Figure 8 shows that their sensitivity to the cycle varies between normal years and crisis

Figure 8. Unites States: Cyclicality of participation rate by age groups, 1999-2012
(coefficient estimate of age-specific UR on LFPR, instrumented)



Sources: IMF staff calculations
*/ Statistically significant at the 5 percent level.

years. The group close to retirement age (54-64) had a counter-cyclical participation pattern before the crisis, likely because a strong economy translates into increasing housing and financial wealth and hence facilitates earlier retirement. However, post-2007, this effect becomes insignificant, possibly driven by heterogeneity between older workers in hard-hit states that had to increase participation (such as Nevada and Arizona) and those in less affected states who withdrew from the labor market due to poor job-finding prospects.

[4] Due to data availability by age groups, this section relies on the 'unemployment rate' model instead of the 'employment gap' model discussed above. We still instrument to avoid endogeneity.

[5] These authors show that during recessions, the unemployment pool is composed relatively more of workers of higher skill and wages compared to normal times (as a big shock hits workers of all ranks). As these workers also have stronger labor market attachment, the average rate of transitioning into non-participation declines during recessions.

D. Youths, SSDI, and Older Workers

22. **Participation rate trends for youths and older workers and the impact of rising SSDI recipients are key components of the aggregate LFPR picture**. However, disentangling how much of their respective changes since 2007 is cyclical, structural, or reversible is a complex issue. This section explores potential explanatory factors behind the behavior of these groups.

Youths

23. **The majority of the reduction in youth participation rates is explained by the decline in those working while studying**. Total school enrollment has risen quite significantly since 2000, driven by increasing enrollment of 18-24 year olds in college rather than 16-18 year olds in high school (Table 5). Even more striking has been the drop of those in school (high school or college) who are working; a decline that started before the Great Recession. Indeed by 2007, the share of those working while in school had declined from a peak of 46 percent in 2000 to less than 40 percent. A similar shift share analysis to that conducted in section B suggests that this latter trend rather than rising college enrollment has been driving most of the decline in the overall youth participation rate since 2000, including during and after the Great Recession (Table 6). Some of this likely reflects a lower employment share for teenagers (and a higher employment share of older workers and immigrants) within all industries and occupations (Dennett and Modestino, 2013), possibly due to higher skill and less flexible work-time requirements, or more stringent regulation.

Table 5. School Enrollment Statistics
(Ages 16-24)

	School Enrollement	Enrolled in HS	Enrolled in College	Enrolled in High School		Enrolled in College	
	(percent of CNIP ages 16-24)			Employed Full-Time	Employed Part-Time	Employed Full-Time	Employed Part-Time
Average 2000-2007	55.5	26.3	29.2	2.4	25.3	17.5	35.6
Average 2007-2010	57.6	25.5	32.1	1.4	17.3	14.4	33.3
Average 2010-2013	57.9	25.1	32.8	1.0	14.5	13.0	32.1
Average 2007-2013	57.8	25.3	32.4	1.2	15.9	13.7	32.7

Sources: U.S. Bureau of Labor Statistics, Haver Analytics
1/ CNIP: Civilian Non-Institutional Population

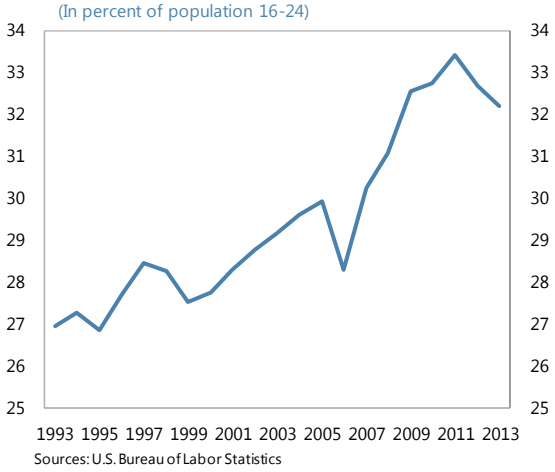
Table 6. Compositional Changes in Participation by School Enrollment
(Ages 16-24, annualized changes)

Period	Part. Rate Change	Enrolled Part. Rate Shift	Enrolled Population Shift	Unenrolled Partipcation Rate Shift	Unenrolled Population Shift
2000-2007 (8)	-0.7	-0.5	0.1	-0.1	-0.2
2007-2010 (3)	-1.2	-0.8	0.2	-0.2	-0.5
2010-2013 (3)	-0.3	-0.3	-0.2	-0.2	0.4
2007-2013 (6)	-0.8	-0.5	0.0	-0.2	-0.1

Sources: U.S. Bureau of Labor Statistics, Haver Analytics
Note: First column shows the total annualized change in LFPR; subsequent columns show the contribution of different factors based on the shift-share analysis.

24. **There appears to be a mix of cyclical and structural factors behind the decline for youths, with much of the cyclical part likely to be reversible**. It is expected that most students will join the labor force upon graduation. And while there clearly was a downward trend in the share of student workers before 2007, this share plummeted by nearly 5 p.p. in 2008-09, and has not recovered since. This suggests a sizable impact of the Great Recession and one that should be partly reversible as job prospects improve. In addition, after a secular increase since 2000, the share of students enrolled in college started to fall in 2012 (Figure 9). With the share in 2013 still 2 p.p. above that in 2007, this suggests an upside risk to youth participation rates if more students start working part time as the job market picks up and if college enrollment rates revert to pre-Great Recession levels (in part to help pay off student loans).[6]

Figure 9. College Enrollment
(In percent of population 16-24)



Sources: U.S. Bureau of Labor Statistics

[6] Indeed, reverting to pre-Great Recession average levels of school enrollment and employment rates for students would increase the youth participation rate by around 7pp from the current level of 54¾ percent.

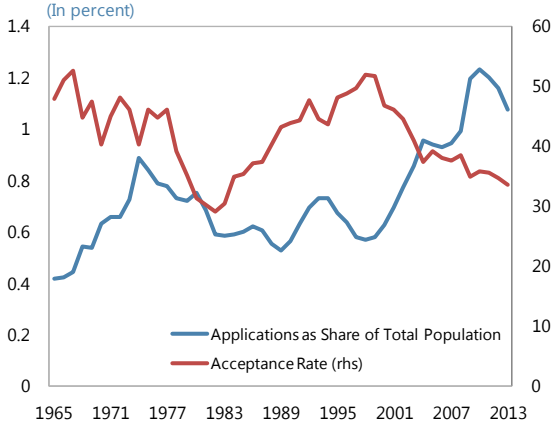
SSDI

25. **Rising SSDI beneficiaries have weighed on participation for a while**. The role of SSDI has been the subject of much academic debate (e.g. Autor 2011), which is unsurprising given the relentless rise in applications since early 2000s (Figure 10). These did spike up further during the Great Recession, but this was somewhat offset by the acceptance rate declining to a near historical low. Overall, when normalized by population size, the changes in SSDI recipients didn't shift significantly following the Great Recession (Table 7), and there doesn't seem to be a strong correlation between state-level changes in SSDI recipients and LFPRs (Figure 11). Notwithstanding these findings, the rising number of beneficiaries as well as applicants that were denied benefits have undoubtedly added downward pressure on the LFPR (the change in SSDI beneficiaries/population was 0.6p.p. during 2007-13).[7]

26. **While it is open to debate how much of the recent rise in SSDI recipients is structural or cyclical, most of it will be irreversible**. SSDI recipients were rising sharply as a share of the population even before 2007. Given that the incidence of SSDI increases significantly with age (nearly 80 percent of SSDI recipients are above 45 years old), much of the rise appears related to population aging (Figure 12).

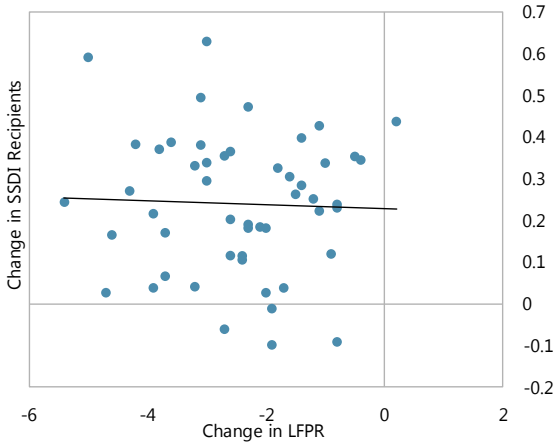
27. **This is also consistent with the lack of a shift in the trend change in SSDI recipients following the Great Recession, as documented in Table 7**. This would suggest that much of the increase in *recipients* is structural. However, there does appear to be a cyclical component to the spike in *applications* during the Great Recession. Regardless of how much of the rise is structural or

Figure 10. Social Security Disability Insurance
(In percent)



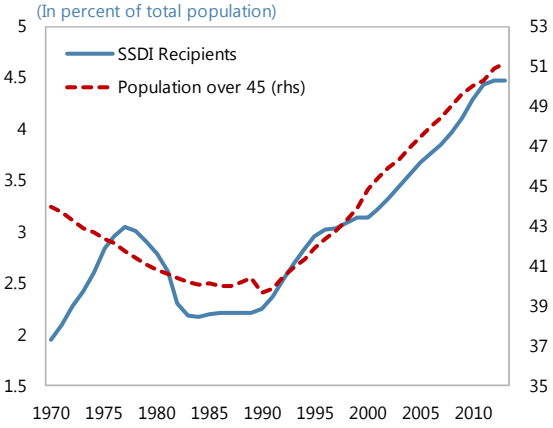
Sources: Social Security Administration

Figure 11. State SSDI and LFPR
(In percent of total population; 2007-2012)



Sources: Social Security Administration, U.S. Bureau of Labor Statistics, Haver Analytics

Figure 12. SSDI Recipients and Population over 45
(In percent of total population)



Sources: Social Security Administration, U.S. Bureau of Labor Statistics

[7] Even those denied benefits can often spend one to three years out of the labor force until the appeals process is exhausted.

cyclical, SSDI recipients tend to exit the labor force permanently and do not return as cyclical conditions improve (Daly, Hobijn, and Kwok 2010).

Table 7. Changes in Social Security Disability Insurance and Labor Force by Age
(Annualized changes, percent of population)

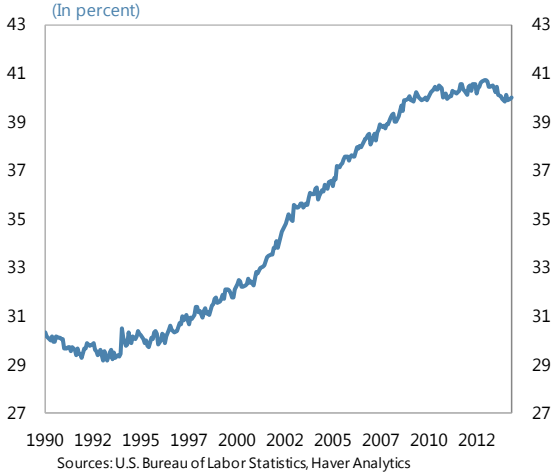
Period	Ages 45-49		Ages 50-54		Ages 55-59		Ages 60 and above		Ages 45+
	SSDI Recipients	Labor Force	SSDI Recipients	Labor Force	SSDI Recipients	Labor Force	SSDI Recipients	Labor Force	Percent of Total SSDI Recipients
2000-2007 (8)	0.2	1.4	0.3	2.0	0.5	3.6	0.3	1.2	74.3
2007-2010 (3)	0.1	-0.7	0.4	1.1	0.5	1.9	0.3	1.6	78.2
2010-2012 (3)	-0.1	-2.3	0.2	0.2	0.6	1.9	0.3	1.5	79.1
2007-2012 (6)	0.1	-1.3	0.3	0.8	0.6	1.9	0.3	1.5	78.5
2013		-2.4		-0.4		1.4		0.8	

Sources: Social Security Administration; Bureau of Labor Statistics; and Haver Analytics

Older Workers

28. **After a significant increase over the last twenty years, the future trajectory of the LFPR for older workers is an open question**. Up until early 2009, the LFPR for workers above 55 was on a steep incline, increasing by around 10 p.p. from the mid-1990s (Figure 13). Since early 2009, the rate of increase slowed significantly and the LFPR started to decline in early 2013. It now stands at around 40 percent. Some of the key factors behind the increase in the LFPR until very recently include: (i) better health and longer life-spans; (ii) stronger incentives to prolong work lives given the growing switch from defined benefit to defined contribution pension plans; and (iii) the rapid increase in healthcare costs and decreasing availability of retiree health benefits causing people to work to receive health insurance until they are eligible for Medicare (at 65). At the same time, some studies show an increasing sensitivity since 2000 of older workers' retirement decision to stock market performance (Daly, Hobijn, and Kwok 2009), which appears consistent with recent dynamics and the results shown in Figure 8. During the Great Recession, older workers stayed in the labor force given the need to rebuild net worth. Once this had been sufficiently replenished, they could afford to retire, as many have done since 2013.

Figure 13. LFPR of Population 55 and Over
(In percent)



Sources: U.S. Bureau of Labor Statistics, Haver Analytics

E. LFPR Forecasts and Slack Measures

LFPR Forecasts

29. **The preceding analysis suggests that while much of the post-2007 decline in the LFPR is irreversible, there should be a material cyclical bounceback over the next few years**. Demographic models suggest that aging of the baby boom generation explains around 50 percent of the near 3p.p. LFPR decline during 2007-13, while the state-level panel regressions suggest a

cyclical effect of 33-43 percent. The demographic effect is considered irreversible and even some of the cyclical effect could be irreversible if it has led to more SSDI applications and ultimately recipients. As noted in section D, there has also been a complex interaction between cyclical and structural factors affecting youths and older workers. For youths, some cyclical bounceback is likely as job prospects improve, but for older workers, the incentive to retire as wealth is re-accumulated may offset any cyclical bounceback.

30. **The state-level panel regression model points to a cyclical bounceback of around ¼-⅓ over the next 5 years but the LFPR continues to decline.** Equation 2 can be combined with forecasts of the employment gap to produce a projection of the cyclical bounceback. The forecasts of the employment gap utilize staff's GDP forecasts and an employment version of Okun's Law. Table 8 gives a range of estimates depending on which version of equation 2 is used, suggesting a cyclical bounceback of ¼ - ⅓ of the LFPR decline during 2007-13. Figure 14 shows the actual LFPR forecast and confidence bands (i.e. taking into account the structural and cyclical effects and the lag structure) from using the payroll employment version of equation 2 and the full sample. Despite the cyclical bounceback, the state-level panel regression suggests that the LFPR will continue declining as structural forces will more than offset the cyclical ones. The confidence bands reflect the sampling uncertainty around the coefficient estimates of the underlying state-level model. They do not, however, explicitly take into account alternative scenarios for shifts in demographic and behavioral trends that could introduce additional uncertainty to the path of the LFPR going forward.

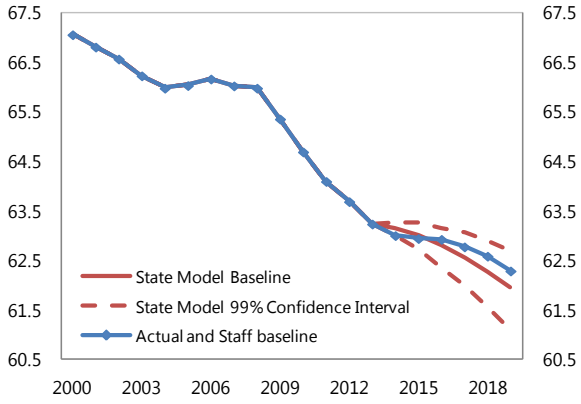
Table 8. LFPR Bounceback

Underlying data:		*Closing the labor demand gap in the MT would increase LFPR by (in ppt):*	*99 pct confidence interval (bootstrapped)*
Payroll emp	*whole sample*	0.8	0.6-1.0
	07-12 sample	0.9	0.7-1.2
Household emp	*whole sample*	0.7	0.5-0.9
	07-12 sample	0.7	0.4-1.0

Sources: IMF staff calculations

Figure 14. Particpation Rates in Baseline Scenario

(Percent)



Sources: U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis, and IMF staff estimates.
Note: The 99 percent confidence band is obtained from 1000 clustered bootstrap resamples with replacement (clustered at state level).

31. **Staff's baseline scenario is based off the forecast from the state-level panel regression models, but applies some additional judgment and utilizes census population forecasts**. Essentially, based on the preceding analysis, the baseline forecast is made up of three components: (i) a pure demographic effect, which holds age-group participation rates constant at 2007 levels and uses the census baseline population forecast; (ii) a cyclical bounce-back as the job market improves

benchmarked off the state-level analysis; and (iii) judgment regarding non-demographic structural forces (i.e., college enrollment, share of students working, and retirement patterns).[8]

32. **Staff's baseline scenario has a more front loaded cyclical bounceback than the state model projection, and the LFPR at 2019 is around 0.3 p.p. higher**. In the baseline, the LFPR of older and younger workers embed some additional judgment that the statistical model is not designed to capture. Specifically, the LFPR of younger workers is expected to bounce-back by around 2p.p. as school enrollment declines a little more (closer to 2007 levels) and more students start working as job opportunities improve and given the need to pay off student loans. Older workers, however, are forecast to have no bounce-back given their participation rates continued going up during 2007-13 and as the recovery of wealth allows many who postponed retirement to finally do so. The projections are younger and older workers are also consistent with the cyclical sensitivities presented in Figure 8. However, the overall cyclical bounceback in the baseline is the same as in the state model (middle of the range given in Table 9) but more is taking place during 2014-16. In sum, the aggregate participation rate is roughly flat for the period 2014-16, as the cyclical and non-demographic structural forces offset the demographic effect, before resuming a downward trend from 2017 as the weight of the aging population begins to dominate. The higher LFPR in 2019 in the baseline relative to the state model projection is mainly driven by using actual Census population forecasts in the baseline.

33. **Staff's baseline forecast is also slightly above CBO's forecast over the medium term**. CBO has a similar projection to staff for the end of 2014 (63 percent). But they have downward pressure from population aging outweighing the cyclical bounceback by more than staff over the medium term, resulting in the LFPR declining to 62.5 by end-2017 (relative to staff's forecast of 62.8 percent). Deutsche Bank (2013) uses a VAR model to estimate that, as economic conditions improve, the participation rate should approach 63 percent by end-2014.

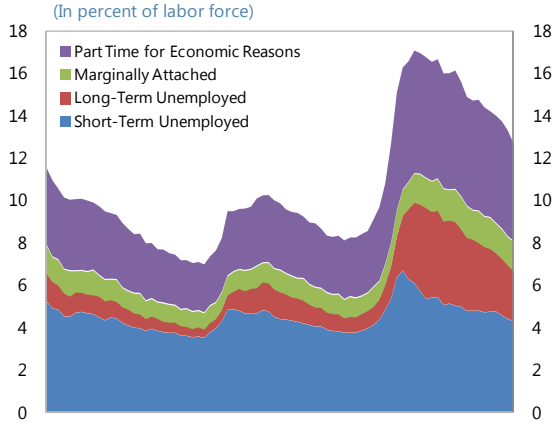
34. **There are some important risks around staff's baseline that are beyond the confidence bands generated from the state-level model**. As noted earlier, the confidence bands do not take into account alternative scenarios for shifts in demographic and behavioral trends that could introduce additional uncertainty to the path of the LFPR going forward. Specifically, as noted in previous studies, forecasting LFPRs for youths and older workers has proven to be incredibly challenging given various structural changes (Aaronson et al, 2006). For example, it's not easy to predict what will happen to college enrollment. Will it continue the very recent decline as job prospects improve and the cost of college goes up, or will a rising skill premium encourage further enrollments? For older workers, which forces will dominate: increasing wealth or rising longevity and better health? And how do we forecast longevity and health?

[8] The census also produces three alternative population forecasts based on different migration assumptions. As we show in Annex (II), this makes little difference to the path of the aggregate LFPR, but can make a substantial difference to the path of labor force growth.

Labor Market Slack

35. **Estimation of a trend LFPR and forecasting the actual one allows construction of a broader measure of labor market slack**. The BLS produces various measures of labor market slack in addition to the unemployment rate (Figure 15). The broadest measure includes marginally attached workers and those working part time for economic reasons. This shows that while the unemployment rate has fallen to well within 1 percentage point of most estimates of the NAIRU, substantial slack still exists, especially given the number of part-time workers for economic reasons. Below an alternative measure is constructed, following Erceg and Levin (2013). Specifically, the "employment gap" or deviation of the employment-to-population from its natural rate is constructed. This can be approximated as the weighted sum of the unemployment and participation gaps (equation 3). We add to this measure, however, by taking account of "part time workers due to slack work or business conditions", which shows up as an adjustment to the unemployment gap in equation 3.[9]

Figure 15. Components of U-6 Rate
(In percent of labor force)

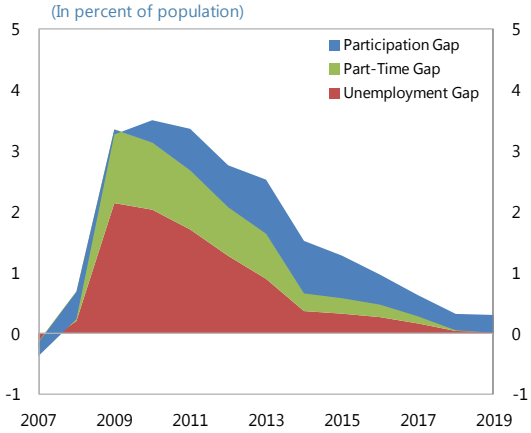


Sources: U.S. Bureau of Labor Statistics, and IMF staff estimates

(3) $$egap \approx (1-u^*)(LFPR - LFPR^*) + LFPR^*(u-u^*)$$

36. **The sizeable participation and part-time work gaps point to significant labor market slack that will take a while to eliminate** (Figure 16). The broader employment gap peaked in 2010 at 3.5 percent, when over half the gap reflected the unemployment gap. The overall gap fell to around 2.5 percent in 2013, with a declining unemployment gap offset by a rising participation gap. Looking ahead, we expect the participation gap will only close slowly, suggesting significant labor market slack will remain over the next few years.

Figure 16. Employment Gap
(In percent of population)



Sources: U.S. Bureau of Labor Statistics, and IMF staff estimates

[9] The adjustment suggested by Citibank (2014) is followed. Specifically, the part time adjustment is the product of: (i) the change in part time workers due to slack work or business conditions relative to the average for 1997-2007; and (ii) (1-the ratio of average part time hours/average full time hours). This adjustment is added to the unemployment rate (i.e. weighted by the trend LFPR).

F. Conclusions and Policy Implications

37. **The key chapter finding is that while around ¼-⅓ of the post-2007 decline is reversible, the LFPR will continue to fall given population aging**. With participation rates for older workers lower than for prime age workers, demographic models suggest that aging of the baby boom generation explains around 50 percent of the near 3p.p. LFPR decline during 2007-13. State-level panel regression analysis is used to tie down the cyclical effect, which is estimated to account for 33-43 percent of the decline. The rest is made up of non-demographic structural factors such as increasing college enrollment and fewer students working. With some of the decline triggered by cyclical factors and non-demographic structural factors judged to be irreversible, only around a ¼-⅓ of the post-2007 decline is forecast to be reversed over the next few years. However, with population aging continuing to weigh, this reversal only causes the LFPR to flatline in the near term, and the secular decline reasserts itself once the cyclical bounceback starts to wane.

38. **There are some important risks around staff's baseline forecast**. In particular, over the last 20 years, forecasting LFPRs for youths and older workers has proven to be incredibly challenging given various structural changes. For example, it's not easy to predict what will happen to college enrollment. Will it continue the very recent decline as job prospects improve and the cost of college goes up, or will a rising skill premium encourage further enrollments? For older workers, which forces will dominate: increasing wealth or rising longevity and better health? And how do we forecast longevity and health?

39. **Macroeconomic policy should remain accommodative for a while given sizeable labor market slack**. This slack goes beyond that signaled by the unemployment rate, and takes account of the LFPR being below trend and many employees working part time "involuntarily". Moreover, the numbers of long-term unemployment are still higher than at any time pre-2007 since WWII, suggesting that further hysteresis effects (e.g., loss of skills, discouragement) could still develop.

40. **Policies to enhance labor supply and help offset the headwinds to potential growth from aging will also be important**. The main drag to potential growth in staff's forecast is expected to come from aging and the retirement of the baby-boom generation. Indeed, staff projects the potential labor force to expand at below ½ percent per year over the medium term, half the average growth rate seen in 2000–13 and well below the long-run average of 1½ percent. Policy priorities include: (i) enhancing training and job search assistance programs (such as sectoral training), particularly those that engage industry and higher education institutions; (ii) better family benefits (including childcare assistance) to reverse the downward trend in female labor force participation rates; (iv) modifying the disability program to allow for part-time work by those receiving benefits; reducing the penalties for working during the application process; and re-examining eligibility rules to present misuse (especially for disability related to mental illness); (v) providing greater visa opportunities for high-skilled immigrants; and (v) expanding the EITC to childless workers and by lowering the age threshold from 25.

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Appendix 1. Demographic Data and Analysis

As discussed in section B, in order to disentangle the effect of population dynamics on the participation rate, the chapter adopted a two-pronged strategy. First, we considered a 'demographic' approach that relies on disaggregated population and participation data by age group (10 groups) and gender to estimate the demographic component of the decline in participation rates. And second, to investigate the behavior of specific age groups, we considered a shift-share analysis. This Annex describes these methodologies and the data used in detail, compares our results to similar studies, and discusses additional simulations on population and immigration growth based on the US Census forecasts.

We used data on labor force by gender and age groups (16-19, 20-24, 25-34, 35-44, 45-54, 55-59, 60-64, 65-69, 70-74, 75+) from the Household Employment Survey of the Bureau of Labor Statistics (BLS), for the period 1981 to present. Population data, including forecasts of population for 2014-2019, were obtained from the BLS, while the data on immigration used in the simulations described in section II of this Annex are from the US Census Bureau.

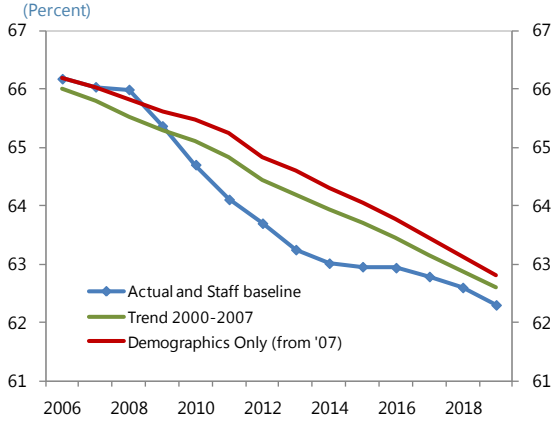
AGE-SPECIFIC DEMOGRAPHIC MODELS

Several models are considered in order to quantify the impact of demographic trends on the labor force. First, we estimate the "demographic component" of the participation rate decline by holding the participation rate of each age group constant at the level of a particular year – namely 2007 in our analysis – and letting the population shares of each group vary according to history. Doing so allows us to construct the aggregate participation rate that would have obtained if the only changes through time stemmed from changes in the population share of each group.

A second approach is to estimate participation rate trends for each age group over a specific period – e.g., the years 2000 to 2007 – and use the estimated trends to project the evolution of each age group's participation rate (Figure A.1.1.). These age-specific projections are then combined with population shares to calculate the aggregate participation rate. Note, however, that this approach comingles the effects from demographic changes (via changes in population shares) and from structural changes in the participation rates (as each group's participation rate follows its specific trend).

Figure A.1.1. Particpation Rates in Baseline Scenario

(Percent)



Sources: U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis, and IMF staff estimates.

Thirdly, to quantify the relative importance of changes in the population shares and participation rates of each age group and gender, we conducted the shift-share decomposition expressed in equation A.1. As noted in Section B, the total change in the participation rate with respect to a base year equals the sum of (a) changes in the population share of each group weighted by their base-year participation rate; (b) changes in the

participation rate of each group weighted by their base-year population share; and (c) an interaction term that is typically small for years not too far from the base year:

$$\text{(A.1)}\quad p_t - p_0 = \sum_g \{\, p_0^g(s_t^g - s_0^g) + s_0^g(p_t^g - p_0^g) + (p_t^g - p_0^g)(s_t^g - s_0^g) \,\},$$

where p_t stands for the aggregate participation rate, and p_t^g and s_t^g stand for the participation rate and the population share of age group *g* in year *t*, respectively.

The demographic and shift share models suggest a demographic effect of similar magnitude to estimates produced elsewhere (Table A.1). Fujita (2013) relies on the Current Population Survey (CPS) micro dataset on 'Reported reasons for non-participation' to find that retirement and disability account for two-thirds of the decline in participation between 2000 and 2013, although the decline due to retirement has taken place after 2010]. This implies that most of the decline in participation is likely to be irreversible, as retirees and disabled are unlikely to rejoin the workforce in large numbers even as job prospects improve. Deutsche Bank (2013) and CBO (2014), in turn, use similar approaches to our demographic models to examine long-term participation trends. They find that structural/demographic forces account for around 50-60% of the participation rate decline during 2007-13. Finally, Mishel *et al.*, (2012) find that the structural component– measured as the long-term trend of the participation rate – explain only one-third of the fall in participation between 2007 and 2011. However, this result partly stems from the authors' use of a longer-term trend of participation rates (for the period 1989-2007), which is consequently flatter than the trends estimated in this Chapter.

IMMIGRATION SCENARIOS

Table A.1. Estimates of structural component in the reduction of the participation rate (various periods, in %)

	Period	Structural Component
CBO (2014)	2007-13	50%
Deutsche Bank (2013)	2007-13	50% - 60%
Mishel, Bivens, Gould, and Shierholz (2012)	2007-11	33%
Fujita (2013)	2000-13	65%

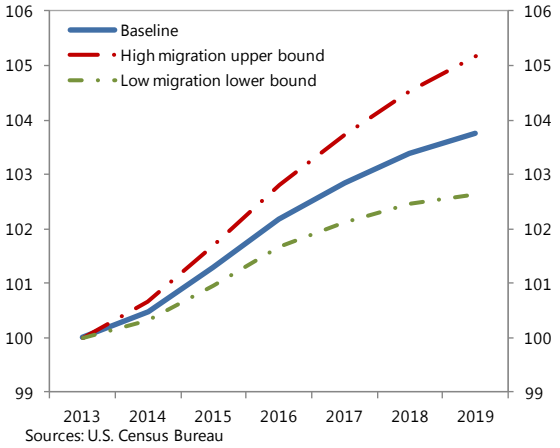
Section E discussed our baseline forecasts for the LFPR and also confidence bands for these forecasts. Besides these baseline projections, we also conducted simulations to ascertain the potential effects on the labor force of different immigration scenarios, as well as constructed confidence bands around the simulations.

To arrive at our results, we first computed the additional working age population under the three current Census scenarios for immigration (the so-called Middle, Low and High scenarios).[10] Then, to obtain estimates of the additional labor force under these scenarios, we further assumed that around 60 percent of the additional immigrants are male and that the participation rates for males

[10] The Census Bureau produces these three scenarios as immigration is very difficult to forecast. The different Census scenarios maintain the same methodologies and assumptions on fertility and mortality, and differ only in the levels of net international migration assumed under each scenario.

and females are 90 percent and 50 percent, respectively (*cf.* CBO, 2011). Finally, in order to assess the accuracy of these forecasts, we used past vintages of the Census' immigration and population forecasts to compute average error forecasts, and applied these estimates to obtain confidence bands around the baseline projection (Figure A.1.2.).

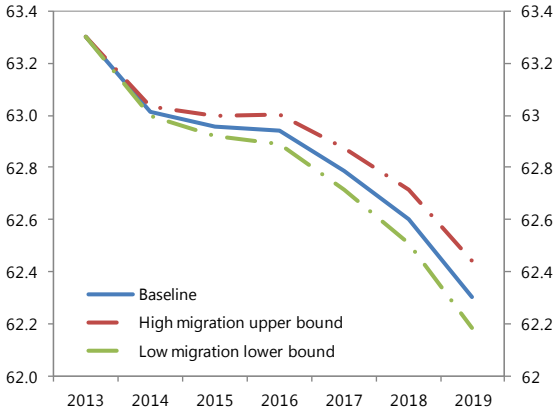
Figure A.1.2. Population Scenarios: labor force
(index 2013 = 100)



Sources: U.S. Census Bureau

Our analysis reveals that alternative immigration scenarios could have a considerable effect on the size of the labor force and hence on potential growth, but not so much on the aggregate participation rate (Figure A.1.3.). Under our baseline projections for LFPR, by the end of the decade, the labor force could have grown 4 percent compared to its level in 2013. The error bands suggest, however, that immigration could further add or detract around 1.1 to 1.4 pp to these estimates, and thus have a non-negligible impact on the size of the labor force and potential growth. However, the impact on the participation rate would not be sizeable, as in the scenario both the labor force and working age population would be growing at a similar pace.

Figure A.1.3. Participation Rate Scenarios
(In percent of total population)



Sources: U.S. Census Bureau and U.S. Bureau of Labor Statistics

It's also worth noting that existing proposals for immigration reform could have a large impact on the size of the labor force (*cf.* CBO, 2013). The CBO estimates that the implementation of the Senate Bill S.744[11] would lead to a further increase (relative to CBO's baseline) in the labor force of around 6 million people (about 3½ percent) by end-2023, as well as raise GDP by 3.3 percent. The increase in GDP would come via the effects of a larger labor force as well as higher demand from an expanded population.

[11] Bill S.744, Border Security, Economic Opportunity, and Immigration Modernization Act

Appendix 2. State-Level Regression Model

EMPIRICAL APPROACH:

The underlying model in levels: To estimate the cyclical effect of labor demand on the participation rate, we start with a linear model determining the level of participation rate as:

(1) $$PR_{st} = \alpha_s + \delta_{1s} * trend_t + \delta_{2s} * trend_t^2 + \sum_{k=0}^{l} \beta_k * cycle_{s,t-k} + \varepsilon_{st}$$

As at the national level, the participation rate in state *s* and year *t* may follow a linear and quadratic trend that accounts for aggregate aging dynamics and other structural forces not related to the business cycle. We allow the trends to be state-specific, accounting for evolution of structural forces that can follow different paths across states. Once de-trended, the participation rate evolves around a state-specific mean, which should capture unobservable state characteristics such as climate, geographic location, industrial specialization, etc, which in turn may affect the demographic composition and hence the mean participation rate across states.

The main variable of interest is the measure of the state-specific business cycle (*cycle*) which should capture the annual variation in labor demand across states. The coefficient β_k therefore gives the effect of cyclical forces on the participation rate, allowing the adjustment to occur gradually over time via the lag structure.

Model in first differences: Taking first differences of the level equation (1), we arrive at the following equation for the *change* in the participation rate:

(2) $$\Delta PR_{st} = \delta_{1s} + \delta_{2s} * trend_t + \sum_{k=0}^{l} \beta_k * \Delta cycle_{s,t-k} + \xi_{st}$$

There are several advantages to estimating the model in first differences as opposed to levels: first, the level variable is likely non-stationary, which conventional unit root tests in fact suggest, possibly rendering the level estimation spurious. Second, the level of participation rate is highly persistent so that the level residuals are strongly auto-correlated, while this is no more the case in first differences. While the state-specific intercept captures state-specific annual change in LFPR during the sample period, the state-specific trend in the changes allows for some curvature in the dynamics, as the evolution of LFPR at the aggregate level as well as in all states has been highly non-linear (both features result directly from the levels equation (1)).

We measure state labor demand or the cycle using two different measures of the employment gap at state level. The employment gap is calculated as the difference between payroll or household employment and its state-specific trend using a HP filter. As we want to measure changes to labor demand, we prefer these employment gap measures to the unemployment rate, which inevitably

responds to endogenous changes in labor supply and the LFPR itself. To avoid that the HP filter fits a trend that is too close to actual data toward the end of the series, we adjust the end points as follows: For each state, we calculate the average annual employment growth between 2002 and 2005 (the last two years before the crisis where aggregate employment was at trend and unemployment close to NAIRU), and for all years starting with 2006, we impose trend growth rate to equal this average growth rate.

Instrumental Variable: The trend captures low frequency movements in employment potential, but cannot account for short-term shocks to labor supply, e.g. reactions to policy such as unemployment insurance benefit extension or temporary tax changes which also often vary at the state level. To control for these and other sources of endogeneity, we estimate equation (2) both with OLS and 2SLS, where the employment gap is instrumented by a measure of predicted employment growth based on a state's industry mix (*imix*):

(3) $$imix_{st} = \sum_{j=1}^{J} \bar{\theta}_{sjt} * \Delta e_{jt}$$

This industry mix variable, often called the Bartik shock (Bartik, 1991), captures changes to a state's labor demand through an average of industry-specific employment growth at the national level (Δe_{jt}), weighted by the state's share of employment in each industry $\bar{\theta}_{sjt}$ (averaged over the previous five years). In other words, this is a measure of employment growth that would result if each industry's employment growth coincided with the national rate, and the sectoral distribution of employment by state did not fluctuate significantly from year to year. It is thus plausible to assume that this predicted employment growth is exogenous to state-specific shifts in labor supply.

REGRESSION RESULTS:

Table A.2 below summarizes various regression results of estimating equation (2), using the household employment variable (as opposed to payroll employment, for which the same table is in the main text) to construct the employment gap as a measure of the state business cycle. The trend-cycle decomposition and end-point adjustment follows the same procedure as for the payroll employment (discussed above).

ANNEXES

AN INTERMISSION IN THE RECOVERY

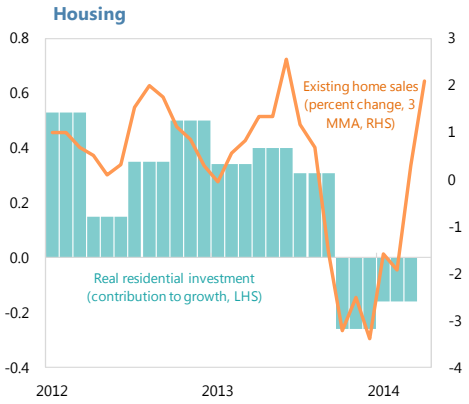
1. ***Overview***. Economic activity in the U.S. accelerated in the second half of 2013, but an unusually harsh winter conspired with other factors—including a still-struggling housing market, an inventory correction, and slower external demand—causing momentum to fade. This led to the first quarterly contraction since early 2011.

2. ***Housing***. After a promising recovery in housing activity for most of 2013, the past several months have seen a retreat characterized by weaker housing starts, declining residential investment, and subdued home sales. New mortgage origination has been particularly sluggish as credit availability remains constrained for lower-rated borrowers and mortgage rates have moved up by around 70 basis points from a year ago.

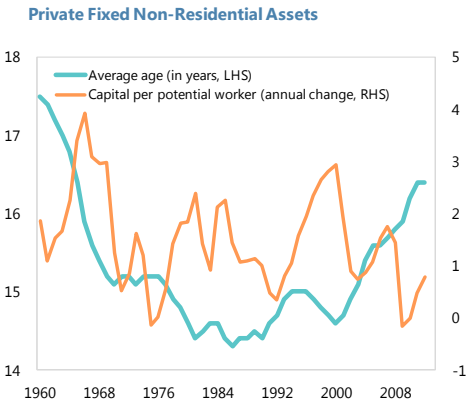
3. ***Corporate investment***. Business investment growth has weakened over the last two years, held back by uncertainty about the strength of future demand. Even after adjusting for the lower growth rate of the labor force, capital accumulation per worker has been disappointing throughout the recovery, and the average age of the non-residential capital stock is at a 40-year high.

4. ***Inventories***. The second half of 2013 saw a significant build-up in inventories that was broad-based across various industries. This over-accumulation was corrected in the first quarter of 2014 causing the drag to growth from inventories alone to amount to 1.7 percentage points on an annualized basis.

5. ***Net exports*** also weighed heavily on activity in the first quarter of the year, detracting 1.5 percentage points of growth (annualized). This negative contribution followed a surge in exports in the last quarter of 2013.



Sources: BEA;, Haver Analytics; IMF staff estimates.



Sources: BEA; IMF staff estimates.

BETTER TIMES AHEAD

6. ***The growth outlook***. Activity is projected to accelerate in the remainder of this year to above potential (in the 3–3½ percent range). Still, the drag on growth from the first quarter contraction will not be offset. This means growth for the year as a whole will be a disappointing 1.7 percent. Nevertheless, barring unforeseen shocks, growth should accelerate in 2015 to the fastest annual pace since 2005.

Summary of Macroeconomic Forecast

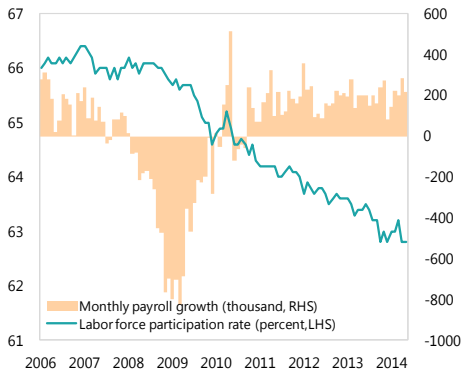
(percent)	2013 Actual	2014 Proj.	2015
GDP growth	1.9	1.7	3.0
o/w:			
Personal consumption[1]	1.4	1.5	2.0
Residential investment[1]	0.3	0.1	0.4
Equipment investment[1]	0.2	0.2	0.4
Government spending[1]	-0.4	-0.2	0.1
Net exports[1]	0.1	-0.2	-0.2
Output gap[2]	-3.8	-4.0	-2.9
CPI inflation[3]	1.5	1.9	1.8
PCE inflation[3]	1.2	1.6	1.5
Unemployment rate[3]	6.7	6.2	5.9
10-yr Treasury yield[3]	3.0	2.9	3.6

Source: IMF staff estimates.
[1]Contribution to growth.
[2] Percent of potential GDP.
[3] End of period.

7. ***A number of factors underpin this baseline*** (Figure 1):

- *A steadily improving labor market*. Job growth has been reasonably healthy with over one million jobs created since January 2014. However, the labor force participation rate at June stood at 62.8 percent (its lowest level since 1978). This combination of decent job growth and declining participation has allowed the unemployment rate to fall rapidly (reaching 6.1 percent in June). Going forward, the pace of decline in the unemployment rate is expected to moderate. However, real wages should slowly rise alongside steady employment growth with around one-third of the post-recession decline in the participation rate expected to be reversed (Box 1). This strengthening of the labor market should underpin growth in the coming quarters.

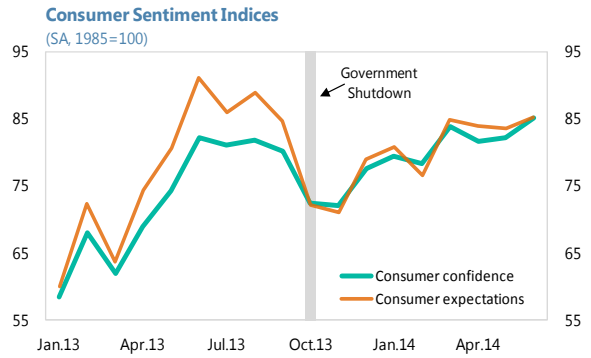
Labor Market



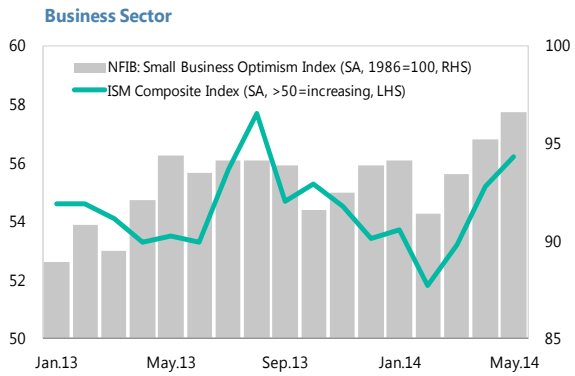
Sources: BEA; IMF staff estimates.

Figure 1. Recent Indicators Suggest a Pick-up in Growth

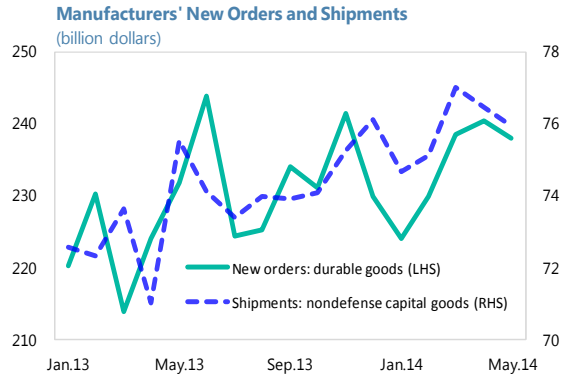
Consumer confidence continues to strengthen.



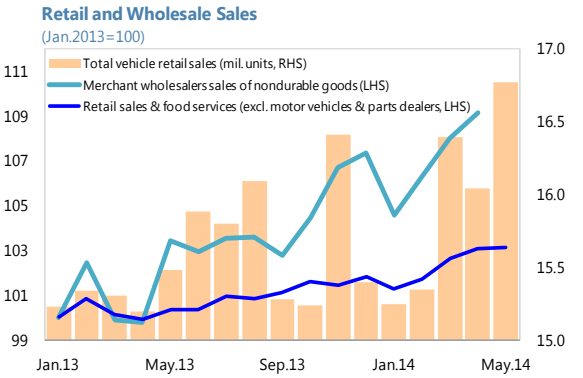
Businesses activity and prospects are also improving.



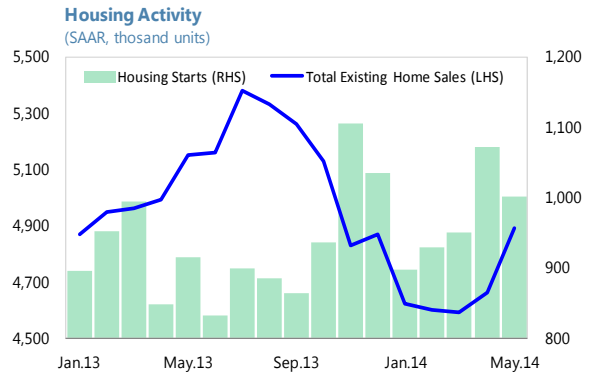
Durable goods and capital expenditures are recovering from the winter pause…



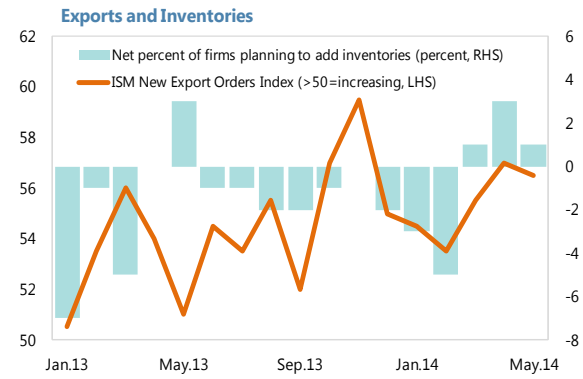
…as are retail and wholesale sales.



Housing activity is regaining momentum.



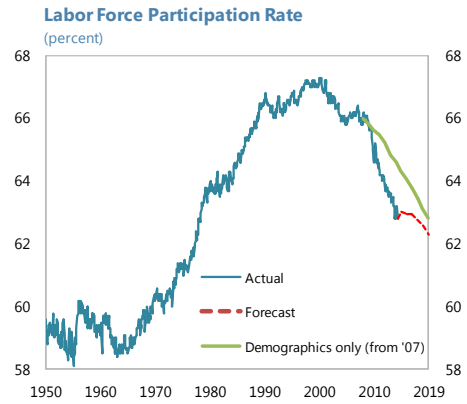
Businesses expect stronger exports and inventory accumulation in the months ahead.



Sources: BEA, Federal Reserve, Haver Analytics; IMF staff estimates.

Box 1. How Reversible is the Decline in U.S. Labor Force Participation? 1/

The U.S. labor force participation rate (LFPR) fell by around 3 percentage points since 2008 and has yet to recover. The falling LFPR is, however, not a recent phenomenon. Labor force participation increased sharply since the early 1960s (as the baby boom generation reached adulthood and women became more represented in the workforce) but then leveled out (reaching an all-time high at 67.3 percent in 2000) and subsequently entered a secular decline (following the 2001 recession). This downward movement accelerated following the global financial crisis.



Sources: Bureau of Labor Statistics, Haver Analytics; IMF staff estimates.

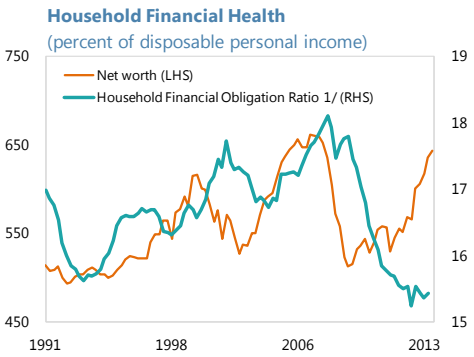
LFPR dynamics are a complex combination of both structural factors (population aging or delayed retirement) and cyclical factors (largely related to the availability of jobs). Staff's demographic models suggest that aging explains around 50 percent of the LFPR decline since 2007. State-level panel regressions suggest that the cyclical effect accounts for a further 30–40 percent of the decline.

The remainder reflects a number of forces at work. For example, the bulk of the decline in youth participation has been driven not by an increase in college enrollment but by a decline (from 43 to 37 percent since 2007) in the number of students that are working. It is unclear how much of this effect will be reversed as the economy improves. Regarding disability insurance, although applications rose following the recession, acceptance rates have fallen. Despite this, disability dynamics are still having an impact on the LFPR: even those denied benefits are likely to exit the labor force while their application is pending and, because of aging, the share of the total population receiving disability insurance has risen.

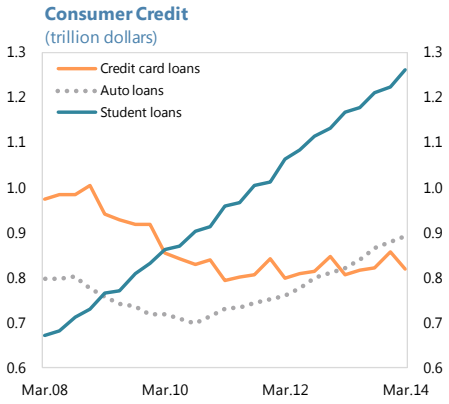
Overall, staff analysis suggests that up to one-third of the post-2007 decline is reversible. This should mean, over the next 2–3 years, there will be a temporary respite in the secular decline of the LFPR. However, after this interim period, participation rates should start declining again as the forces of population aging begin to dominate.

1/ See R. Balakrishnan, M. Dao, J. Solé, and J. Zook, "Recent U.S. Labor Force Participation Dynamics: Reversible or Not?" Selected Issues Paper, 2014.

- *Better household balance sheets*. Since the crisis, total household debt has fallen steadily—albeit with growth in student debt and a surge in auto credit—and wealth gains have been propelled by rising house prices and a booming stock market. As a result, household net worth as a share of disposable income has risen almost back to pre-crisis levels. It is worth noting that the gains in net worth have been unevenly distributed with much of the improvement concentrated in the top two deciles of the income distribution. Despite this, better balance sheets, rising consumer confidence, and the ready availability of consumer credit should support stronger consumption growth in the months ahead.



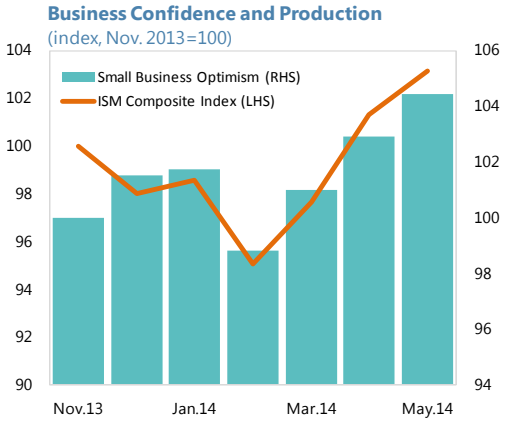
Sources: Federal Reserve Board and Haver Analytics.
1/ The Financial Obligation Ratio is the ratio of total required household debt payments plus rent on tenant-occupied property and auto lease payments to total disposable income.



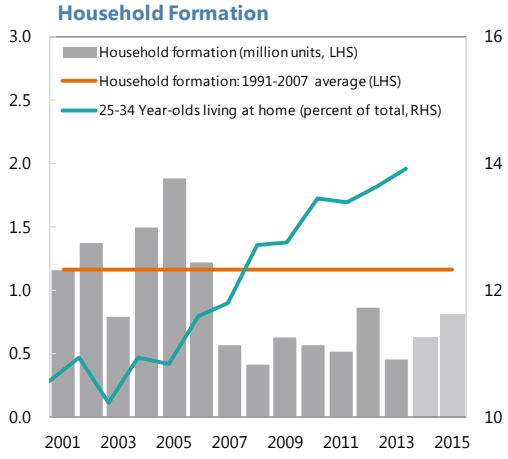
Source: Federal Reserve Board.

- *A healthier housing market*. Household formation is expected to resume a steady path back toward more normal levels as economic growth, more secure job prospects, and a modest improvement in the availability of mortgage credit combine. This, in turn, will create a rising demand for housing (both rental and owner-occupied), supporting a steady pick-up in residential investment.

- *A need to upgrade the capital stock*. With substantial cash holdings, low financing costs, elevated after-tax profit margins, high rates of capacity utilization, and rising business confidence, it is expected that corporations should begin to more assertively upgrade their aging capital stock in the coming quarters, causing an improvement in business investment.



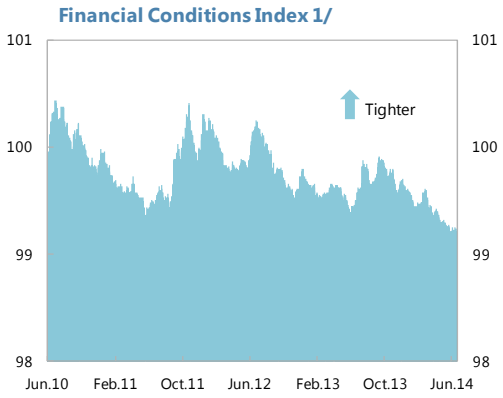
Sources: Institute for Supply Management; National Federation of Independent Business ; Haver Analytics.



Sources: Census Bureau, Haver Analytics; IMF staff estimates.

- *A dissipating fiscal drag*. After an abrupt fiscal adjustment in FY2013—which indiscriminately cut spending and led to a 1½ percent of GDP improvement in the general government primary structural balance in CY2013—as well as the political gridlock that led to a partial government shutdown at the beginning of FY2014, Congress finally reached a budget agreement in December 2013. This agreement partially replaced the automatic spending cuts in fiscal years 2014 and 2015 with mandatory savings in later years and new revenues from non-tax measures. In addition, in February, the debt limit was suspended until March 15, 2015 which helped reduce near-term fiscal uncertainties. As a result, for this year and next, the cumulative decline in the structural balance is projected to be relatively modest (1¼ percent of GDP). This is estimated to dampen growth by around ¼ percentage point per year. In addition, for 2014, much of this drag has already taken place in the first quarter (when emergency unemployment benefits and bonus depreciation both expired). As a result, government spending is expected to add 0.1 percentage points to growth in the remainder of 2014.

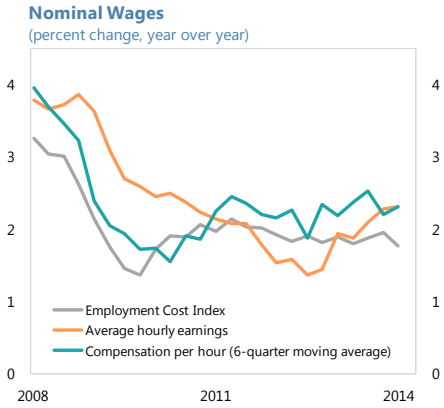
- *Supportive monetary and financial conditions*. Since December 2013, the Fed's Large Scale Asset Purchase Program has been scaled back from net purchases of $85 to $35 billion per month (as of June 2014). At the current pace of withdrawal, asset purchases will finish before the end of this year. The Fed has indicated, though, that it is prepared to maintain the federal funds rate at 0–0.25 percent for a considerable period after asset purchases end. Even after policy rates move away from zero, the subsequent pace of interest rate increase is expected to be relatively slow. The expectation of continued gains in home prices, low term and credit premia, buoyant stock market valuations, and a slow rise in policy rates should mean financial conditions will remain relatively loose for the forseeable future.

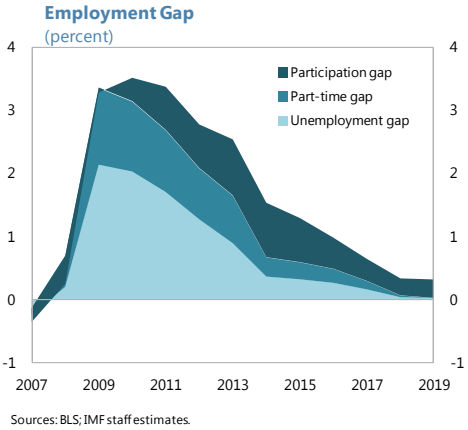


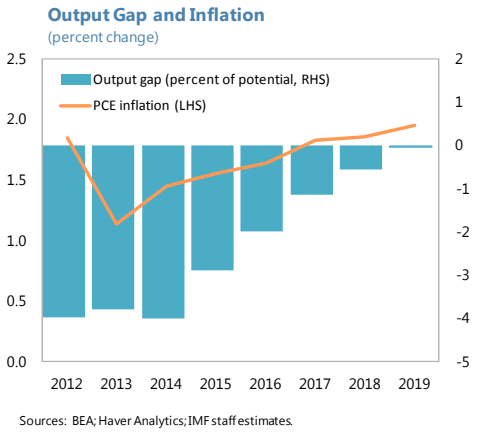
Sources: Goldman Sachs; Bloomberg L.P.
1/ The index is set to 100 for the average since 2000.

8. ***Global spillovers***. The expected acceleration of the U.S. economy in the coming quarters is expected to be a positive force for world growth. Specifically, the projected increase in U.S. growth should add 0.1–0.25 percentage points annually to (non-U.S.) global growth in 2015–16. Spillovers will be largest to those with the strongest trade links (e.g., Canada and Mexico) but other advanced economies and emerging markets should also benefit.

9. ***The output gap and inflation***. Inflation outturns remain well below the Fed's longer-term objective but have steadily risen over the past several months. Core personal consumption expenditure (PCE) inflation at end-May was 1.5 percent (year on year), with headline PCE inflation modestly higher due to rising energy costs. The rise in inflation has been underpinned by increasing shelter costs and the unwinding of the effects that the 2013 sequester had on Medicare costs. There appear to be little sign of labor market tightness or rising wage costs. Around 4½ percent of the workforce are still involuntarily working part-time, and a broad measure of the "employment gap" (i.e., one that combines information on unemployment, underemployment, and the potential unwinding of the fall in the participation rate) suggests that the current level of labor market slack is still significant and will take 3–4 years to be exhausted. As a result, the output gap is estimated at close to 4 percent at end-2013 (and is expected to take until 2018 to close). As a consequence, PCE inflation is forecast to be 1.6 percent at end-2014 and gradually converge (from below) to the Fed's longer-term objective of 2 percent. There is, however, significant uncertainty surrounding these forecasts. If the short-term unemployment rate (which has fallen to 4.1 percent by May 2014, and is close to pre-crisis levels) were to be a more relevant driver of wages—as some researchers have claimed—then inflation could become more evident at an earlier stage.





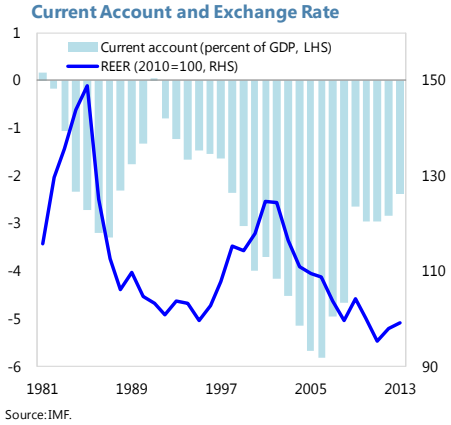


10. The external accounts. The current account deficit is expected to slowly widen as a stronger demand for imports is only partially offset by fiscal consolidation and the improvement in the trade balance that is linked to a rising self-sufficiency in energy. The strong performance of U.S. asset markets and the persistent current account deficit are expected to lead to a continued worsening of the net international investment position (from -27 to -33 percent of GDP over the next five years).

The U.S. external position and the assessed imbalances and fiscal policy gaps have improved considerably in recent years, with positive implications for the global economy. Despite the cyclically-adjusted current account being somewhat on the weaker side, the U.S. external position is assessed to be broadly consistent with medium-term fundamentals and desirable policies (Box 2).

Box 2. External Sector Assessment [1]

The ***current account deficit*** fell to 2.3 percent of GDP in 2013, continuing its descent from the 6 percent of GDP peak reached in 2006. The decline has been due to a falling fiscal deficit, higher private saving, and lower investment in the aftermath of the financial crisis. This shift has been helped by the expansion in unconventional energy production and increased energy independence. The weaker real exchange rate has also supported export growth (in 2013 the REER was around 10 percent below its average value over the past two decades).



The ***net international investment position*** declined from -15 percent of GDP in 2010 to -27 percent of GDP in 2013, reflecting the current account deficit and the stronger performance of the U.S. stock market relative to global markets. Gross assets and liabilities are 131 and 158 percent of GDP, respectively. The U.S. has a positive net equity position vis-à-vis the rest of the world, sizable portfolio equity and direct investment abroad, and a negative debt position owing to sizeable foreign holdings of U.S. Treasuries and corporate bonds.

The ***External Balance Approach*** (EBA) estimates the cyclically adjusted CA deficit to be about 1 percent of GDP weaker than the level implied by medium-term fundamentals and desirable policies. This would suggest some overvaluation of the U.S. dollar (in the 0 to 10 percent range). However, direct analysis of the REER in the EBA would suggest an undervaluation of around 8 percent in 2013.

External Balance Assessment Results

	CA Regression	REER Regression
CA Norm (percent of GDP)	-2.1	
CA Gap (percent of GDP)	-1	
Exchange rate gap (percent)	8	-8

Source: 2014 External Sector Report.

Capital and financial inflows and outflows rose in 2013 but are substantially lower than pre-2008 levels. Portfolio inflows halved in 2013, relative to 2012, but were more than offset by stronger bank inflows. At the same time, there has been a sizable increase in U.S. overseas portfolio investments. The U.S. dollar's reserve currency status continues to support foreign demand for U.S. securities.

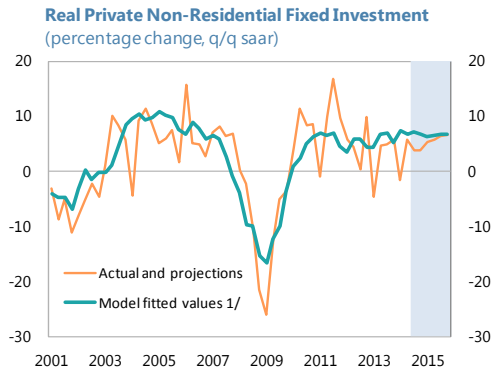
[1] This box draws on the 2014 External Sector Report. See also Annex IV.

11. ***What could go wrong domestically?*** There continue to be important uncertainties surrounding the baseline growth forecast (see Annex I) including whether the slowdown in growth earlier in the year will prove to be more permanent than is currently assessed. In terms of specific domestic risks, interest rates could rise more rapidly—either because of an unanticipated shift in the Fed's position, or markets unwinding the recent compression in volatility, term premia, and credit spreads. This could instigate bouts of financial volatility with damaging implications for U.S. growth. Alternatively, a continuation of low interest rates could foster a build-up of greater systemic financial stability risks. The return of fiscal uncertainties in 2015—for example, linked to renewed disagreement on the debt limit or the budget—would create downside risks. Over a longer horizon, a delay in putting in place a credible medium-term fiscal consolidation plan has the potential to precipitate a loss of confidence and an increase in the sovereign risk premium.

12. ***Global spillovers***. Given the size and importance of the U.S. economy, all of the domestic risks described above, if realized, would have significant implications for the world economy. For example, a rapid increase in interest rates that is not backed by stronger U.S. growth would have negative consequences for global growth, particularly for those emerging markets with weaker fundamentals. A one percentage point increase in the U.S. term premium could reduce growth in the rest of the world by around 0.2 percent (see the 2014 Spillover Report). Similarly, the low-probability but high-impact risk of U.S. bond market distress could generate a peak world output loss of 3.4–6.0 percent (see the 2012 Spillover Report).

13. ***What are the main risks from abroad?*** The principal external risk to the U.S. recovery comes from a more pronounced synchronized slowdown in emerging market economies (including in China). A one percentage point fall in emerging market growth could lower U.S. growth by 0.1 percent over a year (see the 2014 Spillover Report). If increasing geopolitical tensions surrounding Ukraine or Iraq were to lead to global financial and trade disruptions, higher commodity prices, and safe-haven capital flows, then the U.S. dollar would appreciate and growth could fall by up to 0.2–0.8 percent in 2014–15, depending on the severity and longevity of the disruption.

14. ***What are the upsides?*** Non-residential private investment growth is conservatively forecast to be lower than predicted by staff investment models. As a result, the recovery in private investment could be stronger as confidence about future economic prospects grows. There could also be a more energetic rebound in the participation rate than is currently envisaged by staff. This would raise labor incomes and add to consumer demand. Finally, the large destocking that occurred in the first quarter may mean that a rebuilding of inventories in the coming months may provide some upside to growth in 2014. Overall, the distribution of risks around the baseline forecast is believed to be broadly balanced for 2014–15.

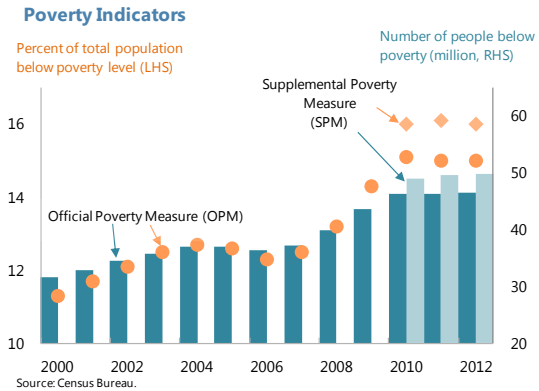


Sources: BEA; Haver Analytics; IMF staff estimates.
1/ Fitted values from staff model of business investment; regressors include corporate profits, personal consumption growth, and labor force growth.

15. ***Authorities' views.*** The authorities believed the weak first quarter growth outturn was a temporary aberration and partly a weather-related phenomenon. They recognized, though, that this meant 2014 growth would likely come in somewhat below their most recent public forecasts. However, they underlined that solid fundamentals and significant policy efforts to support the recovery would mean that there was a strong possibility that growth could surprise on the upside in the coming quarters. They agreed on the nature of the principal risks facing the U.S. economy but saw a relatively remote likelihood that the downside domestic risks highlighted by staff would materialize and were more concerned over the risks that could accompany the recent decline in market pricing of volatility. They pointed, also, to concerns over Europe's nascent recovery and weaker growth in emerging markets, particularly risks emanating from China linked to either a sharper slowdown and/or financial sector stresses. The authorities envisaged a slow rise of inflation to the Fed's 2 percent objective and a gradual increase in long-term interest rates to around 5 percent over the medium-term.

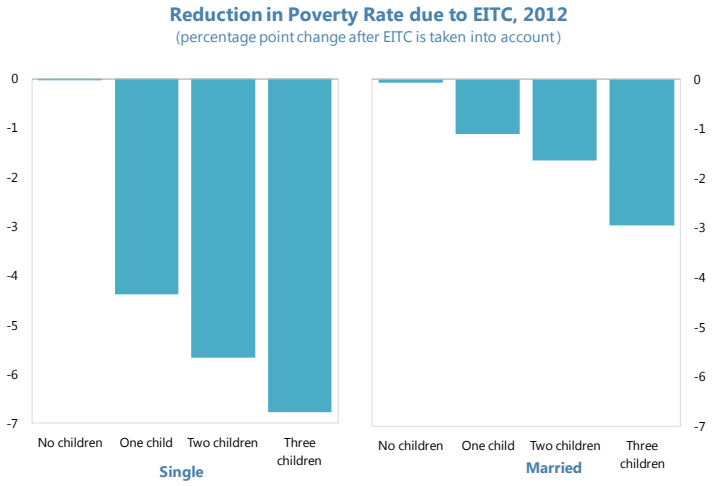
CONFRONTING POVERTY

16. ***The task at hand***. Almost 50 million Americans were living in poverty in 2012, as measured by the Census Bureau's supplemental poverty measure. Poverty rates are higher for children under 18 years and for single-parent households (particularly those headed by single mothers). As troubling as the level of poverty is, perhaps of more concern is the fact that the official poverty rate has been stuck at about 15 percent since the recession, even though the economy has been recovering and average incomes and employment are now both above the levels which prevailed in 2007. Lowering poverty will require a sustained improvement in the economy and in employment opportunities. However, it will also require policy efforts to raise real wages at the bottom end of the distribution and to provide a greater transfer of fiscal resources to society's poorest.



Source: Census Bureau.
Note: OPM based on comparison of cash income to a threshold of three times the minimum diet. SPM takes into account taxes and transfers, basic needs, place of residence, and whether living in rental unit or purchased property.

17. ***Supporting the poor***. While not a full solution to rising poverty, much can be achieved by further expanding the Earned Income Tax Credit (EITC) for workers without dependents, low-income youth, and those older workers not yet eligible for social security. In addition, the government should make permanent the extension of the EITC to larger families, the mitigation of the



Source: Congressional Research Service analysis of the 2013 Current Population Survey.

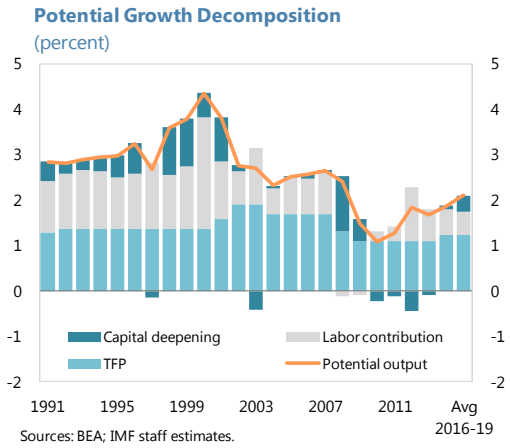
"marriage penalty", and the increase in (and refundability of) the Child Tax Credit, all of which were introduced in 2009 and are due to expire in 2017. Such an upgrade of the EITC would have a relatively low fiscal price tag and would directly target poverty among the working poor while encouraging work. Complementing this with an increase in the federal minimum wage would help ensure that part of the economic costs of raising the income of the lowest decile is borne by firms (rather than the budget). It would also forestall the improved EITC from simply lowering the pre-tax wage without changing the post-tax income of poor households (Box 3).

18. ***Authorities' views***. The President's 2015 Budget underscored the importance of making the EITC a more relevant and effective instrument in tackling poverty and in encouraging people to enter the workforce. It proposed a doubling of the childless worker EITC as well as making younger adult workers eligible for the EITC. The Administration is also committed to increasing the minimum wage. It has already required federal contractors to pay at least $10.10 per hour and has called on Congress to raise the minimum wage to $10.10 for all workers. There have also been initiatives to increase the minimum wage at the state and local levels (as of June 1, 2014, 22 states and the District of Columbia have minimum wages above the federal minimum). Officials agreed that making progress on both the EITC and minimum wage would be a preferred combination but also regarded passage of either in isolation as a valuable step to ensuring that hard work pays off for all citizens and that poor families are able to make ends meet.

COUNTERING THE DECLINE IN POTENTIAL GROWTH

19. ***Pressures on labor supply and labor productivity***. U.S. potential growth is expected to level off at around 2 percent in the coming years. This is well below the average potential growth rate of over 3 percent seen in the decade before the financial crisis. The main drag to potential growth is expected to come from:

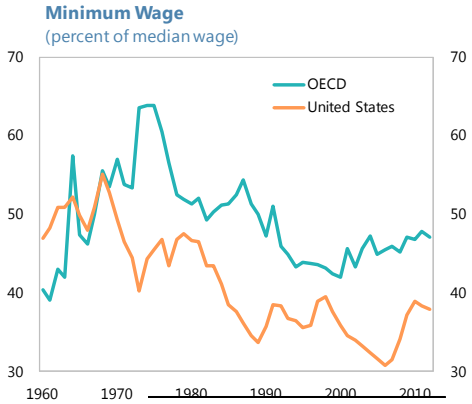
- *A slower expansion of the labor force given population aging*. Under current policies, the labor force is expected to expand at a slow pace (of below ½ percent per year), half the average growth rate seen in 2000–13 and well below the average (1.2 percent) growth seen over the past 30 years.



Sources: BEA; IMF staff estimates.

Box 3. The Earned Income Tax Credit and the Minimum Wage—A Package

"In-work" tax credits such as the Earned Income Tax Credit (EITC) in the U.S. are aimed at stimulating labor force participation and providing income support. More than half of advanced economies use such credits.[1] In the U.S., the credit is phased out as *family* income rises and also varies with the number of dependents in the household. This generates both a "marriage penalty" (the income of one partner can make the other ineligible for the credit) and potentially negative effects on labor supply (since the marginal tax rate, when adding in the loss of the EITC, can be very high for the second earner). The complexity of eligibility for the EITC has also been criticized for leading to high error rates and improper payments.[2]



Source: OECD.

Minimum Wage
(percent of median wage, 2012)

Czech Rep.	36
Japan	38
Korea	42
Canada	45
UK	47
Australia	53
France	62

Source: OECD.

The minimum wage aims to ensure that low-wage, low-skill workers can afford a basic standard of living. Such wage floors have been shown to raise labor force participation at the margin, reduce poverty, and sustain aggregate demand. However, these benefits may be offset if the floor is set so high as to significantly discourage employers from hiring. The minimum wage in the U.S. is 37.8 percent of the median wage, low by international standards (the OECD average is 47.1 percent of the median wage). Despite periodic increases, inflation has meant the minimum wage has been on a broadly downward trend in real terms since 1968. In 2012, there were 3.6 million hourly paid workers in the U.S. with wages at or below the federal minimum wage of $7.25 per hour; a further 13 million earn below $10 per hour. Slightly more than half of these workers were employed in the leisure and hospitality industry.

Possible Effects of Poverty-Reducing Policy Alternatives

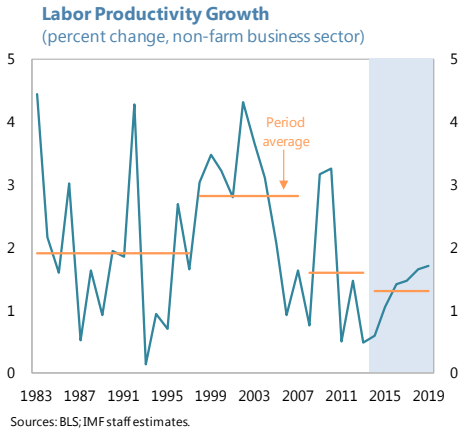
Policy measure	Fiscal cost ($ over 10 years)	Fiscal cost (percent of GDP)	Employment effect (thousands)	Average increase in take-home pay of poor households (percent of average after-tax income)	Reduction in official poverty rate (percentage points)
Make permanent the extension of the EITC to larger families, the mitigation of marriage penalty, and the increase in CTC (due to expire in 2017)	97.4 billion	0.04	Increase of about 40	6.8	0.5
Double the maximum EITC benefits for individuals without dependents and expand EITC benefits to workers aged 21-24	59.7 billion	0.03	Increase of about 20	4.4	0.4
Raise the federal minimum wage from $7.25 to $10.10	Negligible		Decrease of about 500	2.6	0.3
Combination of all	146.9 billion	0.06	Decrease of about 400	9.7	1.0

Sources: OMB, CBO, JCT, Brookings Institution, Urban Institute; IMF staff calculations.

Despite the potential downsides associated with both the minimum wage and the EITC, a combination of the two can have important complementarities and ensure that more of the EITC benefits accrue to the worker.[3] On its own, a minimum wage hike can be a poorly targeted instrument because part of the benefits of a higher minimum wage accrues to higher-income households (the CBO calculates that only a fifth of increased earnings from the minimum wage goes to families living below the poverty threshold). On the other hand, an expansion in the EITC could put downward pressure on pre-tax wages and dilute the benefits to poor households (the increase in after-tax income is only 73 cents for every dollar spent on the EITC[4]). The estimated effects of implementing both an expanded EITC and higher minimum wage are summarized in the text table.

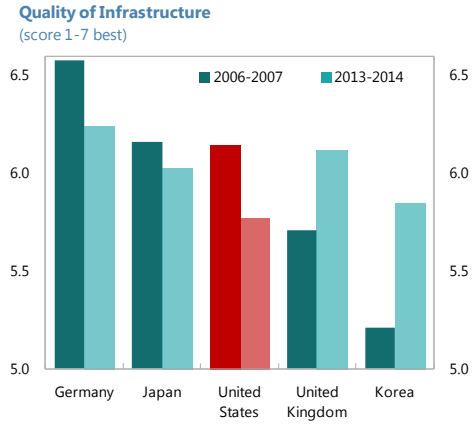
[1] See IMF, "Fiscal Policy and Employment in Advanced and Emerging Economies," 2012.
[2] See GAO, "Improper Payments: Remaining Challenges and Strategies for Governmentwide Reduction Efforts," 2012.
[3] See O. Blanchard, F. Jaumette, and P. Loungani, "Labor Market Policies and IMF Advice in Advanced Economies During the Great Recession," 2013; CBO, "The Effects of a Minimum-Wage Increase on Employment and Family Income," 2014.
[4] See J. Rothstein, "Is the EITC as Good as an NIT? Conditional Cash Transfers and Tax Incidence," 2010.

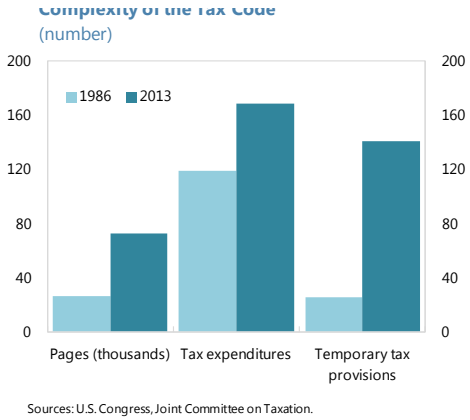
- *A slowdown in productivity.* Recent years have seen a step-down in labor productivity. This has been largely attributed to a smaller contribution from capital deepening and total factor productivity linked to information technology (IT). There is substantial uncertainty as to whether this decline in labor productivity is going to be a long-lasting phenomenon (e.g., due to a diminished pace of IT innovation) or will be partly reversed by newer technological innovations, efficiency gains in infrastructure, and productivity effects from the ongoing energy boom. At this stage, the evidence makes it impossible to distinguish between these two possibilities. Staff's current forecasts assume a middle ground: a partial rebound in labor productivity growth (as measured by non-farm business sector output per hour worked) from 0.5 percent in 2013 (the slowest growth rate since 1993) to around 1.6 percent by the end of the decade (still substantially underperforming the average 2¾ percent productivity gains seen between 1998 and 2007).



20. ***Policies***. Tempering the pace of decline in long-term growth will depend critically on policies that build the (public and private) capital stock, reverse the downswing in productivity growth, and raise labor force participation (Figure 2). Priorities should include:

- *Galvanizing infrastructure investment.* The government capital stock ratio has resumed the downward trend that began in the 1980s. Additional investment is urgently required to improve the quality of infrastructure, particularly for surface transportation. Indeed, the American Society of Civil Engineers estimates that $200 billion (about 1.1 percent of GDP) in funding is necessary to meet the U.S. infrastructure investment needs from 2014 to 2020. Providing clarity on future financing of the Highway Trust Fund is a near-term priority. However, this should be viewed only as a first step. Action is also needed to achieve a sustained increase in both federal and state spending on infrastructure paid for by savings in future entitlement outlays, the raising of additional revenues, and an expansion of infrastructure financing sources (including innovations such as the America Fast Forward Bonds).[1]

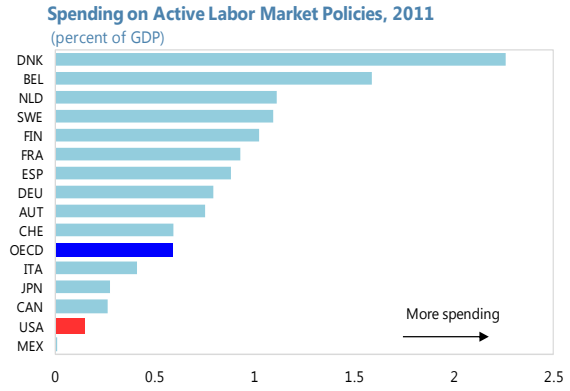




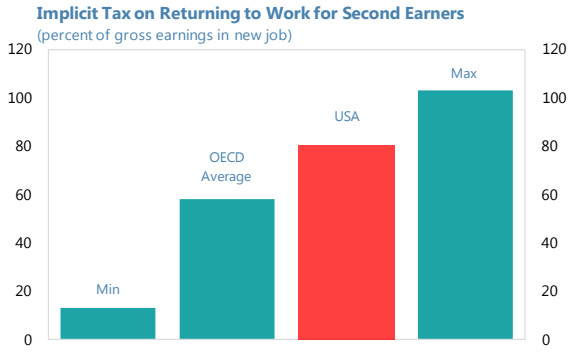
[1] Under this program, the federal government would provide subsidy payments to state and local governments that equals 28 percent of their interest costs on bonds used to finance infrastructure projects and 50 percent if the bonds are issued in 2014 and 2015 to finance the building of schools.

Figure 2. Policy Priorities for Boosting Potential Growth

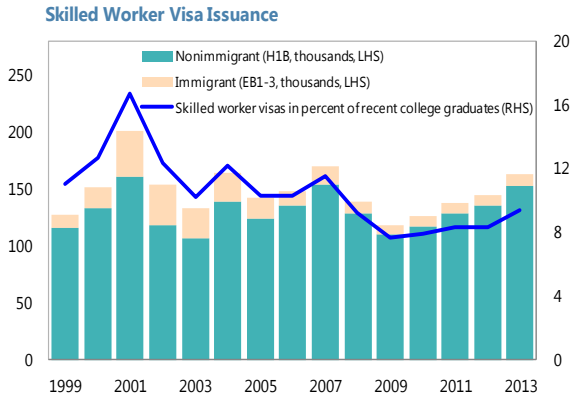
There is scope to strengthen active labor market policies to increase labor supply…



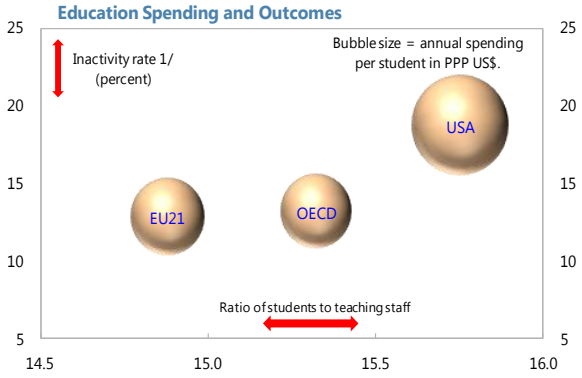
… and tackle other disincentives to work, especially for women with children (e.g. through childcare assistance and tax code changes).



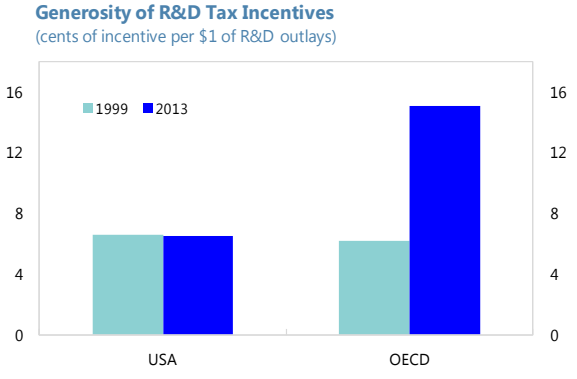
Attracting high-skilled workers through immigration reform would increase labor supply and boost productivity.



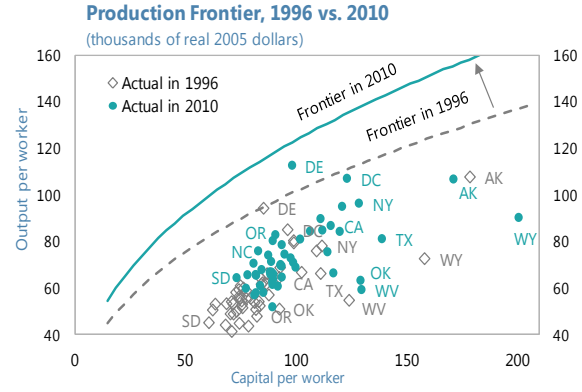
More impactful education expenditures …



… together with incentivizing greater public and private investment in research and development …



… would add to productivity and allow states to move closer to the production frontier.

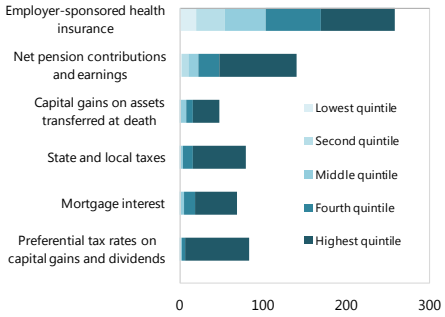


Sources: Department of State, Department of Education, Organization for Economic Cooperation and Development; IMF staff estimates

[1/] Inactivity rate on the y-axis is the proportion of the population that is not in the labor force.

- *A better tax system*. A reform of the U.S. tax code is long overdue, as complexity and loopholes have increased over the years. The Joint Committee on Taxation estimates that a comprehensive tax reform—that involves broadening bases and simplification and reduction of statutory tax rates for individual and corporate income tax—would raise the level of real GDP by up to 1.6 percent over the next ten years. Such a reform would also support medium-term fiscal adjustment and facilitate a more equitable distribution of income. On both efficiency and distributional grounds, the individual income tax base should be broadened through a reduction in exemptions and deductions. In particular, itemized deductions for the individual income tax—including the mortgage interest deduction—should, over time, be either capped or eliminated. On the corporate side, there is scope to broaden the base (by cutting back on the value of various tax exclusions and deductions), lower the marginal corporate tax rate, and change the tax treatment of multinational corporations to limit base erosion and profit shifting.[2]

Size and Distribution of Selected Major Tax Expenditures by Income Group
(fiscal year 2013, billion dollars)



Source: Congressional Budget Office.

- *Incentivizing innovation and building skills*. Fiscal measures should focus on incentivizing research and development including by reinstating and making permanent the Research and Experimentation (R&E) tax credit that expired in December 2013. Progress can be achieved in closing skills gaps over the near term by improving training programs conducted at the state level, building partnerships with industry and higher education institutions for apprenticeships and vocational training, and improving government-provided job search assistance. Over a longer horizon, skills development will require better spending on education to raise educational outcomes through prioritizing early childhood education (including universal pre-K) and giving more support for science, technology, engineering, and math programs (Box 4).

- *Boosting labor supply and reducing long-term unemployment*. In addition to expanding the EITC, increased labor force participation could be achieved through better family benefits (including childcare assistance) to reverse the downward trend in female labor force participation. Moreover, the disability insurance program could be modified to provide incentives for beneficiaries to work part-time (rather than drop out of the labor force). Potential output would also benefit (through both labor supply and productivity effects) from reaching an agreement on immigration reform that provides greater opportunities for high-skilled workers to work in the United States. Finally, to accelerate the progress in lowering unemployment and to counter stigma effects, time-bound tax credits or wage subsidies could be offered to those employers who hire the long-term unemployed.

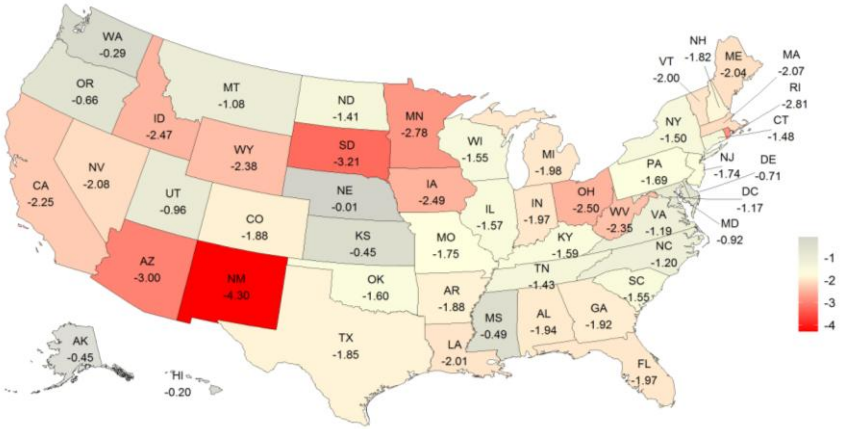
[2] See T. Matheson and J. Grigg, "Raising Revenues from U.S. Personal Income Tax Expenditures" and "International Spillovers from U.S. Corporate Tax Reform," in IMF Country Report No. 12/214, for an extensive discussion.

Box 4. Productivity Growth and Its Determinants: Evidence from the U.S. States[1]

Aggregate total factor productivity (TFP) growth slowed in the mid 2000s, well before the financial crisis. Some argue that part of the decline was due to the information and technology (IT) revolution having run its course, while others maintain that the IT revolution has still a long way to go, and could continue to boost U.S. TFP growth in the future.[2]

Examining TFP growth across U.S. states suggests that the productivity slowdown is less related to the IT cycle than is commonly thought. The change in TFP growth over 2005–10 (relative to 1996–2004) varied from over 3 percentage points in New Mexico and South Dakota to below 1 percentage point in states like Washington, Oregon, Nebraska, Maryland, and others. However, there is little evidence to suggest the TFP slowdown was stronger in those states that were either specialized in IT production or that used IT more intensively.

Deceleration in Average TFP Growth, 2005–2010 vs. 1996–2004
(percent change)



Source: IMF staff estimates.

TFP growth reflects not only technological innovation but also the efficiency of production which, in turn, is linked to education, R&D spending, and the concentration of financial services. Using a stochastic frontier analysis, staff decomposes TFP dynamics into the contributions from technological progress and the improvement in efficiency. In this framework, technological progress shifts the production frontier upward for all states, while an improvement in technical efficiency moves each state towards the production frontier. There appears to be a large variation in the efficiency of production across U.S. states and the empirical work suggests that states with better human capital, higher spending on research and development, or a more developed financial system all tend to be more efficient and closer to the technological frontier.

Panel regressions of TFP growth across U.S. states over the last two decades seem to corroborate these findings, showing that higher educational attainment and greater spending on R&D (especially by the government) are linked to higher TFP growth.

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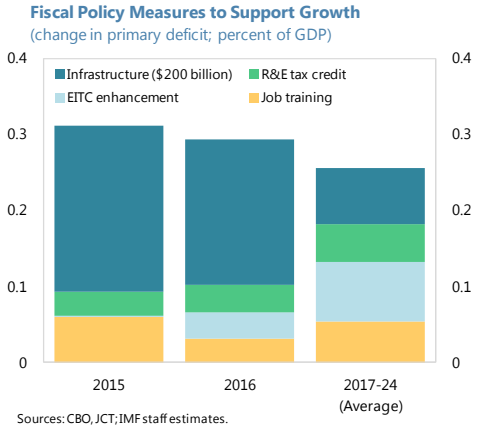
[1] See R. Cardarelli and L. Lusinyan, "U.S. Total Factor Productivity Slowdown: Evidence from the U.S. States," Selected Issues Paper, 2014.

[2] See J. Fernald, "Productivity and Potential Output Before, During, and After the Great Recession," NBER 29th Annual Conference on Macroeconomics, 2014; R. Gordon," Is U.S. Economic Growth Over? Faltering Innovations Confronts the Six Headwinds," NBER Working Paper 18315, 2012; M.N. Baily, J. Manyika, and S. Gupta, "U.S. Productivity Growth: An Optimistic Perspective, International Productivity Monitor 25, 2013. D.M. Byrne, S.D. Oliner, and D.E. Sichel, "Is the Information Technology Revolution Over?" International Productivity Monitor 25, 2013.

- *Energy independence*. Ongoing investments in the development of U.S. energy resources—including those for shale oil and gas and renewables—as well as improvements in energy efficiency have allowed domestic crude oil production to surpass net imports for the first time since 1995. This should narrow the oil trade balance from -1.4 percent of GDP in 2013 to about ¾ percent of GDP by the end of the decade. The U.S. is also expected to become a net exporter of natural gas by 2018. Fully capitalizing on the benefits of increased energy independence in an environmentally responsible way will require removing remaining export restrictions on crude oil, building infrastructure to transport and export gas (particularly LNG), as well as providing incentives for investment in, and use of, green energy technologies.[3] The recent rule proposed by the Environmental Protection Agency to cut emissions from existing fossil fuel-fired power plants by as much as 30 percent by 2030, compared with 2005 levels, would provide further incentives to upgrade plants, switch from coal to natural gas, improve energy efficiency, and promote renewable energy.

- *Trade liberalization*. Longer-term growth will also be helped by a further reduction of obstacles to free trade in goods and services. The U.S. is prioritizing reaching preferential trade agreements—including the Trans-Pacific Partnership and the Transatlantic Trade and Investment Partnership—as well as plurilateral agreements—such as the Trade in Services Agreement and the Information Technology Agreement. To avoid fragmenting the global trading system, progress in preferential trade agreements should be actively complemented by renewed efforts to advance the multilateral trade agenda. The U.S. should work with trade partners to finalize by end-2014 a work program to advance in the trade agenda at the WTO.

21. ***Fiscal implications***. Clearly, many of the measures suggested above to boost long-run growth would have fiscal implications. In particular, passage of bills authorizing additional infrastructure spending, EITC enhancement, increased funding for active labor market policies, and making the R&E tax credit permanent would add about 0.3 percent of GDP to the federal deficit over 2015–16. It should be noted that the fiscal costs would be partly offset by better growth resulting from these policies. Such measures should, however, be accompanied by higher revenues and offsetting expenditure savings in future years (see below).



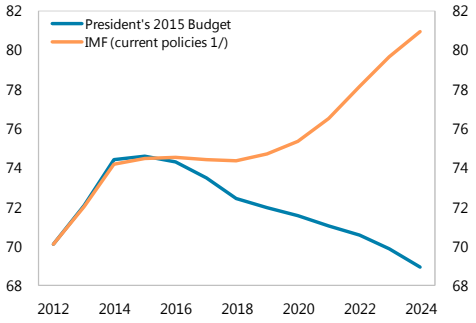
22. ***Authorities' views***. The authorities agreed with many of the supply-side priorities highlighted by staff and indicated that the Administration continues to favor policies that raise long-term growth. They particularly highlighted their efforts to raise public spending on infrastructure, job training, research and innovation, preschool education, and to pass

[3] See B. Hunt, M. Sommer, G. Di Bella, M. Estrada, A. Matsumoto, and D. Muir, "Macroeconomic Implications of the U.S. Energy Boom," in IMF Country Report No. 13/237.

pro-work tax cuts. If put in place today, the authorities believed that such policies would push growth up to an average 3¼ percent over the next three years and achieve a potential growth rate of 2¼ percent over the medium-term. On energy policy, the authorities indicated they were taking an active look at the implications of growing domestic energy supplies including the economic, environmental, and security opportunities and challenges that it presents and would evaluate policy options as needed.

PUTTING PUBLIC DEBT ON A DOWNWARD PATH

23. ***Medium-term adjustment***. Past policy advice has emphasized the importance of a medium-term fiscal plan and early action to slow entitlement spending (see Annex III for a summary of past policy advice). It also made the case that less fiscal withdrawal in the short run, accompanied by a medium-term fiscal plan and ambitious structural reforms, would allow for a more balanced policy mix by partly relieving monetary policy of its burden of supporting the recovery. This, in turn, would generate more favorable outward spillovers while reducing the risks to U.S. and global financial stability from a prolonged period of low interest rates.

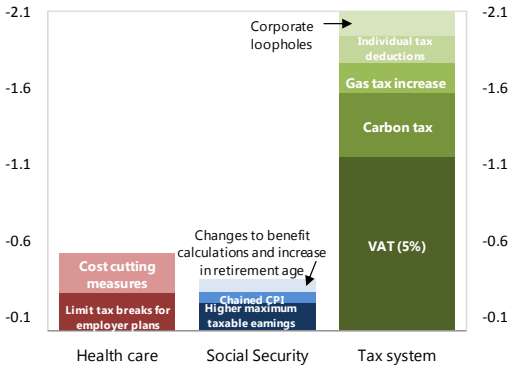


Sources: OMB; IMF staff estimates.
1/ See note in Table 3 for the differnce in policy assumptions compared to the Presiden'ts Budget.

Consolidation in 2011–13 was stronger than had been earlier anticipated (the federal primary structural deficit declined by 1¼ percent of GDP more than was predicted in 2011). However, the outlook for potential growth has worsened, lowering future federal revenues and compounding the long-term fiscal sustainability challenge. As a result, under current policies, after stabilizing in 2015–18, the debt-to-GDP ratio is expected to begin rising again as aging-related pressures assert themselves and interest rates normalize. Staff estimates that, relative to current policies, an additional 2¾ percent of GDP in fiscal adjustment at the general government level would be needed between now and 2023 in order to put the debt-to-GDP ratio on a downward path over the medium term (even as age-related outlays for health and social security start to accelerate).

24. ***A better policy mix***. Given the substantial slack in the economy, there is a strong case to provide continued policy support to the recovery. A credible medium-term fiscal consolidation plan would provide the flexibility for some near-term fiscal support to the economy that is designed with a focus toward reducing poverty and encouraging longer-term growth. Helping to kick-start growth and job creation in this way would have near-term demand effects but, more importantly, lasting implications for potential growth. It may also, at the margin, allow for an earlier withdrawal of exceptional monetary stimulus with some positive spillovers to both domestic and international financial stability.

Options for Federal Fiscal Deficit Reduction
(change in primary deficit in 2014-24, percent of GDP)



Sources: CBO, JCT; IMF staff estimates.

25. ***Policies***. In this vein, the President's 2015 budget outlines various valuable steps that would move toward such a policy mix. It proposes health care savings (including through higher Medicare premia), immigration reform, and measures that limit tax deductions and exclusions for higher earners. There are also sensible options laid out in various proposals under consideration in Congress. Given the long gestation period of reforms, producing measurable savings over the medium term will require up-front action and will need to encompass:

- *Controlling health care costs.* Some progress has already been made in taming the fiscal pressures from rising health care costs and there has been a tangible slowdown in the growth of health spending, partly attributable to the implementation of the Affordable Care Act (ACA).[4] However, it is unclear to what extent this cost slowdown will persist and what are the fiscal and cost implications of the Medicaid expansion under the ACA. As a result, more could be needed. Measures that could be considered to bend the cost curve include the enhanced coordination of services to patients with chronic conditions, the education of patients to reduce the overuse of expensive medical procedures and technology, greater cost sharing with beneficiaries, and the elimination of tax breaks for some of the more generous employer-sponsored health care plans.

- *Strengthening social security finances*. The 2013 Annual Report by the Social Security Trustees projects that the combined trust fund reserves would decline beginning in 2021 and reach zero by 2033, at which point continuing income would be sufficient to pay only 77 percent of benefits. The clock runs faster for the Disability Insurance Trust Fund, which would be exhausted as early as 2016. Addressing the expected depletion of the Social Security Trust Funds will require early and fundamental reforms. These could include a further gradual increase in the retirement age (potentially with steps that link the future retirement age to average life expectancy or other actuarial indicators of the solvency of the system), a modified benefit structure to increase progressivity, an increase in the maximum taxable earnings for Social Security purposes, and an indexation of benefit programs and tax provisions to chained CPI (rather than standard CPI).

- *Improving the tax structure and raising revenues*. In addition to the tax measures described earlier (to enhance long-term growth by making the direct tax system simpler, more equitable, and with less negative incentive effects), there is also a need to raise additional revenues so as to contribute to the needed medium-term fiscal adjustment. To do this, the U.S. could consider a

[4] See D. Igan, K. Kashiwase, and B. Shang, "Risky Business: The Uncertainty in U.S. Health Care Spending," in IMF Country Report No. 13/237.

range of options, including a broad-based carbon tax, a higher federal gas tax, and a federal-level VAT.[5]

26. ***Authorities' views***. The authorities agreed that the benefits to the U.S. economy from a clear fiscal consolidation plan would be significant. They indicated this was exactly the approach that had been taken in the President's 2015 Budget, which proposed a roadmap for accelerating economic growth, expanding opportunity for all Americans, and ensuring fiscal responsibility. Under their budget plan, the federal deficit would be lowered to 1.6 percent of GDP by 2024, bringing debt down to 69 percent of GDP. This would be achieved through improved efficiency savings as well as longer-term health, tax, and immigration reforms. They also agreed that a credible medium-term consolidation plan would give some space to provide more support to the recovery in the near term (particularly through investments in infrastructure, education, and other productivity-enhancing areas). However, they believed that, although it would be politically difficult to agree on a comprehensive medium-term fiscal plan, it could be possible to achieve bipartisan support to pass, by the end of the current administration, a reform of the business tax regime, increased funding for infrastructure and work training programs, and immigration reform. In this regard, the Bipartisan Budget Act of December 2013 could be a blueprint to replace automatic spending cuts in FY2016 with mandatory savings in future years. On health care, officials believed that the full effects of the ACA had yet to be felt and they favored waiting on other health care reforms in order to allow the system time to adapt to the various provisions of the ACA.

27. ***The institutional framework***. The three-week shutdown in October 2013 is estimated to have subtracted 0.3 percentage points (annualized) from fourth quarter growth with the uncertainties generating negative spillovers to various other countries. Fiscal policy uncertainty has been temporarily reduced, but many of the same features—linked to discussions on appropriations, negotiations on removing the sequester provisions for fiscal year 2016, and raising the debt ceiling—could come back to the fore in spring 2015. A more durable, institutional solution to risks from political brinkmanship is needed both for the sake of the U.S. and the global economy. Useful measures could include reaching bipartisan agreement on a clear, simple medium-term fiscal objective (with an integrated view of all budget functions and numerical targets for the debt and deficit); adopting carefully-designed mechanisms to trigger revenue or spending adjustments if targets are breached; an automatic process that would raise the debt ceiling once there is agreement on the broad budget parameters; and shifting to a budget cycle where annual spending levels are agreed for a two-year period (but with the possibility for supplemental budget resolutions during that two-year window under clearly specified conditions).

28. ***State and local finances***. At the state level, higher levels of unfunded pension liabilities and political polarization appear to be associated with lower credit ratings.[6] To support their credit

[5] See IMF, 2010, "From Stimulus to Consolidation: Revenue and Expenditure Policies in Advanced and Emerging Economies," for a broader discussion of tax policy options.

[6] See M. Estrada, D. Igan, D. Knight, "Fiscal Risks and Borrowing Costs in State and Local Governments," Selected Issues Paper, 2014.

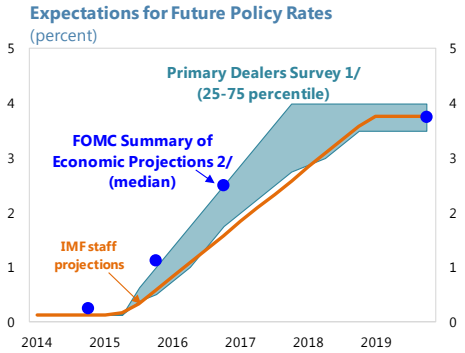
ratings and lessen financing costs, state and local governments should adopt budget institutions that reduce the impact of these factors, including less stringent voting requirements to implement revenue increases and more flexible rainy-day fund rules. Steps could also be taken to require states to measure their unfunded liabilities under more realistic actuarial assumptions and to restore actuarial soundness for public sector employee pension and other post-employment benefit programs.

29. ***IMF quota reform***. The implementation of the 2010 reforms remains a high priority and the U.S. was urged to ratify these reforms at the earliest opportunity.

30. ***Authorities' views.*** Counterparts were supportive of the importance of budget process reform, including through a more sensible approach to the debt ceiling, although they expressed skepticism on whether any of these changes would be achievable in the near term. On IMF quota reform, the authorities reiterated their belief that IMF quotas must truly reflect countries' weight in the global economy and indicated that they were actively working with Congress to secure legislation to implement the 2010 IMF quota reforms.

THE PATH TO LIFT-OFF

31. ***Monetary policy***. The Fed currently has to contend with multiple areas of uncertainty including the degree of slack in the economy, the degree to which this slack will translate into future wage and price inflation, and the transmission to the real economy of an increase in policy rates. Currently, the median forecast of participants in Federal Open Market Committee (FOMC) deliberations indicates that the fed funds rate is expected to lift-off from zero by mid-2015, with a gradual path upward toward a 3.75 percent long-term level. Staff's baseline path is somewhat more gradual than this median. However, even with this path for policy rates, the economy is expected to reach full employment slowly and inflation pressures are forecast to remain muted. This could mean that—presuming systemic financial stability risks are contained—there is some scope for policy rates to stay at zero for longer while still keeping inflation under 2 percent. On the other hand, inflation could start rising faster than expected. This would place increasing tension between the Fed's mandates of maximum employment and price stability. In that case, if expectations remained anchored and financial stability risks were low, there could be room for the Fed to tolerate a temporary and modest rise of inflation above the 2 percent target. Much will depend on the source of the higher inflation. If the increase were transitory or not accompanied by rising wages, there could well be more space to defer rate increases. However, if this inflation were driven by an unexpected upswing in wages, then there would be a need to carefully reconsider whether preferred measures of slack were still appropriate, reassess if the economy was actually much nearer to full employment than it currently appears, and potentially begin raising rates at an earlier stage.



Sources: Federal Reserve Board, Federal Reserve Bank of New York; IMF staff estimates.
1/ April 2014.
2/ June 2014.

32. ***Global spillovers***. The impending increases in U.S. interest rates will have important consequences for the global economy. The 2014 Spillover Report highlights that if these increases come at a time of higher U.S. equity prices and a better U.S. growth outlook, they should generally be a positive factor for other countries. However, there could still be pockets of stress in some of the more vulnerable economies. In contrast, an increase in the long rate that is not accompanied by a U.S. growth improvement (for example, a shift in Fed policy driven by concerns about a pickup in inflation) will have an unambiguously negative outward spillover effect, especially for those emerging markets (EMs) and advanced economies with already-weak fundamentals (as was seen in 2013). The latter scenario would likely mean higher sovereign and corporate spreads, a slowdown or reversal of capital flows, lower asset prices, and a drag on EM growth. Model estimates indicate that the second-round effects—i.e., the multiplier effect of a movement in U.S. rates, spilling out to emerging markets and other advanced economies, and then feeding back into U.S. growth and inflation—are likely to be empirically modest. Of course, there could be larger feedback effects that are not easily captured by such models (for example, in a tail event where U.S. policy action triggers crises in several of the vulnerable countries) but any estimate of their possible size would be necessarily speculative.

33. ***Authorities' views.*** The authorities indicated that monetary policy would adapt to changing economic circumstances, as it always has, and would be focused on achieving the Fed's mandate of maximum employment and price stability. The authorities believed the recent increase in core PCE inflation mainly reflected transitory or seasonal factors and emphasized that inflation is unlikely to return to 2 percent until wage growth moves above labor productivity growth. In the event inflation were to rise close to their longer-term goal but the economy appeared to remain well below full employment, they would have to carefully re-examine their assessment of the degree of slack left in the economy. The authorities also said that, while they would not try intentionally to overshoot that target, if inflation were to rise above 2 percent the pace at which they would try to subsequently disinflate would depend very much on how much progress had been made in achieving their employment mandate. The authorities recognized the international implications of U.S. monetary policy and pointed out that Fed staff had undertaken significant analysis to better understand the size and nature of outward spillovers from policy actions. They also indicated they would not discount the potential risks of second-round effects, but highlighted the uncertainty surrounding the size of both spillovers and subsequent "spillbacks".

34. ***Communication***. The Fed has made important and substantive efforts to increase transparency and has adopted an adaptable approach to communication. So far, the Fed's forward guidance has generally been effective in managing expectations and reducing uncertainty about future policy rates (Box 5). The return to qualitative forward guidance in March provides the Fed with greater flexibility but, at the same time, puts an even higher premium on clear and systematic communication to guide expectations, particularly given the potential adverse effects of miscommunication for international financial markets. Enhancing the Fed's communications toolkit would be a natural evolution that could help temper the likelihood of market volatility or abrupt asset price corrections along the exit path. Specifically, consideration could be given to:

- Scheduling press conferences by the Fed Chair after each FOMC meeting to provide a more frequent, structured environment to explain the committee's evolving thinking.
- Publishing a quarterly monetary policy report, that is endorsed by the FOMC and which conveys more detail about the majority view of the FOMC on the outlook, policies, and the nature of uncertainties around the baseline. Such a report may also convey dissenting views within the FOMC as well as broader information on how the FOMC thinks about policy reactions in plausible, non-baseline scenarios. This would complement the "dots" (i.e., the individual FOMC member's quantitative assessment of future macroeconomic variables and policy interest rates) and provide a more systematic way for the Fed to convey the majority FOMC view.
- Providing greater clarity from the FOMC on how it views current conditions for financial stability, how such considerations figure into its monetary policy decisions—both about the balance sheet and policy interest rates—and how these relate to its current mandate. This would allow the Fed to convey to markets how its monetary policy may be affected by its assessment of a decline in realized and expected volatility, a build-up in leverage, credit risks, unsustainable declines in term premia, or other financial stability concerns.

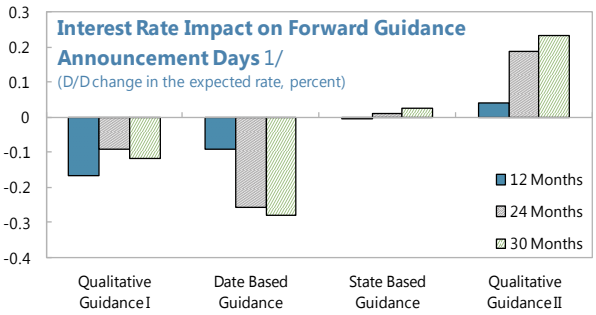
35. ***Authorities' views.*** The authorities indicated that attempts had been made in the past to agree on some form of monetary policy report but, in the end, it had proved very difficult to reach agreement among the FOMC members on the structure of such a report and on a set of forecasts or scenarios that the FOMC could somehow endorse. They would, however, continue to examine the possibilities of such a product and emphasized the inappropriateness of viewing the median of the summary of economic projections as a representation of the aggregate views of the FOMC. At present, quarterly press conferences coincide with the publication of the summary of economic projections and the authorities felt that tangible benefits from more frequent press conferences were unclear at this stage. In terms of taking account of financial stability concerns, the authorities indicated that this was a complex task because there is no solid analytical structure, as yet, to frame such issues in the context of monetary policy. Nevertheless, the FOMC was highly attuned to financial developments, and their assessment of progress toward maximum employment and price stability certainly took due account of readings on financial developments.

36. ***Operational issues***. Barring unforeseen developments, the current pace of tapering should be maintained, implying an end to asset purchases in late 2014. Normalization of the Fed's balance sheet over the medium term should occur by letting asset holdings mature (in line with the June 2011 "exit principles" and subsequent communications). It would be useful, however, for the Fed to provide greater clarity at an early stage, through a formal update of its exit principles. The effectiveness of the fed funds target as the signal for monetary policy may pose a challenge for the operational framework once rates begin to rise. Although the fed funds market is unlikely to operate as it did before the financial crisis, there are arguments for retaining the fed funds target, for now, while maintaining flexibility to respond to market reactions during exit. The use of the overnight reverse repo and interest on excess reserves should allow the Fed to set a solid floor on market rates, and this could be complemented with term instruments to absorb excess liquidity. The recent expansion in Fed counterparties for the overnight reverse repo potentially creates arbitrage

Box 5. The Impact of Fed's Forward Guidance[1]

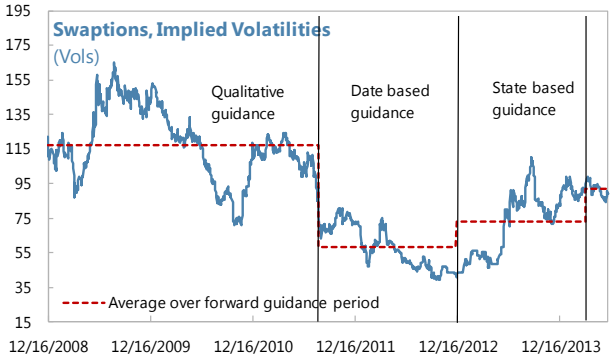
The Fed has used forward guidance since December 2008 to communicate its intention to keep the policy interest rate low, providing added stimulus to the economy and reducing uncertainty about future policy. Several studies find that interest rate expectations shifted at Fed announcements, consistent with a financial market re-evaluation of the Fed's policy reaction function.[2] There is also evidence that forward guidance has reduced the sensitivity of interest rates to macro news.[3] However, less attention has been paid to the impact of forward guidance on uncertainty.

Date-based forward guidance (i.e., where the Fed specified the likely date of future rate increases) was successful in moving the date at which rates were expected to increase further into the future. This helped reduce policy uncertainty. There was, however, little discernible impact on expected interest rates following the shift to *state-based* forward guidance (i.e., where the Fed specified unemployment and inflation thresholds that would need to be reached before rates begin to rise). Most recently, the return to *qualitative* forward guidance coincided with some upward shift in policy rate expectations.



1/ Changes in the implied interest rate of Eurodollar options.
Sources: Bloomberg and staff estimates.

After controlling for economic uncertainty (as measured by the dispersion in analysts' unemployment and inflation forecasts) and other factors (including broader market uncertainty and risk aversion as proxied by the VIX index), forward guidance appears to have been associated with reduced uncertainty about future interest rates (as measured by the implied volatility on swaption contracts). This effect was larger under date-based forward guidance but state-based forward guidance also helped reduce uncertainty (even despite the spike in volatility in mid-2013). Finally, the recent return to qualitative forward guidance has also been associated with lower uncertainty.



Sources: Bloomberg and staff estimates.

[1] See T. Mahedy, J. Turunen, and N. Westelius, "Monetary Policy Communication and Forward Guidance," Selected Issues Paper, 2014.
[2] See K. Femia, S. Friedman, and B. Sack, "The Effects of Policy Guidance on Perceptions of the Fed's Reaction Function," Federal Reserve Bank of New York, 2013; and M.D. Raskin, "The Effects of the Federal Reserve's Date-Based Forward Guidance," Finance and Economics Discussion Series, Federal Reserve Board, 2013.
[3] See E. Swanson and J. Williams, "Measuring the Effect of the Zero Lower Bound on Medium and Longer Term Interest Rates," Federal Reserve Bank of San Francisco, 2013.

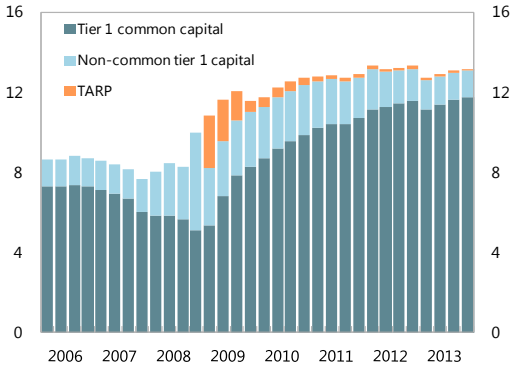
opportunities by encouraging resources to migrate from banks—that are subject to more rigorous regulations and deposit insurance fees—to money market funds that now have access to Fed instruments. However, these risks could be managed through the setting of rates (on the overnight reverse repo) and caps on either an aggregate or per counterparty basis.[7]

37. ***Authorities' views.*** The authorities noted that the FOMC continues to evaluate the appropriate future operational framework for normalizing the stance of monetary policy in the context of the Fed's large balance sheet, including the appropriate role of the fed funds target in communications regarding monetary policy during normalization. They argued that the fed funds rate currently moves in line with other short term rates and that any reduction of its role would need to be carefully communicated well in advance of its implementation. A new money market survey is likely to help the Fed in better understanding different segments of the money market. The Fed could also employ a variety of other short-term rates (such as the interest on excess reserves and the overnight reverse repo rate) in its policy communications during exit.

SECURING A SAFER FINANCIAL SYSTEM

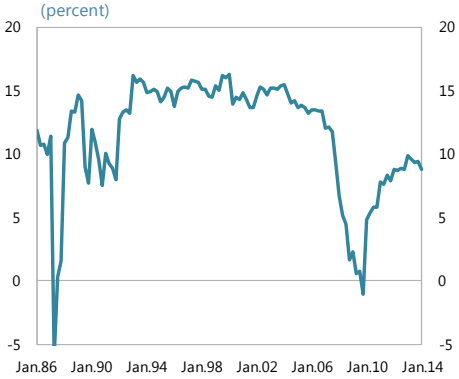
38. ***Progress in the banking sector***. The largest U.S. banks have continued to boost their capital positions: Tier 1 common equity ratio rose to 11.6 percent at end-2013 and the recent Fed stress tests showed the 30 largest U.S. banks are resilient to a severe deterioration of domestic macroeconomic conditions. Further, the majority of the large U.S. banks will add capital over the next two years. Nevertheless, in the latest Comprehensive Capital Analysis and Review (CCAR) stress tests, capital plans were rejected for five banks (including three foreign-owned bank holding companies), of which four were rejected based on qualitative concerns about their internal controls.

Tier 1 Common Capital Ratios at CCAR Institutions
(percent of risk-weighted assets)



Source: SNL Financial.

Return on Equity for U.S. Banks
(percent)



Sources: FRED Database and Federal Reserve.

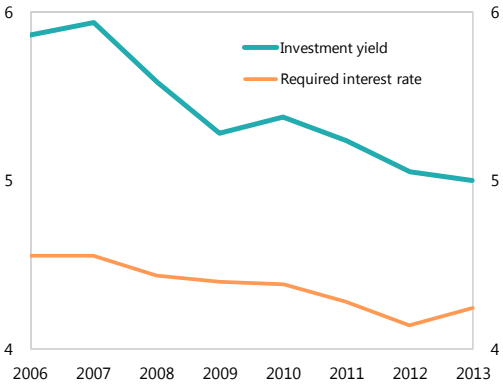
39. ***Potential pressure points***. The results from the stress tests showed that, if hit by a severe global market shock, the larger U.S. banks would face a significant decline in their capital ratios and sizable losses from trading activities. For investment banks, a non-trivial dependence on wholesale funding continues to be a source of vulnerability in periods of severe financial market distress. Recent regulatory changes aimed at addressing these vulnerabilities have lowered systemic risks but, in doing so, may weigh on

[7] See S. Gray and D. King, "The Operational Framework for Monetary Policy," Selected Issues Paper, 2014.

banks' future profitability with the current return on equity well below pre-crisis averages. There is a risk, therefore, that banks will try to restore their profitability through looser lending standards or a lengthening of the duration of assets, boosting returns at the cost of larger asset-liability mismatches. Avoiding such an outcome and preventing such incentives from creating new financial risks will necessitate an intensive approach to bank supervision.

40. ***Insurance***. While difficult to assess, there may well be risks building in the insurance sector, driven by a search for yield in a prolonged low interest rate environment. Indeed, investment returns had been steadily falling, narrowing the gap with the required return on the portfolio. Also, concerns about the ceding of liabilities to affiliated and less-regulated off-balance sheet reinsurance vehicles have emerged. The oversight of the insurance sector is fragmented between state and federal entities, and there is a need for a better consolidated picture of insurance companies' global activities and risks. At the same time, the lack of timely and publicly-available, consolidated data on insurance companies, including their offshore activities, complicates the monitoring of credit and liquidity risks. Such risks should be assessed and publicized through a coordinated, nationally consistent approach to supervision and stress testing. As part of that effort, the Federal Insurance Office should have a significantly larger role in the regulatory framework and be resourced accordingly.

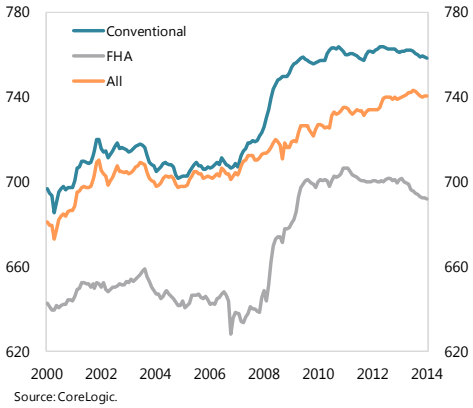
Life Insurance: Net Yield on Invested Assets
(percent)



Source: SNL Financial.

41. ***Mortgage availability***. A tighter regulatory regime for mortgage lending has helped better match the costs of such financing with the underlying risks. However, as a consequence, the recovery in the U.S. housing market has been held back by a continued conservative approach to mortgage lending, particularly to lower-rated borrowers. This has been driven by a range of factors that include persistent anxiety about potential "put-back" risks (i.e., where Fannie Mae or Freddie Mac require mortgage originators to repurchase loans because of discrepancies in underwriting or documentation); litigation and reputational risks to lenders; a tighter regulatory environment and supervisory scrutiny; and uncertainty about the future structure of the mortgage industry. Some steps have been taken, including by establishing a safe harbor for Qualified Mortgages that meet a clear set of minimum standards and by clarifying the conditions for put-backs. There is scope to do more to lessen uncertainties facing lenders, without undermining regulatory and supervisory scrutiny. In particular, efforts could be made to improve information sharing during the mortgage origination process and to clarify further the scope of exemptions in "sunset" clauses (i.e., provisions that release lenders from their liability under certain circumstances).

Average FICO Scores across Loan Types



Source: CoreLogic.

42. ***Housing finance***. The federal government continues to play an unprecedented role in this market, guaranteeing nearly 80 percent of newly originated loans. Going forward, there is a need for a more clearly-defined and transparent government participation in the housing finance market with a clear delineation—and transparent fiscal accounting—of public interventions designed to promote social goals linked to housing. In the end, the system should have:

- A substantial first-loss risk borne by private capital (rather than taxpayers);
- An explicit public backstop that is limited to catastrophic credit losses with risk-based guarantee fees;
- A role for regulatory agencies in setting underwriting standards; and
- A common platform for securitization.

The transition to such a system should be carefully phased so as to avoid undermining the ongoing recovery of the housing market and the tentative restart in the private securitization market. It is also essential that along this transition path appropriate underwriting standards and supervision are kept in place to discourage a future cycle of overinvestment and unsustainable leverage in the housing market.

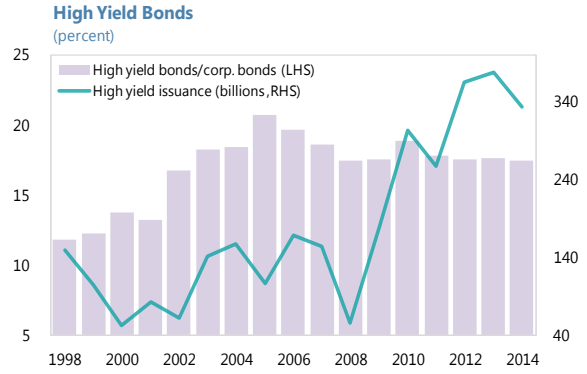
43. ***Corporate credit market risks***. Ample liquidity and low rates have encouraged companies (which already have significant liquid assets) to refinance, extend maturities, and push rollover risks out into the future (Figure 3). At the same time, though, underwriting standards have been weakened in some areas, particularly linked to lending to corporations with weaker credit fundamentals. Indications of such risks include:

- Gross issuance of high yield bonds and loans in 2011–13 is more than double that in 2005–07;
- The share of bonds being issued with non-cash coupons or CCC ratings, and of loans that are covenant-lite or with second-liens, is rising;
- Debt-to-earning levels for corporations taking on highly leveraged loans are increasing.

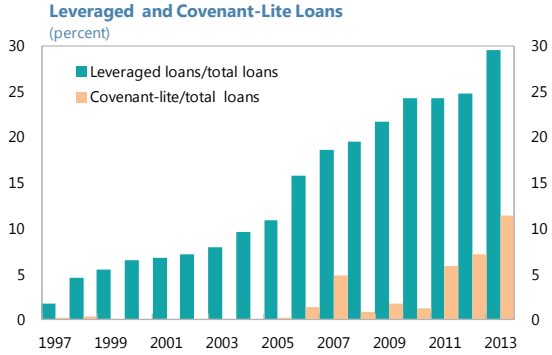
Lower credit costs and longer maturities should lessen the likelihood of corporate stress. However, as the credit cycle matures, increased exposure to more risky borrowers and the aggregate rise in leverage in the nonfinancial corporate sector could contribute to a rising rate of default and lower recoveries on defaulted debt.

Figure 3. Credit Market Risks

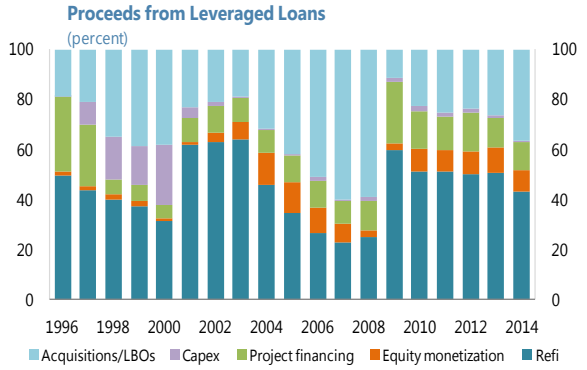
While high-yield bond issuance has picked up over the last two years, their share of total issuance remains stable.



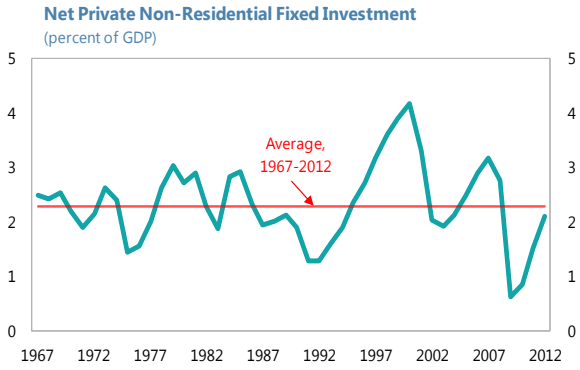
Leveraged loans and covenant-lite loans have also grown although the latter represents a relatively small share of the overall loan market.



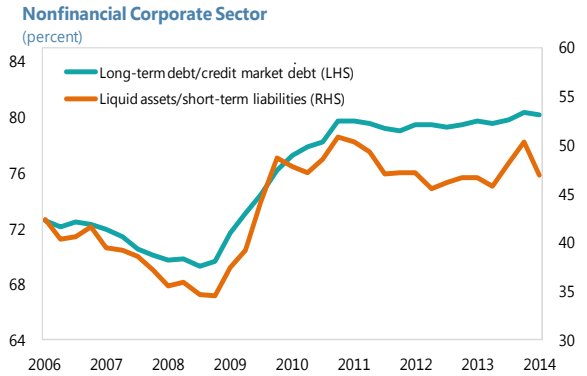
Proceeds from such borrowing have been used mainly to refinance higher cost financing…



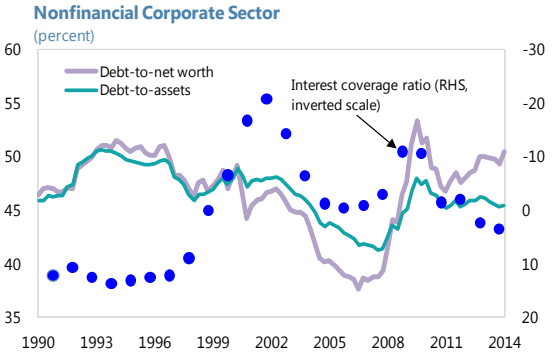
….and total corporate investment remains depressed.



Firms have plenty of cash and have extended their debt maturity.

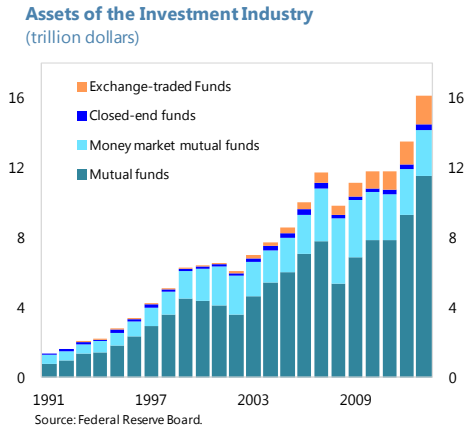


Aggregate leverage has risen but the debt burden is lower than pre-crisis.



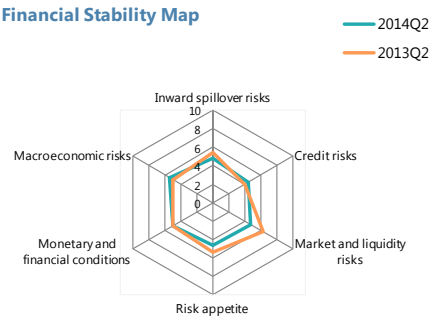
Sources: Bloomberg L.P., Census Bureau, Federal Reserve Board, Haver Analytics, Thomson-Reuters, SNL Financial, World Scope; IMF staff estimates.

44. ***Nonbank intermediary risks***. Intermediation taking place outside of the banking system is growing, creating a range of potential risks, all of which were highlighted in the 2014 Financial Stability Oversight Council (FSOC) Annual Report and include:



- The growing amount of maturity and liquidity transformation that is taking place through mutual funds or exchange-traded funds (ETFs), particularly those investing in credit instruments;
- The volume of nonbank flows being directed to higher credit risk and longer duration assets;
- The uncertain leverage and risks that are embedded in securities lending undertaken by large financial institutions;
- A decline in broker-dealer involvement in market making activity, potentially hampering the functioning of markets and price discovery at times of market stress.

45. ***Implications***. Despite these pockets of vulnerability, overall financial stability risks appear to have marginally declined over the past year. However, when set against a backdrop of an upcoming rise in short-term interest rates or the potential for an abrupt unwinding of currently compressed market pricing of volatility and risk and term premia, there is a possibility that these vulnerabilities could manifest themselves in a disruptive way. For example, a tail risk involving a precipitous attempt by investors to exit certain markets—perhaps exacerbated by outflows from exchange traded funds (ETFs) and mutual funds as well as near-term illiquidity in market functioning—could trigger a sudden, self-reinforcing re-pricing of a range of financial assets. While the banking system would be robust to such a set of events, it could have more dramatic implications for the nonbanks which, in turn, would hurt U.S. growth—through wealth effects from lower asset prices, difficulties in rolling over or accessing new financing, and strains in the corporate sector—as well as have negative knock-on effects internationally.



Source: IMF staff estimates.
Note: Away from center signifies higher risks, easier monetary and financial conditions, or higher risk appetite.

46. ***Regulatory responses***. Good progress has been achieved in implementing the Dodd-Frank Act and moving ahead the financial regulatory agenda including through the finalization of the Volcker rule, the designation of another systemically important financial institution, implementing the over the counter (OTC) derivative reform, and putting in place liquidity and leverage requirements that appear to be compatible with Basel III standards (an ongoing Regulatory

Consistency Assessment Program will help provide a more definitive assessment). In addition, the U.S. recently put in place a rule to require foreign bank organizations (FBOs) over a certain size to incorporate as holding companies, a move that aligns the treatment of foreign and U.S. banks that are operating in the U.S. and eliminates an existing regulatory distortion (Box 6). To tackle the emerging pockets of risky behavior, there is scope for supervisors to tighten underwriting standards for more risky commercial lending, to attach higher risk weights or tighter limits on large exposures for particular assets (such as leveraged loans or high yield bonds), to strengthen prudential norms for holdings of securitized loans such as collateralized loan obligations (CLOs) by regulated entities, and to put additional capital charges on insurance companies. In addition, specific steps could be taken linked to:

- *Money market mutual funds.* Floating net asset value rules for prime money market mutual funds would be particularly useful in mitigating the risk of runs and should be introduced for those funds which invest in government securities. Other alternatives could include imposing stricter liquidity requirements or investment restrictions. These options are being considered by the SEC and will possibly result in a new rule for such funds.

- *Tri-party repo markets***.** Stricter haircuts and margins would limit the risk of a pre-default sale of repo collateral (although the U.S. already imposes higher haircuts than the minimum defined by the Financial Stability Board). In addition, it will be important to press ahead in developing mechanisms to help counter the risk of 'fire sale' dynamics in the tri-party repo market.

- *Too important to fail.* The U.S. should continue to build on the Dodd-Frank Act provisions that allow for an orderly resolution of systemically important financial institutions. The remaining rules needed to fully implement the orderly liquidation authority for systemic nonbanks should be finalized. The resolution and recovery plans (submitted annually by the large banks) should be thoroughly assessed against severe contingencies that involve a large cross-border component. Progress is also needed in developing cooperative arrangements with regulators in other jurisdictions to manage the resolution of institutions with a significant cross-border presence, building on joint crisis planning exercises and in line with the principles of the Key Attributes of Effective Resolution Regimes. There is also a case for other large, interconnected, and complex financial institutions to be formally designated as systemically important in the insurance and asset management sectors.

- *Strengthening the macro-prudential framework.* Given the complexity of the U.S. regulatory structure, there are potentially large gains in establishing a smoother sharing of data and analysis among regulatory agencies and the Office of Financial Research. The macro-prudential framework could also be made more responsive to the build-up of systemic risk by clarifying how financial stability monitoring by the Office of Financial Research translates into FSOC recommendations and by instituting a timely and structured process for the various regulatory agencies to respond to FSOC recommendations.

Box 6. The Foreign Bank Organizations (FBO) Rule

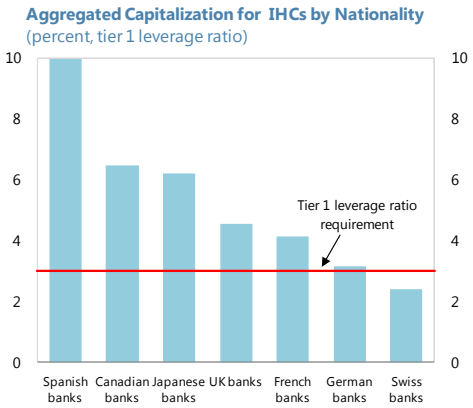
By July 1, 2016 FBOs with more than $50 billion assets in U.S. bank and nonbank subsidiaries will be required to reorganize their U.S. operations under an intermediate holding company (IHC). The resulting IHC will become subject to a 3 percent Tier 1 leverage ratio and similar prudential standards on liquidity as U.S. Bank Holding Companies (BHCs). FBOs with assets between $10–50 billion will be subject to enhanced prudential standards.

Currently, FBOs play a significant role in the U.S. financial system accounting for 15 percent of the total U.S. banking assets, approximately 40 percent of the reserves held at the Fed, around one-half of the U.S. corporate bond issuance, and one-third of equity trading. Of the 22 primary dealers for the Federal Reserve, 15 are FBOs.

Requiring FBOs to hold more capital and liquidity in the IHCs improves the resilience of the U.S. financial system and aligns FBO governance to U.S. BHC standards. The FBO rule appears to be consistent with Basel III standards and moves the U.S. closer to the capital and liquidity standards applied to investment banking subsidiaries of foreign banks in other jurisdictions (notably the Euro Area, where investment banking subsidiaries are subject to Basel capital requirements, and the U.K., where additional local liquidity requirements are applied to banking subsidiaries of non-U.K. banks).

By requiring IHCs to be separately capitalized within the U.S., the rule may reduce bank profitability at the parent level and induce organizational changes. The impact on U.S. *bank credit* will likely be minor (loans and portfolio holdings of FBOs account for less than 10 percent of lending). The effect on U.S. *capital markets* could be larger. FBO broker-dealer subsidiaries current have an estimated aggregate tier 1 leverage ratio of 1.6 percent and the higher leverage ratio requirement may cause some of these types of FBOs to scale down their U.S. operations rather than raise equity, perhaps moving some balance-sheet-intensive operations to other jurisdictions. This could mean lower liquidity in the U.S. equity and bond markets and higher transaction costs. Moreover, repo transactions will start to count towards total leverage on a gross basis (rather than net as the current rules prescribe) which could make some repo lending by FBOs uneconomic (particularly low margin, balance-sheet-intensive repos of Treasuries and Agency MBS).

Using the limited publicly available data on non-commercial bank subsidiaries as of year-end 2013, it appears that of the 14 FBOs that are likely to be required to form IHCs, 4 currently fail to meet the 3 percent Tier 1 leverage ratio. Assuming zero retained earnings or asset sales between now and July 1, 2016, the total capital shortfall to meet the Tier 1 leverage ratio would be about $17.4 billion (although this estimate is tentative given the lack of public data on the nature of FBO operations in the U.S.).



47. ***Global spillovers***. Recent regulatory changes in the U.S.—including the Volcker rule and rules on FBOs—will lower financial stability risks and reduce the associated risks of negative spillovers from the U.S. In doing so, though, these changes may increase the capital costs of the market making and trading activities of foreign banks operating in the U.S. There is little evidence, at this stage, to conclude that the range of regulatory changes undertaken by the U.S. are adding to financial fragmentation or are balkanizing the global financial system. Such potential spillovers will, however, be a topic that will be examined further in the context of the upcoming Financial Stability Assessment Program (FSAP).

48. ***Financial integrity***. Initiatives are underway to strengthen financial institutions' requirements to identify and verify beneficial owners and to access information about beneficial ownership and control of U.S. corporations. These initiatives aim to prevent the abuse of legal persons and arrangements for financial crimes and to address deficiencies identified in the last Financial Action Task Force (FATF) mutual evaluation report of June 2006. However, these initiatives may only be implemented after 2015 and would imply an only modest improvement in the transparency of U.S. corporations and trusts. It will remain difficult, in particular, to pursue either the laundering of proceeds of foreign tax crimes taking place inside the U.S. or the use of U.S. corporations to commit tax crimes abroad.

49. ***Authorities' views***. Substantial progress has been made in the regulatory framework, in increasing capital and liquidity buffers, and reducing leverage in the financial system. The authorities also felt that the FSOC process was working well. Low interest rates could create potential financial stability risks but, at this stage, these appear not to be systemic and are limited to pockets of vulnerabilities. Nevertheless, low levels of market pricing of volatility were of concern. Officials underscored that interest and funding risks are being closely watched as are other areas including embedded risks in securities lending and the repo market. The authorities expected the Securities Exchange Commission (SEC) to soon issue rules to tackle risks in the money market mutual funds. The authorities indicated that work is under way to better understand risks in the asset management industry and to modernize the regulatory framework for the insurance sector. Officials noted that the U.S. is committed to adhering to its commitments under the G20 financial reform agenda and is encouraging other jurisdictions to do so also. This has included taking leadership in international derivatives regulation and building on international agreements on leverage ratios for banks. The authorities indicated that they are actively pursuing ways to make access to mortgages for creditworthy borrowers easier but, without passage of legislation, it would be difficult to fully resolve uncertainties on the future of the housing finance system. Finally, the authorities looked forward to the upcoming FSAP as a means to engage in a full assessment of the financial system and the U.S. approach to regulatory reform as well as to discuss the many changes made to the U.S. financial system since the 2010 FSAP.

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50. ***Growth***. Recent data suggest a meaningful rebound in activity is now underway. This renewed dynamism will provide only a partial offset to the weak first quarter and GDP is projected to expand at 1.7 percent for 2014 as a whole. Barring unforeseen shocks, growth is expected to well exceed potential for the foreseeable future and, on an annual basis, should rise to 3 percent in 2015.

51. ***Jobs***. Employment growth has been healthy but labor markets are weaker than is implied by the headline unemployment number. Long-term unemployment and the rate of involuntary part-time work are high, labor force participation is well below what can be explained by demographic factors, and wages are stagnant. With better growth prospects, the U.S. should see steady progress in job creation but headline unemployment is expected to decline only slowly—in part because improving prospects will draw discouraged workers back into the labor force—and long-term unemployment will take time to fall back to historic levels.

52. ***Poverty***. Reducing poverty will require, first and foremost, a much more robust return to growth and job creation. However, other policies have a role to play. The recent expansion of Medicaid and the increase in health insurance coverage under the ACA have been concrete steps whose effect on poverty and health outcomes should become more evident over time. An expansion of the EITC (including making permanent the various extensions that are due to expire in 2017) would also raise living standards for the very poor. Finally, given its current low level, the minimum wage should be increased. This would help raise incomes for millions of working poor and would have strong complementarities with the suggested improvements in the EITC, working in tandem to ensure a meaningful increase in after-tax earnings for the nation's poorest households.

53. ***Productivity and labor supply***. To offset the expected slowdown in potential growth immediate steps should be taken to raise productivity, encourage innovation, augment human and physical capital, and increase labor force participation. Such measures should involve investments in infrastructure and education, improving the tax system, active labor market policies, a broad, skills-based approach to immigration reform, and efforts to fully capitalize on the gains from rising U.S. energy independence. No single measure will be sufficient and a manifold solution will certainly be required. There is no shortage of good ideas currently under public debate and so the challenge ahead will be to forge political agreement on specific legislation.

54. ***External assessment***. Assessed imbalances and fiscal policy gaps in the U.S. have improved considerably over the past few years, creating significant positive spillovers to the global economy. The move toward increased energy independence will have a further positive effect on the U.S. external accounts. The U.S. external position appears broadly consistent with medium-term fundamentals and desirable policies.

55. ***Fiscal policy***. The recent experience of debt ceiling brinkmanship and the government shut down once again illustrates the difficulty of finding political common ground on fiscal policy and the negative consequences—for both the U.S. and global economy—from political discord linked to

fiscal policies. The Bipartisan Budget Act, enacted in December 2013, and the subsequent raising of the debt ceiling were important steps to address fiscal risks and improve both the pace and distribution of near-term deficit reduction. Going forward, even in the absence of a fully articulated medium-term consolidation plan, there is room to build on this progress through the identification of targeted areas to expand the near-term budget envelope, funded by offsetting savings in future years. Specific near-term measures that should be supported—many of which were in the Administration's budget proposal—include front-loaded infrastructure spending, a better tax system, active labor market policies, and improving educational spending. Beyond this, further steps will be needed to put the general government debt on a sustainable longer-term path. This will require reaching political agreement on a credible and detailed medium-term fiscal consolidation path that includes measures to lower health care spending, restore solvency to the social security system, reform the tax system, and raise revenues. Finally, while not a panacea, changes to budget procedures—including switching to a two-year budget cycle—could have a lasting effect in lessening fiscal policy uncertainty.

56. ***Monetary policy***. The economy is expected to reach full employment only by end-2017 and inflationary pressures are expected to remain muted. If true, policy rates could afford to stay at zero for longer than the mid-2015 date currently foreseen by markets. Policy would, however, have to remain cognizant of burgeoning financial stability risks, particularly those that are inherently difficult to contain through available regulatory and supervisory tools. If inflation were to rise more rapidly than expected and the economy was still well below full employment, tolerating a modest, temporary rise of inflation above the longer-term goal could be consistent with the Fed's balanced approach as long as inflation expectations remained anchored and financial stability risks were low. There could also be scope to enhance the Fed's communications toolkit. Given the global spillovers from U.S. monetary policy, a well-communicated normalization of U.S. monetary conditions, in the context of robust U.S. growth, would be positive for the global economy.

57. ***Financial stability risks***. Over the past few years, much has been done to reduce financial system risks: the banks are stronger, corporate balance sheets are healthy, leverage has been contained, and the regulatory framework has been greatly improved. Nevertheless, the prolonged period of very low interest rates continues to raise financial stability concerns, particularly related to activities in the so-called "shadow" banks and in other nonbank intermediaries. Steps that could be taken to tackle these risks and lessen the likelihood of negative spillovers to the global economy include tighter underwriting standards, higher risk weights, tighter limits on large exposures to riskier assets, and stronger prudential norms for the holding of securitized loans by regulated entities. Addressing the remaining vulnerabilities of the money market funds and of the tri-party repo market also remains a priority. In addition, the U.S. should continue to implement measures that allow for the orderly resolution of too-important-to-fail financial institutions, including through deepening cooperation with other jurisdictions to manage the resolution of institutions with a significant cross-border presence. The insurance sector warrants particular attention and would benefit from stronger and more uniform capital adequacy and solvency oversight standards, refinement and harmonization of stress testing exercises, greater efforts to close data gaps, further designation of systemically important firms, and a larger federal role in insurance regulation and oversight. The U.S. should

continue to play a lead role in advancing the global regulatory reform agenda, ensuring consistency with international rules and best practices, and limiting the opportunities for regulatory arbitrage while remaining attuned to the spillover implications of regulatory changes on the international financial system.

58. ***Housing finance***. Limited availability of mortgage financing is a pressing constraint on economic growth. Policy efforts have been made to encourage greater availability of mortgage credit. However, the recovery of mortgage lending to lower-rated borrowers is likely to be a slow process. Legislative changes that clarify the future role of government in housing finance would help. While reaching agreement on legislation will be hard, in anticipation of broader legislative actions, many of these objectives can still be realized in the medium term through administrative action including expanding the use of market transactions to transfer first-loss risks from the agencies to private investors; moving gradually to higher and more risk-based guarantee fees; steadily building up capital within the agencies while reducing their role in housing finance; and establishing a single securitization platform.

59. It is recommended that the next Article IV consultation take place on the standard 12-month cycle.

Table 1. Selected Economic Indicators 1/

(percentage change from previous period, unless otherwise indicated)

			Projections					
	2012	2013	2014	2015	2016	2017	2018	2019
National production and income								
Real GDP	2.8	1.9	1.7	3.0	3.0	2.9	2.8	2.6
Net exports 2/	0.1	0.1	-0.2	-0.2	-0.3	-0.2	-0.1	-0.1
Total domestic demand	2.6	1.7	1.8	3.2	3.2	3.1	2.8	2.7
Private final consumption	2.2	2.0	2.2	2.9	2.8	2.7	2.7	2.7
Public consumption expenditure	-0.2	-2.0	-0.6	0.2	0.2	0.5	0.7	1.0
Gross fixed domestic investment	5.5	2.9	2.4	6.3	7.1	6.1	4.4	3.3
Private fixed investment	8.3	4.5	3.5	7.1	8.0	6.7	4.7	3.4
Equipment and software	7.6	3.1	3.9	6.7	7.9	7.3	6.7	4.1
Intellectual property products	3.4	3.1	4.0	3.3	4.0	3.8	3.7	3.0
Nonresidential structures	12.7	1.3	2.2	5.6	5.0	2.7	2.6	2.4
Residential structures	12.9	12.2	3.2	13.4	14.6	11.2	4.2	3.4
Public fixed investment	-4.0	-3.2	-2.1	2.5	2.7	3.2	3.0	2.9
Change in private inventories 2/	0.2	0.2	-0.1	0.1	0.0	0.0	0.0	0.0
Nominal GDP	4.6	3.4	3.3	4.9	4.9	5.0	4.8	4.7
Personal saving rate (percent of disposable income)	5.6	4.5	4.3	4.0	4.2	4.3	4.1	4.0
Private investment rate (percent of GDP)	15.2	15.9	16.1	16.8	17.6	18.1	18.5	18.6
Employment and inflation								
Unemployment rate	8.1	7.4	6.4	6.0	5.8	5.6	5.5	5.5
CPI inflation	2.1	1.5	1.8	1.8	1.9	2.0	2.0	2.0
Core CPI Inflation	2.1	1.8	1.8	1.9	2.0	2.1	2.0	2.0
PCE Inflation	1.8	1.1	1.5	1.6	1.6	1.8	1.9	2.0
Core PCE Inflation	1.8	1.2	1.4	1.7	1.7	1.8	1.9	2.0
GDP deflator	1.7	1.5	1.6	1.8	1.9	2.0	2.0	2.0
Output gap (percent of potential GDP)	-4.0	-3.8	-4.0	-2.9	-2.0	-1.1	-0.6	0.0
Interest rates (percent)								
Three-month Treasury bill rate	0.1	0.1	0.1	0.3	1.2	2.2	3.3	3.8
Ten-year government bond rate	1.8	2.4	2.7	3.3	4.0	4.5	5.0	5.1
Balance of payments								
Current account balance (percent of GDP)	-2.8	-2.4	-2.4	-2.6	-2.8	-2.8	-2.8	-2.7
Export volume 3/	3.8	2.3	1.7	4.7	5.3	5.5	5.8	5.4
Import volume 3/	2.1	1.2	2.3	5.4	6.1	5.9	5.5	5.0
Net international investment position (percent of GDP)	-23.8	-27.2	-28.7	-29.5	-30.4	-31.3	-32.1	-32.8
Saving and investment (percent of GDP)								
Gross national saving	16.2	17.1	17.1	17.6	18.2	18.8	19.2	19.4
General government	-5.3	-2.8	-2.7	-2.0	-1.7	-1.4	-1.4	-1.7
Private	21.6	19.9	19.8	19.6	19.9	20.2	20.6	21.0
Personal	4.2	3.3	3.2	3.0	3.1	3.2	3.0	2.9
Business	17.3	16.6	16.7	16.7	16.8	17.1	17.6	18.2
Gross domestic investment	19.0	19.5	19.6	20.2	21.0	21.6	21.9	22.1
Private	15.2	15.9	16.1	16.8	17.6	18.1	18.5	18.6
Public	3.8	3.6	3.5	3.5	3.4	3.4	3.5	3.5

Sources: IMF staff estimates.

1/ Components may not sum to totals due to rounding.

2/ Contribution to real GDP growth, percentage points.

3/ NIPA basis, goods.

Table 2. Balance of Payments
(annual percent change unless otherwise indicated)

	2012	2013	Projections 2014	2015	2016	2017	2018	2019
			(annual percent change)					
Real exports growth:								
Goods and services	3.5	2.7	1.7	4.4	5.0	5.2	5.3	5.0
Goods	3.8	2.3	1.7	4.7	5.3	5.5	5.8	5.4
Services	3.0	3.5	1.6	3.8	4.2	4.4	4.2	4.0
Real imports growth								
Goods and services	2.2	1.4	2.3	5.1	5.7	5.5	5.2	4.7
Goods	2.1	1.2	2.3	5.4	6.1	5.9	5.5	5.0
Nonpetroleum goods	4.8	3.1	3.2	7.2	7.6	6.9	6.4	5.7
Petroleum goods	-8.2	-7.3	-2.0	-4.3	-3.2	-1.7	-1.3	-0.5
Services	2.7	2.5	2.2	3.8	4.0	3.9	3.6	3.3
Net exports contribution to real GDP growth	0.1	0.1	-0.2	-0.2	-0.3	-0.2	-0.1	-0.1
			(percent of GDP)					
Nominal exports								
Goods and services	13.5	13.5	13.4	13.4	13.4	13.6	13.7	13.9
Nominal imports								
Goods and services	16.9	16.4	16.3	16.3	16.4	16.6	16.7	16.8
Current account								
Current account balance	-2.8	-2.4	-2.4	-2.6	-2.8	-2.8	-2.8	-2.7
Balance on trade in goods and services	-3.3	-2.8	-2.8	-2.8	-2.9	-2.9	-2.9	-2.8
Balance on income	1.2	1.2	1.1	1.0	0.9	0.8	0.8	0.9
Capital and Financial Account								
Balance on financial account	2.6	2.2	2.2	2.6	2.8	2.8	2.8	2.7
Foreign direct investment abroad	-2.0	-2.1	-1.8	-1.9	-1.9	-1.9	-1.9	-1.9
Foreign direct investment in the U.S.	1.1	1.4	-0.1	0.5	0.5	0.5	0.5	0.5
Foreign acquisition of U.S. securities	2.5	1.7	3.3	2.8	2.9	2.9	2.8	2.9
Foreign acquisition of other U.S. liabilities	-2.6	0.9	1.0	1.1	1.3	1.3	1.2	1.1
Net foreign direct investment	-1.0	-0.7	-1.9	-1.4	-1.4	-1.4	-1.4	-1.4
Net portfolio investment	3.9	0.8	2.2	1.8	1.9	1.9	1.9	1.9
Portfolio investment assets	-1.0	-2.6	-2.5	-2.6	-2.5	-2.5	-2.5	-2.5
Memo:								
Current account balance in billions of dollars	-461	-400	-423	-477	-531	-561	-582	-588
Non-oil trade balance in percent of GDP	-1.5	-1.5	-1.6	-1.8	-2.0	-2.1	-2.1	-2.1
Broad real dollar, index	84.4	84.6	85.8	85.8	85.8	85.8	85.8	85.8
Foreign real GDP growth, pct chg, a.r.	2.7	2.5	2.8	3.2	3.3	3.3	3.2	3.2
U.S. real GDP growth, pct chg, s.a.a.r.	2.8	1.9	1.7	3.0	3.0	2.9	2.8	2.6
U.S. real total domestic demand growth, saar	2.6	1.7	1.8	3.2	3.2	3.1	2.8	2.7

Sources: IMF staff estimates.

Table 3. Federal and General Government Finances

(percent of GDP)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
		Projections										
Federal government (staff)					(fiscal years; budget basis)							
Revenue	16.7	17.4	17.9	18.0	17.8	17.7	17.6	17.7	17.7	17.8	17.9	18.0
Expenditure	21.2	20.9	21.0	21.2	21.0	20.8	21.1	21.3	21.6	22.2	22.2	22.2
Non-interest	19.8	19.6	19.5	19.5	19.1	18.6	18.6	18.6	18.7	19.0	18.9	18.7
Interest exp	1.3	1.3	1.5	1.7	1.9	2.2	2.5	2.7	2.9	3.2	3.4	3.5
Budget balance 1/	-4.5	-3.5	-3.1	-3.2	-3.1	-3.1	-3.5	-3.7	-3.9	-4.4	-4.4	-4.2
Primary balance 2/	-3.1	-2.2	-1.6	-1.5	-1.2	-0.9	-1.0	-1.0	-1.0	-1.2	-1.0	-0.7
Primary structural balance 3/ 4/	-2.1	-1.2	-0.9	-1.0	-0.9	-0.8	-0.9	-1.0	-1.0	-1.2	-1.0	-0.7
Change	2.1	0.9	0.4	-0.1	0.1	0.2	-0.2	0.0	0.0	-0.2	0.2	0.3
Federal debt held by the public	72.0	74.2	74.5	74.6	74.5	74.4	74.7	75.4	76.6	78.1	79.7	81.0
General government (staff)					(calendar years; GFSM2001 basis)							
Revenue	30.8	31.5	32.1	32.1	32.0	31.8	31.7	31.7	31.8	31.9	32.0	
Expenditure	37.6	38.2	37.8	37.6	37.1	37.0	37.1	37.3	37.6	38.0	38.0	
Net interest	3.2	3.2	3.2	3.3	3.4	3.6	3.8	3.9	4.1	4.3	4.5	
Net lending 1/	-6.8	-6.6	-5.7	-5.4	-5.1	-5.1	-5.4	-5.5	-5.8	-6.1	-6.0	
Primary balance 2/	-3.6	-3.5	-2.5	-2.1	-1.7	-1.5	-1.6	-1.6	-1.7	-1.7	-1.5	
Primary structural balance 3/ 4/	-2.6	-1.9	-1.3	-1.4	-1.2	-1.3	-1.6	-1.6	-1.7	-1.7	-1.5	
Change	1.5	0.7	0.5	0.0	0.1	-0.1	-0.3	-0.1	0.0	0.0	0.2	
Gross debt	104.0	105.8	106.0	106.0	106.0	106.0	106.2	106.8	107.9	109.2	110.7	
Gross debt incl. unfunded pension liabilities	122.5	124.2	124.3	124.2	124.1	124.0	124.1	124.6	125.6	126.8	128.2	
Memorandum items:												
Federal government deficit (authorities)												
President's FY2015 Budget	-4.1	-3.7	-3.1	-2.8	-2.3	-1.9	-2.3	-2.2	-2.1	-2.1	-1.8	-1.6
CBO's Assessment of the Budget	-4.1	-2.9	-2.8	-2.9	-2.7	-2.6	-3.0	-3.1	-3.1	-3.3	-3.0	-2.8
CBO Baseline Scenario (current law)	-4.1	-2.9	-2.6	-2.8	-2.9	-3.0	-3.3	-3.5	-3.7	-4.0	-3.9	-3.7
Federal government debt (authorities)												
President's FY2015 Budget	72.1	74.4	74.6	74.3	73.5	72.4	72.0	71.6	71.1	70.6	69.9	69.0
CBO's Assessment of the Budget	72.1	73.8	73.6	73.1	72.6	72.3	72.5	72.9	73.3	73.9	74.2	74.3
CBO Baseline Scenario (current law)	72.0	74.1	73.9	73.6	73.3	73.1	73.4	73.8	74.6	75.7	76.6	77.3

Sources: Congressional Budget Office; Office of Management and Budget; and IMF staff projections.

Note: Staff baseline counts in the savings from the reduction in overseas contingency operations and assumes that current tax policies are mostly extended (with the notable exception of bonus depreciation), Medicare payment rates are held constant, and automatic spending cuts are replaced with back-loaded measures (at the same proportion in FY2016 and latter years as the replacement achieved for FY2014 and FY2015 by the Bipartisan Budget Act of 2013). By contrast, the President's Budget assumes only a few of the current tax policies will be extended (Earned Income Tax Credit and Child Tax Credit provisions extended under the American Taxpayer Relief Act of 2012 and due to expire in 2017) and the policy measures proposed by the Administration (including capping of deductions for higher-income taxpayers and immigration reform) will be implemented. CBO baseline does not count in the savings from the reduction in overseas contingency operations and assumes that expiring tax provisions are not extended, Medicare payment rates are reduced, and automatic spending cuts take place as currently written in law. The President's Budget uses the OMB macroeconomic assumptions. CBO uses CBO macroeconomic assumptions both for its own baseline and its assessment of the President's Budget.

1/ Includes staff's adjustments for one-off items, incl. costs of financial sector support.

2/ Excludes net interest.

3/ Excludes net interest, effects of economic cycle, and costs of financial sector support.

4/ In percent of potential GDP.

Table 4a. General Government Statement of Operations
(percent of GDP)

	2007	2008	2009	2010	2011	2012	2013
Revenue	31.7	30.2	28.4	28.8	29.0	29.0	30.8
Taxes	20.6	19.1	17.0	17.6	18.5	18.8	19.3
Social contributions	6.7	6.7	6.7	6.6	5.9	5.9	6.6
Grants	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other revenue	4.3	4.3	4.6	4.6	4.6	4.3	4.9
Expenditure 1/	35.7	38.0	43.1	41.3	40.1	38.7	37.6
Expense	34.0	36.3	41.3	39.6	38.7	37.5	36.6
Compensation of employees	9.5	9.8	10.3	10.3	10.0	9.6	9.3
Use of goods and services	5.8	6.2	6.5	6.5	6.3	6.1	5.7
Consumption of fixed capital	2.4	2.5	2.7	2.7	2.7	2.7	2.6
Interest	3.7	3.5	3.8	3.9	4.0	3.9	3.8
Subsidies	0.4	0.4	0.4	0.4	0.4	0.4	0.3
Grants	0.3	0.3	0.4	0.3	0.4	0.3	0.3
Social benefits	11.8	12.7	14.7	15.0	14.7	14.4	14.4
Of which: Social security benefits	7.5	8.0	9.3	9.3	9.1	9.0	9.0
Expense not elsewhere classified	0.2	0.9	2.5	0.5	0.3	0.2	0.1
Net acquisition of nonfinancial assets	1.7	1.7	1.8	1.7	1.4	1.2	1.0
Net operating balance 2/	-2.3	-6.1	-12.9	-10.8	-9.6	-8.5	-5.8
Net lending/borrowing 1/	-4.0	-7.8	-14.7	-12.5	-11.0	-9.7	-6.8
Of which: Imputed interest on unfunded pension liabilities	0.7	0.7	1.2	1.1	1.1	1.1	
Net acquisition of financial assets	1.1	3.1	1.0	2.0	-1.3	0.3	1.3
Net incurrence of liabilities	4.3	11.2	13.9	13.8	9.8	8.9	7.2

Source: Government Finance Statistics; IMF staff calculations.
1/ Includes staff's adjustments for one-off items, including the cost of financial sector support.
2/ Revenue minus expense.

Table 4b. General Government Financial Assets and Liabilities

(percent of GDP)

	2007	2008	2009	2010	2011	2012	2013
Net worth	15.1	3.5	-9.4	-19.4	-26.6	-29.8	-28.0
Nonfinancial assets	71.4	74.9	76.9	77.0	78.1	77.0	76.8
Net financial worth	-56.3	-71.4	-86.3	-96.4	-104.6	-106.8	-104.9
Financial assets	19.6	20.6	18.8	19.0	16.1	15.7	16.9
Currency and deposits	2.6	4.9	4.0	4.9	3.3	3.4	3.8
Securities other than shares	5.6	5.6	6.5	6.3	5.1	4.4	4.3
Loans	4.4	4.5	5.7	6.5	7.1	7.5	8.0
Shares and other equity	2.5	1.5	-2.4	-3.2	-3.9	-3.9	-3.6
Financial derivatives	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Insurance technical reserves	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other accounts receivable	4.4	4.1	4.5	4.3	4.2	4.1	4.1
Financial liabilities	75.9	92.0	105.1	115.4	120.7	122.5	121.7
Special Drawing Rights (SDRs)	0.1	0.1	0.4	0.4	0.4	0.4	0.4
Currency and deposits	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Securities other than shares	57.0	65.3	78.1	86.6	90.7	94.1	96.1
Loans	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Shares and other equity	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Financial derivatives	13.1	20.5	20.5	22.2	23.4	21.8	18.9
Insurance technical reserves	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other accounts receivable	5.5	5.8	5.8	5.9	6.0	6.0	6.2

Source: Government Finance Statistics.

Annex I. Risk Assessment Matrix: Potential Deviations from Baseline[1]

Nature/Source of Risk	Overall Level of Concern	
	Likelihood of Realization	**Expected Impact if Risk Materializes**
1. Faster increase in interest rates	**Medium** The Fed may raise policy rates at a faster-than-expected pace because inflation picks up earlier and/or because of heightened concerns on the financial stability effects of low interest rates. Recent compression in volatility and risk premia could unwind.	**Medium** A 50 bps permanent increase in 10-year interest rates could subtract about ½ percent of GDP after two years. Spikes in term premia could imply greater output losses.
2. Distortions from a protracted period of low interest rates	**Low** Continued search for yield could lead to excess leverage, weaker underwriting standards and potential mispricing of risk.	**High** If unaddressed, distortions could lead to financial instability with significant economic costs and large spillovers to the rest of the world.
3. Recovery in private investment	**Medium** Greater confidence in future economic prospects could cause private investment to recover at a faster pace than in the baseline.	**Medium** A 5 percentage point increase in private investment growth would add about ¾ percentage points to GDP growth.
4. Labor market recovery	**Medium** The labor markets could surprise on the upside, especially if labor force participation were to rebound more than expected.	**Medium** Employment growth of around 1½ percent would be consistent with GDP growth that is ¼ percentage point higher than the baseline.
5. Protracted period of slower growth (and lower inflation) in advanced and emerging economies	**High** Lower-than-anticipated potential growth and persistently low inflation leads to secular stagnation in advanced economies. Maturing of the cycle, misallocation of investment, and incomplete structural reforms leads to prolonged slower growth in emerging markets.	**Medium** Slower growth in advanced and emerging economies could subtract about ½ percent of GDP after two years.

[1] The Risk Assessment Matrix (RAM) shows events that could materially alter the baseline path (the scenario most likely to materialize in the view of IMF staff). The relative likelihood of risks listed is the staff's subjective assessment of the risks surrounding the baseline ("low" is meant to indicate a probability below 10 percent, "medium" a probability between 10 and 30 percent, and "high" a probability between 30 and 50 percent). The RAM reflects staff views on the source of risks and overall level of concern as of the time of discussions with the authorities. Non-mutually exclusive risks may interact and materialize jointly.

Nature/Source of Risk	Overall Level of Concern	
	Likelihood of Realization	**Expected Impact if Risk Materializes**
6. Increasing geopolitical tensions/risks surrounding Russia/ Ukraine or the Middle East	**Medium** A sharp increase in geopolitical tensions surrounding Russia/Ukraine that creates significant disruptions in global financial, trade and commodity markets. Heightened geopolitical risks in the Middle East, leading to a sharp rise in oil prices.	**Low** A rise in oil prices would have a negative impact on the U.S. with a possible flight to safety resulting in dollar appreciation. A sustained 15 percent increase in oil prices above baseline would subtract about 0.2 percent of GDP after two years.
7. Failure to pass budget and raise debt limit in 2015	**Low** The federal borrowing limit is not raised or the budget is not passed in 2015 owing to political gridlock.	**High** The economic cost of failure to raise debt limit would be potentially catastrophic depending on how long the impasse lasts with severe global spillovers.
8. U.S. bond market stress	**Low** Policymakers do not take sufficient measures to put debt on a sustainable trajectory. The lack of fiscal sustainability triggers a sharp rise in the sovereign risk premium.	**High** A 200bps increase in the benchmark Treasury yields would subtract 2.5 and 1.5 percentage points from U.S. growth in 2015 and 2016, respectively.

Annex II. Public Debt Sustainability Analysis (DSA)

The budget deficit in the United States has been reduced significantly since 2011. Yet, the public debt ratio remains on an unsustainable trajectory. Under the baseline scenario, general government gross debt is projected to briefly stabilize in 2015–18 at about 106 percent of GDP but starts rising again as spending pressures on entitlement programs rise and interest rates normalize. The public debt dynamics are highly sensitive to growth and interest rate assumptions, primarily reflecting the fact that the U.S. public debt ratio already exceeds 100 percent of GDP. Gross financing needs are large but manageable given the safe haven status of the United States. A medium-term, credible consolidation plan remains a key policy priority.

Background

About $2.8 trillion in medium-term fiscal consolidation measures were legislated in 2011–13 to tackle the high public debt ratio, which has doubled at the federal government level since 2007 as a result of the financial crisis and the ensuing recession.

a. The Budget Control Act enacted in August 2011 capped discretionary spending, saving about $900 billion over 10 years relative to the CBO baseline.

b. Additional savings worth $1.2 trillion over 10 years were triggered by the failure of the Congressional Committee on Deficit Reduction in November 2011. These cuts took effect in March 2013 through cancellation of budget authority ("sequestration") in FY2013. The Bipartisan Budget Act of December 2013 partially reversed the cuts scheduled to take place in FY2014 and FY2015 but still kept three-fourths of the cuts in place and made up for the partial reversal by extending certain direct spending cuts scheduled to end in FY2021 to FY2022 and FY2023. The cuts in FY2014–23 will be executed through caps on appropriation levels.

c. The American Taxpayer Relief Act signed into law in January 2013 increased the top ordinary income tax rate as well as the tax rate on capital gains and dividends, phased out personal exemptions, and limited itemized deductions for upper-income taxpayers, raising $700 billion over 10 years relative to the CBO alternative baseline.

Despite the substantial deficit reduction achieved so far and the legislated savings in the pipeline, U.S. public finances remain on an unsustainable trajectory.

Assessment

The baseline. For the purposes of the 10-year fiscal projections, real GDP growth is assumed to converge to the potential beyond the standard 5-year WEO horizon. Under staff's baseline projection which, in addition to the legislated budgetary savings, includes the savings from the drawdown of overseas contingency operations and removal of emergency funding for disaster relief, the debt ratio temporarily stabilizes in 2015–18. However, the debt ratio starts rising again at the end of the decade given the spending pressures from an aging population and excess cost growth in the health care sector (even taking into account the more optimistic trend growth based on the recent slowdown in health care expenditure growth rate). Federal debt held by the public is projected to increase from 72 percent of GDP now to 81 percent of GDP in FY2024, with general government gross debt approaching 111 percent of GDP by CY2023.

Debt servicing costs. The fiscal projections are being substantially improved by the current favorable interest rate-growth differential. Reflecting accommodative monetary policy and the safe haven status of the United States, real interest rates have fallen well below GDP growth. Under staff's baseline, as monetary policy normalizes, the average interest rate is projected to rise gradually from the current historical lows and reach about 5¼ percent by 2023 (compared to a pre-crisis average of 6½ percent). As a result, real interest rates will become a major debt-creating flow after 2019. In staff's view, aiming for a medium-term primary surplus of about 1¼ percent of GDP would be appropriate to put the public debt ratio firmly on a downward path. The target primary surplus would be even higher in the long run to bring the debt ratio closer to the pre-crisis levels by 2030.

Realism. Baseline economic assumptions and fiscal projections are generally within the error band observed for all countries. While ambitious, the projected fiscal adjustment is realistic based on the consolidation episodes observed in 1990–2011.

Stress tests. The public debt dynamics are highly sensitive to growth and interest rate assumptions, primarily reflecting the fact that the U.S. public debt ratio already exceeds 100 percent of GDP. An increase of 200 basis points in the sovereign risk premium would mean a debt ratio that is about 17 percentage points above the baseline. If real GDP growth turns out to be one standard deviation below the baseline, the public debt would reach 122 percent of GDP in 2023. A scenario involving a 1 percentage slippage in the planned consolidation over the next two years would lead to a gross debt-to-GDP ratio of 116 percent in 2023. A combined macro-fiscal shock could raise the public debt ratio as high as 137 percent of GDP by the end of the 10-year horizon. An exchange rate shock is unlikely to have important implications for debt sustainability in the United States given that all debt is denominated in local currency and the reserve currency status of the dollar.

Mitigating factors. The depth and liquidity of the U.S. Treasury market as well as its safe haven status at times of distress represent a mitigating factor for relatively high external financing requirements.

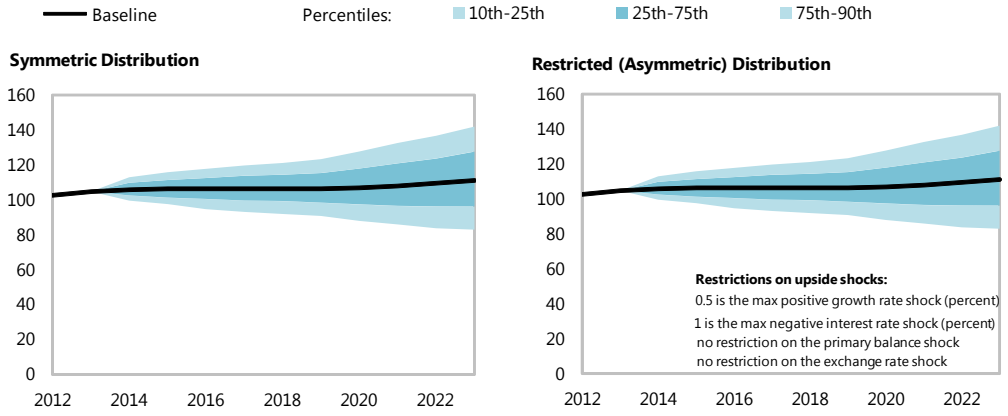
Annex Table 1. United States: Public DSA—Risk Assessment

Heat Map

Debt level [1/]	Real GDP Growth Shock	Primary Balance Shock	Real Interest Rate Shock	Exchange Rate Shock	Contingent Liability shock
Gross financing needs [2/]	Real GDP Growth Shock	Primary Balance Shock	Real Interest Rate Shock	Exchange Rate Shock	Contingent Liability Shock
Debt profile [3/]	Market Perception	External Financing Requirements	Change in the Share of Short-Term Debt	Public Debt Held by Non-Residents	Foreign Currency Debt

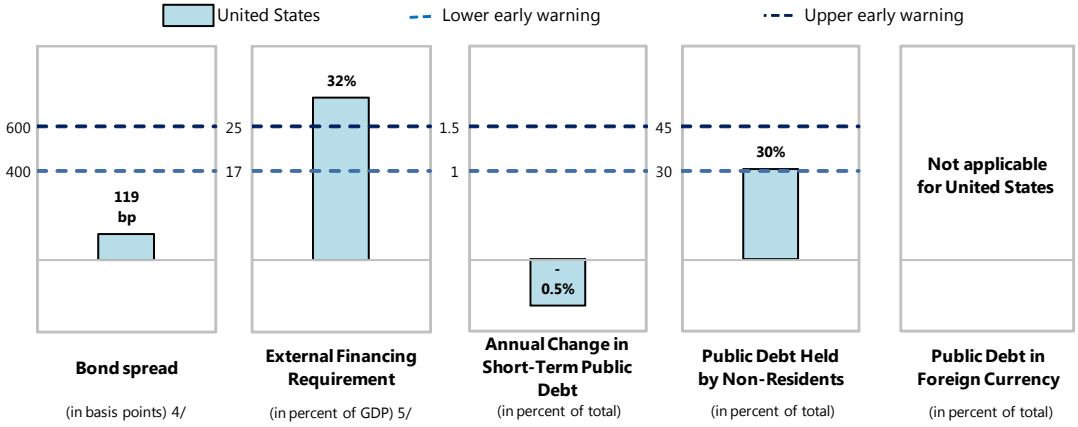
Evolution of Predictive Densities of Gross Nominal Public Debt

(in percent of GDP)



Debt Profile Vulnerabilities

(Indicators vis-à-vis risk assessment benchmarks, in 2013)



Source: IMF staff.

1/ The cell is highlighted in green if debt burden benchmark of 85% is not exceeded under the specific shock or baseline, yellow if exceeded under specific shock but not baseline, red if benchmark is exceeded under baseline, white if stress test is not relevant.

2/ The cell is highlighted in green if gross financing needs benchmark of 20% is not exceeded under the specific shock or baseline, yellow if exceeded under specific shock but not baseline, red if benchmark is exceeded under baseline, white if stress test is not relevant.

3/ The cell is highlighted in green if country value is less than the lower risk-assessment benchmark, red if country value exceeds the upper risk-assessment benchmark, yellow if country value is between the lower and upper risk-assessment benchmarks. If data are unavailable or indicator is not relevant, cell is white.
Lower and upper risk-assessment benchmarks are:

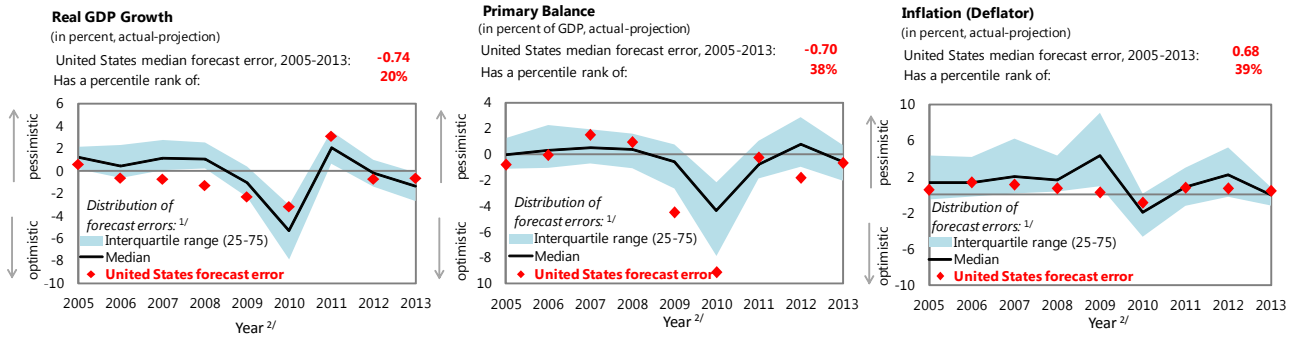
400 and 600 basis points for bond spreads; 17 and 25 percent of GDP for external financing requirement; 1 and 1.5 percent for change in the share of short-term debt; 30 and 45 percent for the public debt held by non-residents.

4/ Long-term bond spread over German bonds, an average over the last 3 months, 03-Apr-13 through 02-Jul-13.

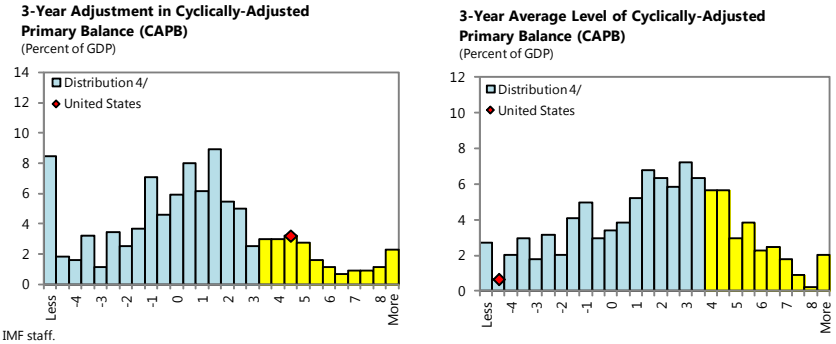
5/ External financing requirement is defined as the sum of current account deficit, amortization of medium and long-term total external debt, and short-term total external debt at the end of previous period.

Annex Table 2. United States: Public DSA—Realism of Baseline Assumptions

Forecast Track Record, versus all countries



Assessing the Realism of Projected Fiscal Adjustment



Boom-Bust Analysis 3/

Source : IMF staff.

1/ Plotted distribution includes all countries, percentile rank refers to all countries.

2/ Projections made in the spring WEO vintage of the preceding year.

3/ Not applicable for United States, as it meets neither the positive output gap criterion nor the private credit growth criterion.

4/ Data cover annual observations from 1990 to 2011 for advanced and emerging economies with debt greater than 60 percent of GDP. Percent of □ sample on vertical axis.

Annex Table 3. United States: Public DSA—Baseline Scenario

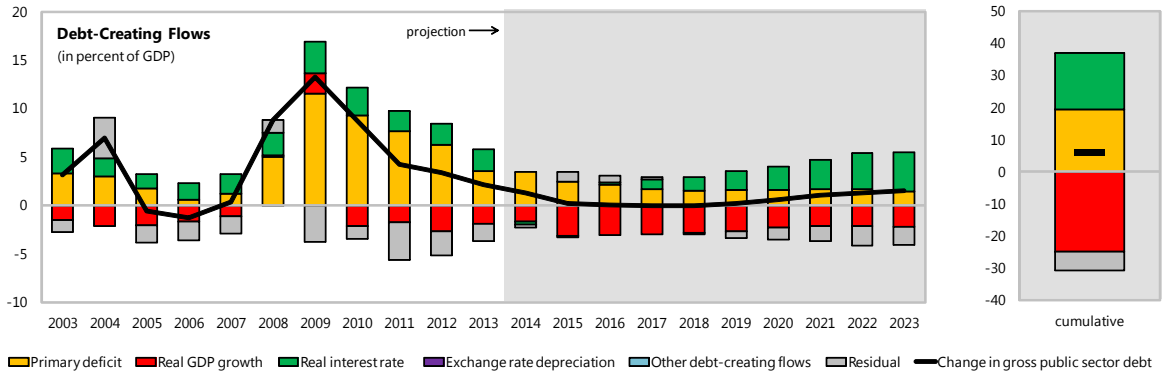
Debt, Economic and Market Indicators [1/]

	Actual			Projections									
	2003-2011 [2/]	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Nominal gross public debt	74.4	102.4	104.5	105.8	106.0	106.0	106.0	106.0	106.2	106.8	107.9	109.2	110.7
Public gross financing needs	18.2	26.2	24.2	24.1	25.6	25.6	23.4	22.2	21.2	20.2	19.7	19.5	20.6
Real GDP growth (in percent)	1.7	2.8	1.9	1.7	3.0	3.0	2.9	2.8	2.6	2.3	2.1	2.1	2.1
Inflation (GDP deflator, in percent)	2.2	1.7	1.5	1.6	1.8	1.9	2.0	2.0	2.0	2.1	2.0	2.0	2.0
Nominal GDP growth (in percent)	4.0	4.6	3.4	3.3	4.9	4.9	5.0	4.8	4.7	4.4	4.1	4.1	4.1
Effective interest rate (in percent) [4/]	5.6	4.1	3.8	1.4	1.6	2.2	3.0	3.5	4.0	4.5	5.0	5.6	5.9

As of July 02, 2013		
Sovereign Spreads		
EMBIG (bp) 3/		134
5Y CDS (bp)		16
Ratings	Foreign	Local
Moody's	Aaa	Aaa
S&Ps	AA+	AA+
Fitch	AAA	AAA

Contribution to Changes in Public Debt

	Actual			Projections											
	2003-2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	cumulative	debt-stabilizing primary balance [9/]
Change in gross public sector debt	4.8	3.4	2.2	1.3	0.2	0.1	0.0	0.0	0.2	0.6	1.1	1.3	1.5	6.2	
Identified debt-creating flows	6.0	5.9	3.9	1.5	-0.8	-0.7	-0.3	0.2	0.9	1.8	2.6	3.3	3.4	12.0	
Primary deficit	4.8	6.3	3.6	3.5	2.5	2.1	1.7	1.5	1.6	1.6	1.7	1.7	1.5	19.5	1.9
Primary (noninterest) revenue and grants	29.1	28.5	30.3	31.0	31.5	31.5	31.2	31.0	30.8	30.8	30.8	30.9	31.0	310.5	
Primary (noninterest) expenditure	34.0	34.8	33.8	34.5	34.0	33.6	32.9	32.5	32.5	32.4	32.5	32.7	32.5	330.0	
Automatic debt dynamics [5/]	1.1	-0.4	0.4	-2.0	-3.3	-2.8	-2.0	-1.4	-0.7	0.1	1.0	1.6	1.9	-7.5	
Interest rate/growth differential [6/]	1.1	-0.4	0.4	-2.0	-3.3	-2.8	-2.0	-1.4	-0.7	0.1	1.0	1.6	1.9	-7.5	
Of which: real interest rate	2.2	2.2	2.2	-0.3	-0.2	0.3	1.0	1.4	1.9	2.4	3.1	3.7	4.1	17.4	
Of which: real GDP growth	-1.1	-2.6	-1.9	-1.7	-3.1	-3.1	-3.0	-2.8	-2.7	-2.3	-2.1	-2.1	-2.2	-24.9	
Exchange rate depreciation [7/]	0.0	0.0	0.0	...	...	...	...	...	...	...	...	...	...	...	
Other identified debt-creating flows	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Residual, including asset changes [8/]	-1.1	-2.5	-1.8	-0.3	1.0	0.7	0.2	-0.2	-0.7	-1.2	-1.6	-2.0	-1.9	-5.8	



Source: IMF staff.

1/ Public sector is defined as general government.

2/ Based on available data.

3/ Long-term bond spread over German bonds.

4/ Defined as interest payments divided by debt stock (excluding guarantees) at the end of previous year.

5/ Derived as $[(r - \pi(1+g) - g + ae(1+r))/(1+g+\pi+g\pi))$ times previous period debt ratio, with r = interest rate; π = growth rate of GDP deflator; g = real GDP growth rate; a = share of foreign-currency denominated debt; and e = nominal exchange rate depreciation (measured by increase in local currency value of U.S. dollar).

6/ The real interest rate contribution is derived from the numerator in footnote 5 as $r - \pi (1+g)$ and the real growth contribution as -g.

7/ The exchange rate contribution is derived from the numerator in footnote 5 as ae(1+r).

8/ Includes asset changes and interest revenues (if any). For projections, includes exchange rate changes during the projection period.

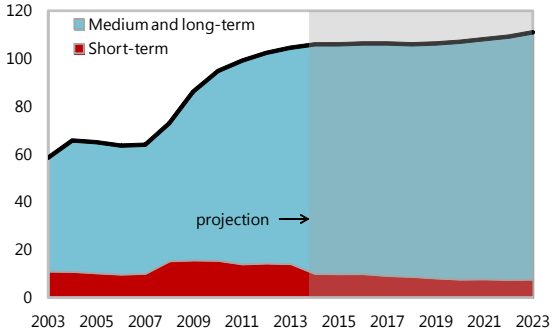
9/ Assumes that key variables (real GDP growth, real interest rate, and other identified debt-creating flows) remain at the level of the last projection year.

Annex Table 4. United States: Public DSA—Composition of Public Debt and Alternative Scenarios

Composition of Public Debt

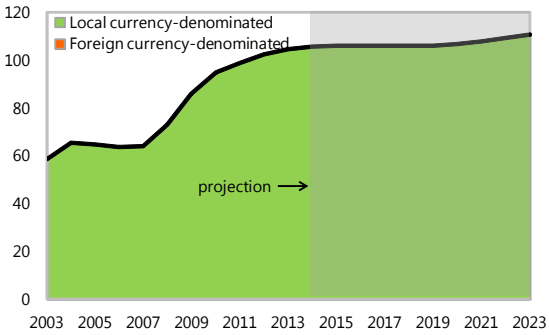
By Maturity

(in percent of GDP)

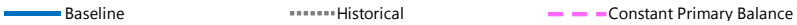


By Currency

(in percent of GDP)

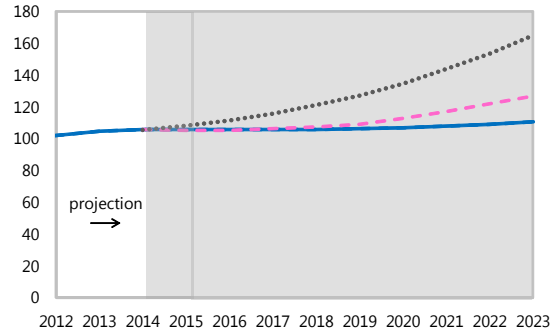


Alternative Scenarios



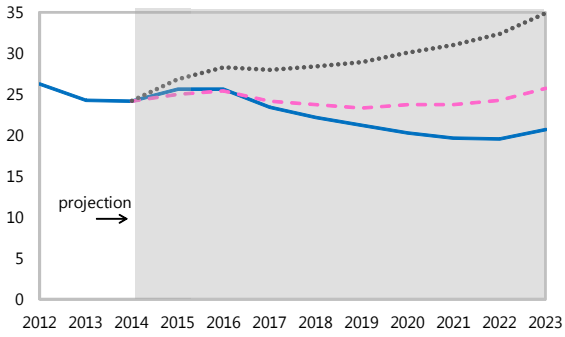
Gross Nominal Public Debt

(in percent of GDP)



Public Gross Financing Needs

(in percent of GDP)



Underlying Assumptions

(in percent)

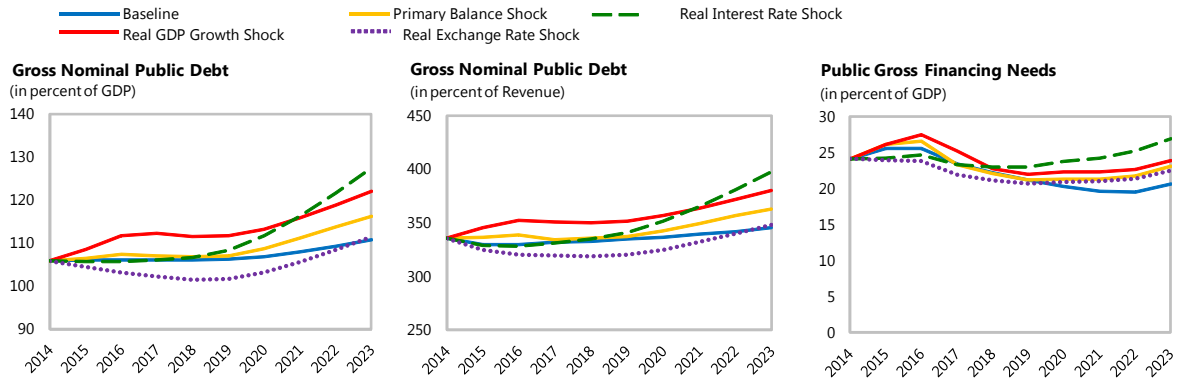
Baseline Scenario	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Real GDP growth	1.7	3.0	3.0	2.9	2.8	2.6	2.3	2.1	2.1	2.1
Inflation	1.6	1.8	1.9	2.0	2.0	2.0	2.1	2.0	2.0	2.0
Primary balance	-3.5	-2.5	-2.1	-1.7	-1.5	-1.6	-1.6	-1.7	-1.7	-1.5
Effective interest rate	1.4	1.6	2.2	3.0	3.5	4.0	4.5	5.0	5.6	5.9
Constant Primary Balance Scenario										
Real GDP growth	1.7	3.0	3.0	2.9	2.8	2.6	2.3	2.1	2.1	2.1
Inflation	1.6	1.8	1.9	2.0	2.0	2.0	2.1	2.0	2.0	2.0
Primary balance	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5
Effective interest rate	1.4	1.6	2.2	3.0	3.5	4.0	5.2	5.7	6.1	6.3

Historical Scenario	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Real GDP growth	1.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Inflation	1.6	1.8	1.9	2.0	2.0	2.0	2.1	2.0	2.0	2.0
Primary balance	-3.5	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0
Effective interest rate	1.4	1.6	2.6	3.9	4.7	5.6	7.0	7.6	8.2	8.5

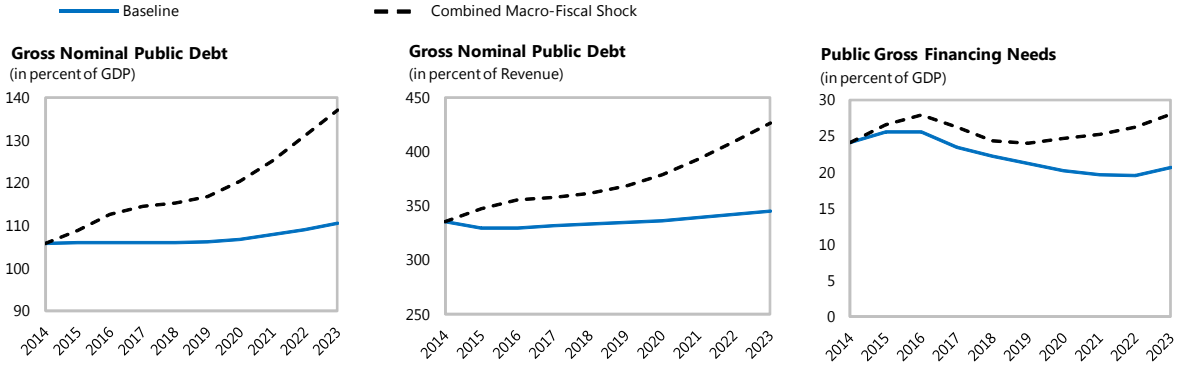
Source: IMF staff.

Annex Table 5. United States: Public DSA—Stress Tests

Macro-Fiscal Stress Tests



Additional Stress Tests



Underlying Assumptions

(in percent)

Primary Balance Shock	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Real GDP growth	1.7	3.1	3.1	3.0	2.8	2.6	2.3	2.1	2.1	2.1
Inflation	1.6	1.8	1.9	2.0	2.0	2.0	2.1	2.0	2.0	2.0
Primary balance	-3.5	-4.3	-4.0	-1.7	-1.5	-1.6	-1.6	-1.7	-1.7	-1.5
Effective interest rate	1.4	1.6	2.2	3.1	3.6	4.1	5.3	5.8	6.3	6.5
Real Interest Rate Shock										
Real GDP growth	1.7	1.8	2.0	2.3	2.4	2.4	2.1	1.9	1.9	1.9
Inflation	1.6	1.8	1.9	2.0	2.0	2.0	2.1	2.0	2.0	2.0
Primary balance	-3.5	-2.5	-2.1	-1.7	-1.5	-1.6	-1.6	-1.7	-1.7	-1.5
Effective interest rate	1.4	1.6	2.5	3.7	4.5	5.3	6.8	7.5	8.2	8.5
Combined Shock										
Real GDP growth	1.7	1.1	1.1	2.3	2.4	2.4	2.1	1.9	1.9	1.9
Inflation	1.6	1.3	1.4	2.0	2.0	2.0	2.1	2.0	2.0	2.0
Primary balance	-3.5	-4.6	-4.3	-3.3	-1.5	-1.6	-1.6	-1.7	-1.7	-1.5
Effective interest rate	1.4	1.6	2.6	3.8	4.5	5.3	6.8	7.4	8.1	8.4

Real GDP Growth Shock	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Real GDP growth	1.7	1.1	1.1	2.9	2.8	2.6	2.3	2.1	2.1	2.1
Inflation	1.6	1.3	1.4	2.0	2.0	2.0	2.1	2.0	2.0	2.0
Primary balance	-3.5	-4.1	-4.3	-3.3	-1.5	-1.6	-1.6	-1.7	-1.7	-1.5
Effective interest rate	1.4	1.6	2.2	3.1	3.5	4.1	5.3	5.8	6.3	6.5
Real Exchange Rate Shock										
Real GDP growth	1.7	3.0	3.0	2.9	2.8	2.6	2.3	2.1	2.1	2.1
Inflation	1.6	1.8	1.9	2.0	2.0	2.0	2.1	2.0	2.0	2.0
Primary balance	-3.5	-2.5	-2.1	-1.7	-1.5	-1.6	-1.6	-1.7	-1.7	-1.5
Effective interest rate	1.4	1.6	2.2	3.0	3.4	4.0	5.3	5.8	6.3	6.5

Source: IMF staff.

Annex III. U.S. Responses to Past Policy Advice

Fiscal policy. Over the last few years staff has emphasized the importance of a medium-term fiscal consolidation plan to restore long-run fiscal sustainability, stressing that early action is needed to slow entitlement spending. The prospects for such a comprehensive plan remain unfavorable, given the lack of political consensus. However, cost saving measures that were part of the Affordable Care Act appear to be lowering health care inflation. Staff also called for a more balanced and gradual pace of fiscal consolidation in the near-term and the replacement of automatic spending cuts (also referred to as the sequester) with back-loaded savings. The Bipartisan Budget Act of December 2013 moved in this direction by raising the spending caps imposed by the sequester for 2014 and 2015 in exchange for savings in future years. In addition, suspending the debt ceiling until March 2015 and passing the Consolidated Appropriations Act in early 2014 were all steps in a positive direction to lessen fiscal uncertainties.

Monetary policy. Given the large output gap and well-anchored inflation expectations, staff supported a highly accommodative monetary policy stance. Last year, it also stressed the importance of maintaining effective communications. The Fed continues to maintain a supportive monetary policy and have made increasing efforts—in FOMC statements, press conferences, and speeches—to articulate is views on progress toward the Fed's longer-term objectives.

Financial policies. Substantial progress has been made on the national and global financial reform agenda over the last few years, and many of the policy suggestions contained in last year's U.S. staff report have been implemented (including Basel III capital standards and the finalization of the Volcker rule). Still, a few reforms emphasized by staff remain to be completed, particularly those concerning the regulation of money market mutual funds.

Housing policy. Staff has stressed the need to reduce regulatory uncertainty (particularly on the risks that banks could be required to repurchase defaulted loans from the GSEs). Measures have been taken to lessen these uncertainties. Staff also called for a rapid completion of the regulation requiring banks to retain part of mortgage risk on their balance sheet (i.e., the Qualified Residential Mortgage standards) and in advancing legislation to reshape housing finance. On the latter, legislative proposals have moved forward in Congress but the likelihood of these becoming law remains slim.

Structural policies. The Administration has launched new initiatives for job training and apprenticeships, in line with staff's recommendations on more active labor market policies. Building a political consensus on a reform of the tax system in the direction envisaged by staff (a less complex system with a broader tax base and lower rates) remains difficult and there is no plan to introduce a VAT or a carbon tax.

Table A5. Determinants of Total Factor Productivity

	Fixed-Effects Estimator				Mean Group Estimator			
	Dependent variable: TFP growth				*Dependent variable: log TFP*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Schooling	0.42**							
	(2.02)							
Log schooling			5.50**	9.64***	5.00***	5.15***	4.71***	3.91***
			(1.98)	(2.69)	(4.23)	(4.02)	(4.23)	(2.94)
Tertiary educational attainment		0.16*						
		(1.70)						
Business R&D expenditure	0.36**		0.08	7.45*				
	(2.48)		(0.48)	(1.83)				
Total R&D expenditure		0.40*						
		(1.69)						
Government R&D expenditure			-0.52***	-0.48***	0.26	0.61***	0.53**	0.50**
			(-2.86)	(-2.64)	(1.15)	(2.61)	(2.55)	(2.50)
Business x Gov. R&D expenditure			0.36**	0.38**				
			(2.01)	(2.16)				
Log schooling x Business R&D exp.				-2.83*				
				(-1.81)				
Time trend					-0.02***	-0.02***	-0.02***	-0.01**
					(-3.96)	(-3.62)	(-3.77)	(-2.26)
Own-source taxes (% GDP)						2.04***	1.97***	0.77
						(3.41)	(3.35)	(1.29)
Tax burden (% GDP)						-6.38***	-6.31***	-4.46**
						(-3.11)	(-3.11)	(-2.23)
Capital expenditure (% GDP)							-0.01	
							(-0.28)	
Government size score								0.04*
								(1.65)
Constant	-4.49	-3.76	-12.75*	-23.50**	-5.68*	-5.86*	-4.65*	-3.38
	(-1.65)	(-1.39)	(-1.78)	(-2.53)	(-1.92)	(-1.83)	(-1.69)	(-0.99)
Combined effect (for interaction terms)								
Log schooling				5.68**				
				(2.05)				
Government R&D expenditure			-0.02	0.06				
			(0.08)	(0.28)				
Business R&D expenditure			0.25	0.21				
			(1.57)	(1.34)				
Time fixed effects	yes	yes	yes	yes				
State-specific time trend					yes	yes	yes	yes
Three-year averages	yes	yes	yes	yes				
Annual					yes	yes	yes	yes
Observations	346	204	346	346	1,071	950	950	950
R-squared	0.40	0.48	0.42	0.42				
Number of states	51	51	51	51	51	50	50	50

Notes: *t*-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1. See Appendix 1 for the definitions and sources of variables.

MONETARY POLICY COMMUNICATION AND FORWARD GUIDANCE[25]

A. Introduction

57. **Forward guidance has taken a more important role during the Global Financial Crisis (GFC) and its aftermath.** Already prior to the crisis, some central banks used explicit forward looking language as a device to increase transparency and strengthen the effectiveness of monetary policy. However, with the onslaught of the GFC, a growing number of central banks, including the U.S. Federal Reserve (the Fed), began to use forward guidance as a way to provide greater clarity about their policy intentions and reaction function.[26]

58. **The Fed has used forward guidance to add stimulus and reduce uncertainty about future policy**.[27] Whether forward guidance can achieve these objectives depends on whether it is perceived as credible and whether it can enhance policy predictability through systematic and clear communication.[28] In normal times, both credibility and predictability are helped by a well established pattern of past policy behavior that has proven successful in achieving the central bank's stated policy objectives. However, as argued by Woodford (2012), in unusual circumstances, when policymakers have to break from past behavior, forward guidance becomes particularly challenging and requires more explicit explanations to be effective. Indeed, since December 2008, the Fed has taken several steps to clarify its goals and policy strategy, and to provide information about the expected path for policy rates (see Box 1).

59. **Assessing the effectiveness of forward guidance requires distinguishing between shifts in the behavior of monetary policy and in the economic outlook**. A forward guidance announcement associated with a more protracted policy rate path can be interpreted as a signal of either (i) a weaker economic outlook and/or lower inflation, or (ii) a more accommodative policy stance given current and projected economic conditions. Both would lead to lower expected interest rates. Similarly, lower policy rate uncertainty could reflect clearer and more systematic Fed communication or reduced uncertainty about the economic outlook.

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[25] Prepared By Tim Mahedy, Jarkko Turunen and Niklas Westelius.

[26] The Fed also had some experience with forward guidance prior to the crisis. For instance in August 2003, the FOMC stated that it believed that policy accommodation could be maintained for a "considerable period".

[27] See Bernanke (2013).

[28] Credibility requires consistency between forward guidance and the central bank's policy objectives (e.g., price stability and maximum employment) as well as with its economic outlook. Predictability requires that the public understands how the central bank adjust its projected policy path as underlying economic data changes.

Box 1. The Fed's Communication since 2008

Communication channels. In March 2011, the FOMC introduced regular post-meeting press conferences by the chairman. The press conferences coincide with the committee's publication of the Summary of Economic Projections (SEP) and are intended to "further enhance the clarity and timeliness of the Federal Reserve's monetary policy communication."

Policy objectives and strategy. In January 2012, the FOMC published a statement on its longer-run goals and monetary policy strategy, formally committing to a 2 percent inflation target and assessment of maximum employment based on a range of indicators. The statement also clarified that the FOMC follows a balanced approach in making tradeoffs between the two objectives when necessary.

Forward guidance. In January 2012, the FOMC included federal funds rate projections by FOMC participants in the SEP (the so-called "dot" graph). Since December 2008, the FOMC has gone through four different forward guidance regimes:

- *Qualitative FG I*: In December 2008, together with establishing a target range for the federal funds rate of 0 to 1/4 percent, the FOMC introduced qualitative policy rate guidance by indicating that economic conditions are likely to *"warrant exceptionally low levels of the federal funds rate for some time."* In March 2009 the language was changed to *"for an extended period."*
- *Date based FG*: In August 2011, the FOMC shifted to date-based guidance by declaring that economic conditions are likely to *"warrant exceptionally low levels of the federal funds rate at least through mid-2013"*. In January 2012, the date was changed to late 2014, and in September 2012, it was changed to mid-2015.
- *State based FG*: In December 2012, the FOMC transitioned to state-based guidance by stating that the committee deemed it appropriate for the federal funds rate to be at its zero lower bound at *"least as"* long as unemployment remains above 6.5 percent, projected inflation is no more than 2.5 percent and longer term inflation expectations are well anchored. This announcement also coincided with an extension of the long-term asset purchase program. In December 2013 the language was changed from *"at least"* to *"well past."*
- *Qualitative FG II*: Finally, in March 2014, the FOMC went back to qualitative guidance by removing the reference to specific unemployment and inflation thresholds. Instead the committee stated that it would be *"appropriate to maintain the current target range for the federal funds rate for a considerable time after the asset purchase program ends, especially if projected inflation continues to run below the Committee's 2 percent longer-run goal."* and that it *"anticipates that, even after employment and inflation are near mandate-consistent levels, economic conditions may, for some time, warrant keeping the target federal funds rate below levels the Committee views as normal in the longer run."*

60. **This selected issues paper addresses two main questions.** First, did forward guidance represent a shift in the reaction function of the Fed or simply signal a weaker economic outlook? Second, did forward guidance move policy rate expectations as

intended and reduce policy uncertainty? To complement existing studies, we focus on the impact of the different forward guidance regimes on policy uncertainty.[29]

B. Did Forward Guidance Represent a Change in the Fed's Reaction Function?

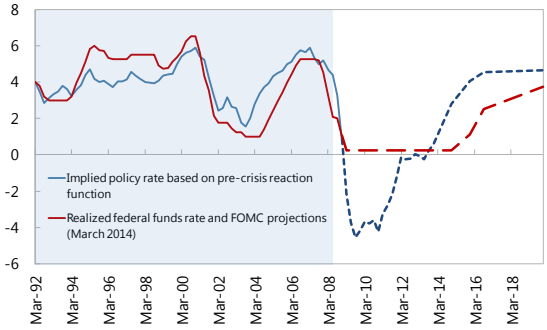
61. **Monetary policy before the crisis is well proxied by an estimated reaction function over inflation and unemployment**. Given the Fed's dual mandate of price stability and maximum employment a simple pre-crisis reaction function was estimated by regressing the federal funds rate (ff) on core PCE inflation (π) and the unemployment gap (u^g).[30]

$$ff_t = 0.86 + 1.82\,\pi_t + 1.58\,u_t^g \qquad R^2 = 0.77$$

$$(0.34)\quad (0.13)\quad (0.15)$$

Although the overall fit of the regression is quite high, there are two past periods where the implied policy path persistently differs from the actual (see Figure 1). The later episode, which occurred in the mid 2000s and where the predicted path was higher than the realized path, is particularly noteworthy as it coincided with the Fed's first experiment with explicit forward guidance (i.e., August 2003 to December 2005).[31] Figure 1 also shows the implied policy rate path over the medium term based on the latest FOMC projection (June 2014). The large deviation between the implied path (dashed blue) and that of the committee's median projection (dashed red) suggests a marked break from pre-crisis behavior.

Figure 1. Forward Guidance Compared to Pre-crisis Policy Behavior



Sources: FOMC and Staff Estimations

[29] This paper does not tackle other important communication issues, such as how to communicate about financial stability considerations, the future of the Fed balance sheet or operational framework (see also S. Gray and D. King "The Operational Framework for Monetary Policy", Selected Issues Paper, 2014).

[30] The OLS regression was estimated using quarterly data over the sample period 1985:Q1 and 2008:Q3, and the unemployment gap is defined as the difference between the unemployment rate and CBO's estimate of the NAIRU. The numbers in parentheses are the standard errors of the estimated coefficient, indicating that they are all statistically significant at the 5 percent level. Moreover, the estimated reaction function suggests that the Fed raise the real interest rate in response to inflationary pressure (consistent with the Taylor principle) and that the long-run federal funds rate is approximately 4.5 percent, given an inflation target of 2 percent.

[31] The first period in the 1990s has been attributed by some observers to a temporary hike in the neutral rate due to strong productivity growth as well as by the Fed's policy of opportunistic disinflation. The explicit forward guidance in August 2005 was in response to concerns that the policy rate would hit the ZLB.

62. **Starting from 2012, the FOMC members' projected policy path deviates significantly from pre-crisis behavior, suggesting a shift in the Fed's reaction function.** In early 2012, the implied path of the federal funds rate based on pre-crisis behavior and the median of FOMC member's projected policy rate path were fairly well in line with each other. [32] However, while the implied policy path shifted up during 2012, due to a slight improvement in the FOMC's economic outlook, the median projected path was lowered and the lift-off date pushed further out (see Figure 2 and Table 1). Indeed, some FOMC members explicitly stated that the shift to date-based guidance did not constitute a more pessimistic view on the US economic outlook.[33]

Figure 2. A Shift to an Expansionary Stance Despite an Improving Economic Outlook, 2012
(September, 2012)

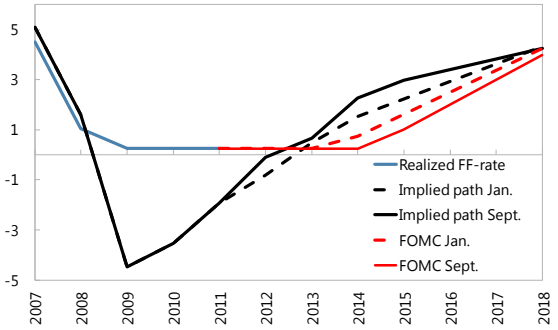


Table 1. FOMC's Economic Outlook and Policy Projections for 2014

	Date of Projection		
Projections	Jan-12	Jun-12	Sep-12
Unemployment rate	7.2	7.4	7.0
PCE core inflation	1.8	1.8	1.9
Federal funds rate	0.75	0.50	0.25

Source: Selected Economic Projections, FOMC. The numbers correspond to the mid point of the central tendancy for each variable.

63. **Alternatively, the shift in the FOMC member's projected path could potentially be explained by unusual headwinds from the crisis.** The shift to a more protracted policy rate path could also reflect a focus on broader measures of slack or a lower neutral real rate.[34]

- *Greater labor market slack than indicated by headline unemployment (or concerns that inflation was likely to run below target).* The crisis has been associated with a greater decline in labor force participation than can be explained by demographic factors, as well as a rising number of part-time employed.[35]

- *A lower neutral real policy rate.* Shifts in savings preferences, lower expected future growth, as well as global conditions could have contributed to a decline in the neutral

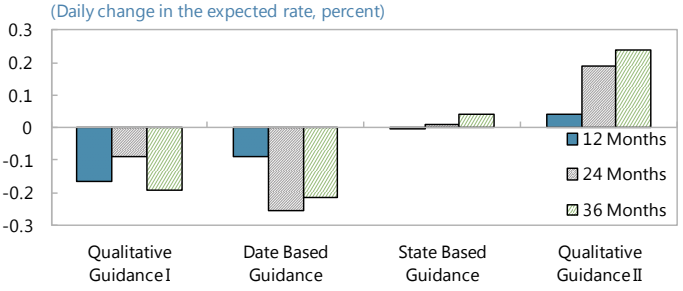
[32] The implied path is derived using the midpoint of unemployment and inflation from the SEP.
[33] See Dudley (2012) and Bullard (2013).
[34] See also Levin (2014).
[35] See Balakrishnan et al. (2014).

real interest rate. For example, estimates by Laubach and Williams (2001) suggest a current real neutral federal funds rate that is close to zero.

64. **Empirical evidence suggests that markets interpreted date-based forward guidance as a shift in the reaction function, and not as a deterioration in the economic outlook.** Femia et al. (2013) use primary dealer survey data to show that date based forward guidance coincided with a perceived shift to a more accommodative monetary stance. Similarly, Raskin (2013) provides evidence of a shift in the Fed's reaction function by showing that interest rate expectations became significantly less sensitive to macroeconomic surprises after the introduction of date-based forward guidance.[36]

65. **Event studies have also found that forward guidance moved expectations in the intended direction.** By defining a narrow window around FOMC announcements, event studies are designed to exclude other factors that might influence expectations such as news about the economic outlook. Campbell et al. (2012) and Femia et al. (2013) find significant announcement effects that lowered expected short term rates, as well as rates on longer term Treasuries and corporate bonds. Woodford (2012) shows that announcements had significant intra-day effects lowering interest rates and contributing to a flatter yield curve.

Figure 3. Interest Rate Impact on Forward Guidance Announcement Days 1/
(Daily change in the expected rate, percent)



1/ Daily change in the interest rate of Eurodollar futures.
Sources: Bloomberg and staff estimates.

66. **However, market responses also appear to have differed across forward guidance regimes**. First, while the initial introduction of qualitative guidance in December 2008 and the date based guidance in August 2011 had sizable negative impacts on policy rate expectations, the shift to state based guidance in December 2012 had virtually no impact on policy rate expectations (see Figure 3). The latter result may reflect the fact that market participants had anticipated the shift, but it is also in line with the FOMC statement that made it clear that the FOMC viewed the new forward guidance

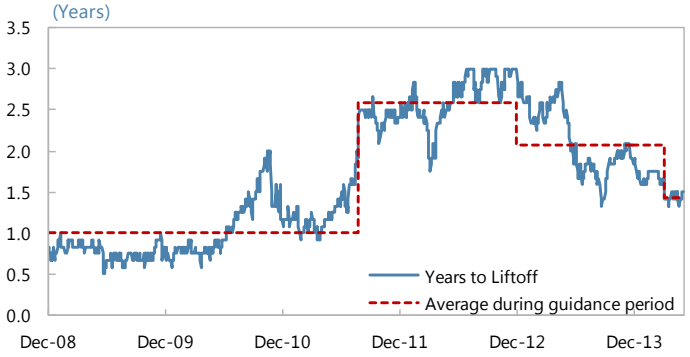
[36] Swanson and Williams (2013) also find that the sensitivity of short rates to macro news declined during the qualitative and date based forward guidance periods, suggesting that they were effective in anchoring rate expectations.

as consistent with its earlier date-based guidance. Second, the shift back to qualitative guidance in March 2014 coincided with an increase in policy rate expectations at announcement. However, this shift may also reflect an upward revision in FOMC member's projections for policy interest rates that were released at the same time.[37]

C. Did Forward Guidance Reduce Policy Uncertainty?

67. **Forward guidance has been associated with a decline in policy uncertainty**. While most of the recent literature has focused market expectations about interest rates, less attention has been paid to the impact of forward guidance on policy rate uncertainty. Bauer (2012) finds that early announcements of forward guidance reduced uncertainty about future interest rates. Filardo and Hoffman (2014) show descriptive evidence that forward guidance has coincided with lower interest rate uncertainty at shorter horizons. Indeed, implied volatility of swaptions (a measure of interest rate uncertainty) has declined during the forward guidance period, with some increase in volatility at longer horizons from mid-2013 onwards (see Figure 4). The period of date based forward guidance in particular coincides with a sizeable decline in uncertainty. At the same time, the introduction of date based forward guidance resulted in a significant increase in market expectations about the time to lift-off from the ZLB (see Figure 5). While time to lift-off is also impacted by changes in the economic outlook, the upward shift at the announcement of date based guidance suggests that a significant part of the dampening impact of forward guidance on rate uncertainty worked through this channel. The period with state based forward guidance coincides with some increase in volatility at longer horizons and, as the recovery proceeded, a decline in the expected distance to lift-off. Finally, the return to qualitative forward guidance has been associated with an increase in policy uncertainty.

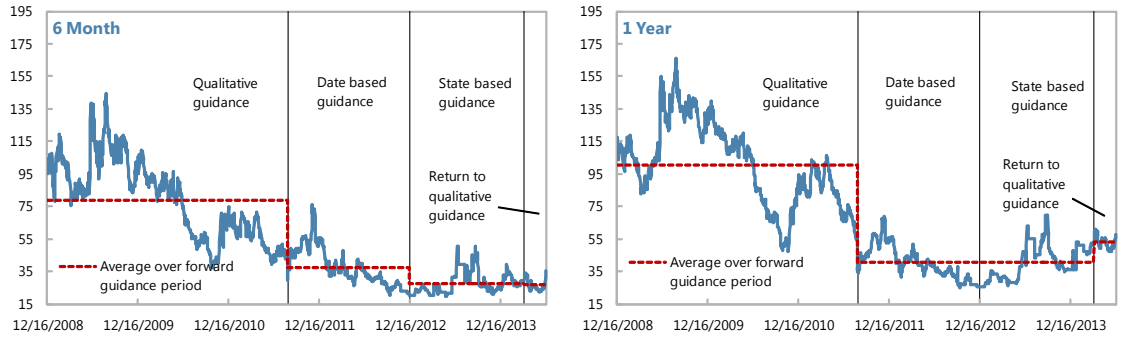
Figure 5. Time to Liftoff



Source: Bloomberg and staff estimates.

[37] More generally, interpretation of specific events is complicated by announcements that occurred at the same time. For example, the introduction of date based forward guidance coincided with an extension of the LSAP program.

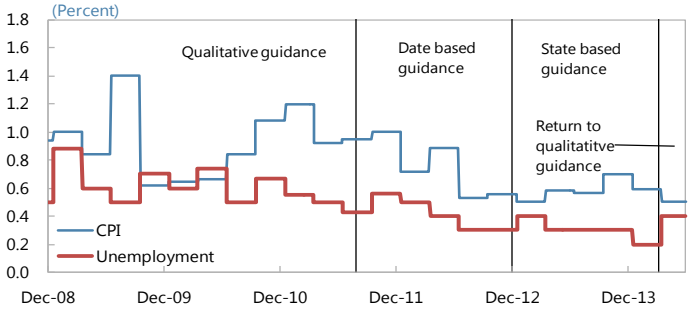
Figure 4. Implied Volatilities of Swaptions



Sources: Bloomberg and staff estimates.

68. **Uncertainty about the economic outlook has also fallen.** Lower policy uncertainty could reflect less uncertainty about the near-term economic outlook. Forecaster disagreement about both inflation and the unemployment rate (as measured by the dispersion in private sector forecasts four quarters ahead) have also declined over time (see Figure 6). This is true in particular for the period after date based forward guidance was announced.

Figure 6. CPI and Unemployment Rate 1/



1/ Measurement of dispersion, or the difference in forecasts between the 75th and 25th percentiles.
Source: Philidelphia Federal Reserve.

69. **Regression evidence.** To futher analyze the impact of forward guidance on uncertainty, we regress measures of uncertainty on future interest rates on indicator variables for the forward guidance periods, controlling for economic uncertainty and other factors (including broader market uncertainty and risk aversion as proxied by the VIX index) (see the Appendix for a more detailed description of the data). Specifically, we estimate OLS regressions:

$$VOL_t = \alpha + \beta ECON_t + \sum_{i=1}^{3} \lambda_i FG_i + X_t + u_t$$

Where *VOL* is a measure of uncertainty about future interest rates (implied volatility of swaptions at different time horizons); *ECON* a measure of economic uncertainty (forecaster disagreement on unemployment and inflation) and FG are step dummy variables for the three forward guidance regimes (with the first qualitative forward guidance period as the omitted category). We also include control variables *X* (VIX, time to lift off from the ZLB and the OIS-Libor spread). The regressions were estimated using daily data over the sample period from 12/16/2008 through 06/16/2014.

70. **Regressions evidence confirms that forward guidance was associated with lower policy uncertainty, with some differences across regimes**. Several interesting results emerge:

- *Economic uncertainty increases uncertainty about future policy interest rates*. As expected, msot coefficients for forecaster disagreement about the unemployment rate and inflation are positive and statistically significant (see Table 2). Broader market uncertainty (as measured by the VIX) is also associated with higher uncertainty about future policy interest rates.

- *Date-based forward guidance is associated with lower policy rate uncertainty on average*. This effect is primarily driven by date-based forward guidance successfully pushing the lift-off date further out, and therefore providing greater clarity about the period when policy rates were expected to remain close to zero (see Figure 7).

- *State-based forward guidance may have reduced policy uncertainty above and beyond time to-lift-off*. In particular, there is some evidence that once time to lift-off is controlled for, state-based forward guidance was associated with lower policy uncertainty. This may reflect the fact that at shorter horizons, state based forward guidance provided a more systematic approach to evaluating progress towards liftoff from ZLB. Indeed, this seems to be consistent with Bernanke's (2013) argument that an important limitation to date based guidance was that it did not explain how future policy would be affected by changes in the economic outlook.

- *While based on a short sample, there is some evidence that the return to qualitative forward guidance was associated with lower uncertainty*. Despite the increase in uncertainty at announcement, the regression evidence suggests that qualitatitive forward guidance has been associated with lower uncertainty. This may reflect additional forward guidance about the path of policy rates post lift-off.

Table 2. Regressions Results

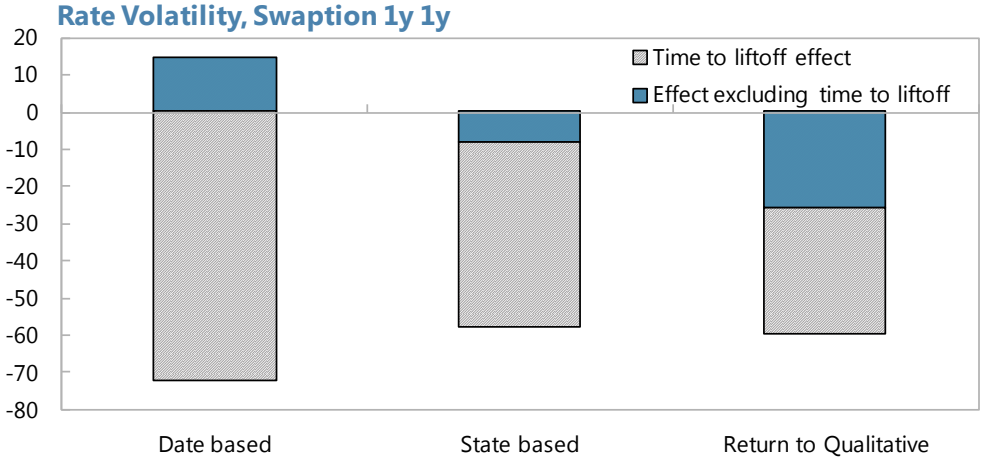
Regression Results - Implied Volatility of Swaptions

	1 Year Expiry, 1 Year Tenor	2 Year Expiry, 1 Year Tenor
SPF CPI Forecast	8.811*	17.83***
SPF Unemployment Forecast	19.52***	3.526
VIX	0.680***	0.713***
FG 2	-53.01***	-53.41***
FG 3	7.337***	20.38***
FG4	8.622***	19.06***
LIBOR OIS-Spread	-0.128***	-0.246***
Constant	67.32***	88.17***
R-sq	0.727	0.707
Observations	1357	1358

Regression Results - Implied Volatility of Swaptions w/ Time to Liftoff

	1 Year Expiry, 1 Year Tenor	2 Year Expiry, 1 Year Tenor
SPF CPI Forecast	1.224	9.916***
SPF Unemployment Forecast	4.029	-12.75***
VIX	0.369***	0.387***
Time to Liftoff	-3.828***	-4.017***
FG 2	14.84***	17.80***
FG 3	-23.19***	-11.64***
FG4	-17.49***	-8.329***
LIBOR OIS-Spread	-0.173***	-0.293***
Constant	139.3***	163.7***
R-sq	0.895	0.938
Observations	1357	1358

Figure 7. Cumulative Effects of Foward Guidance on Interest Rate Volatility, Swaption 1y 1y



1/ Interest rate volatility is measured as the change in volatility of Swaptions with a 1 year expiry and 1 year tenor.
Sources: Bloomberg and staff estimates.

71. **These regression results are subject to a number of caveats.** The descriptive regressions do not identify causal effects and estimated impacts could reflect omitted factors. Furthermore, the analysis of volatility is complicated by the ZLB which tends to shrink volatility. However, the qualitative results for the forward guidance periods are robust across a number of alternative specifications, such as using alternative measures of uncertainty (e.g. realized volatility of eurodollar futures or the MOVE index of implied volatility in Treasuries), other variables to capture economic uncertainty (e.g. the Citi surprise index), and controlling for other factors (e.g. the impact of euro area sovereign stress using the spread between euro area core versus perphery bonds). To minimize complication from the ZLB the analysis refrains from comparisons with non-ZLB periods.

D. Conclusions

72. **Uncertainties remain whether the deviation from pre-crisis policy is due to a change in the Fed's reaction function or lingering headwinds from the crisis.** Empirical evidence suggests that market participants have interpreted the protracted policy path as a shift in the Fed's reaction function and not as response to a deteriorating outlook. While the Fed has mentioned a number of reasons for the protracted path, there have been calls for more

clarity from both within the FOMC and from market participants.[38] Further communication about the FOMCs consensus view on the rationale for the protracted policy path could facilitate a smoother and more predictable normalization process.

73. **Forward guidance has generally been effective in moving policy expectations in the intended direction and in reducing policy uncertainty**. This is consistent with the Fed's stated objectives of forward guidance policy. However, recent events have also resulted in challenges, in particular as the economic recovery has been moving the Fed closer towards a turning point in monetary policy.

74. **Across regimes, there is some evidence that more recent forward guidance was been more effective in guiding expectations and reducing uncertainty than initial qualitative forward guidance**. This experience suggests a potential trade off between systematic communication and policy flexibility. More recently, there is some evidence that the recent shift back to qualitative forward guidance was associated with lower uncertainty, perhaps reflecting additional guidance about the path of policy rates post lift-off. Looking forward , while qualitative forward guidance will provide the FOMC with more policy flexibility, it also suggests a greater premium on clear and systematic communcation to avoid an increase in policy uncertainty as lift-off approaches.

[38] See Bernanke (2012) for a list of reasons for the protracted path and Plosser (2014) and the NY Federal Reserve Survey of Primary Dealers for calls for more clarity.

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Statement by the IMF Staff Representative on the United States

July 22, 2014

1. **This statement reports on information that has become available since the staff report was issued. It does not alter the thrust of the staff appraisal.**

2. **Recent indicators**. Labor market conditions continued to improve. Jobless claims fell in the first week of July and are on a downward path from earlier in the year. The number of job openings rose in May to their highest levels since August 2007. Retail sales growth in June was solid and there were upward revisions to the data for April and May. An increase in the July homebuilder's index suggests improving confidence in the housing recovery. The Fed's Empire manufacturing index for July was at its highest level since May 2010 and industrial production grew at (an annualized) 5.5 percent in the second quarter of the year.

3. **Fed outlook**. In testimony to the Congress on July 15 and 16, Chair Yellen noted that the still-elevated unemployment rate, depressed participation rates, and slow pace of wage growth suggest that the level of slack in the labor market remains considerable, despite recent improvements in labor market indicators. Chair Yellen noted that "almost all" FOMC participants expected the first rate hike at some time in 2015 and that asset purchases would likely conclude after the October FOMC meeting. The Fed Chair assessed that the threats to financial stability at this stage appeared moderate.

4. **Regulatory cooperation**. On July 8, the US Treasury and the European Commission reiterated their commitment to cooperate on financial market regulation, in particular on OTC derivatives regulation and cross-border resolution.

5. **The Mid-Session Budget Review**. The growth projection for 2014 was revised down from 3.1 percent in the March Budget to 2.4 percent (although the estimate does not incorporate the latest GDP estimate for Q1). Average growth in 2015–19 is also projected to be slightly lower than in the Budget. These revisions imply there will be modestly larger fiscal deficits and a higher debt-to-GDP ratio over the medium term. Nevertheless, the federal deficit for FY2014 and 2015 has been revised down by around ¼ percent of GDP in each year (to 3.4 and 2.9 percent of GDP respectively) due to slower-than-expected spending in a range of programs (including the use of Hurricane Sandy recovery funds, defense spending, and healthcare).

6. **Legislative action.** On July 9, Congress passed the "Workforce Innovation and Opportunity Act", a compromise between the Senate and House versions of a bill that reauthorizes and streamlines the existing job training programs and gives states more flexibility in using federal funds. Committees in the House and Senate have both approved measures to temporarily address the funding of the Highway Trust Fund; work will now aim to reconcile the differences between the two proposals.

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INTERNATIONAL MONETARY FUND

COMMUNICATIONS DEPARTMENT

Press Release No.14/359
FOR IMMEDIATE RELEASE
July 23, 2014

International Monetary Fund
Washington, D.C. 20431 USA

IMF Executive Board Concludes 2014 Article IV Consultation with the United States

On July 22, 2014, the Executive Board of the International Monetary Fund (IMF) concluded the Article IV consultation with the United States.[1]

Economic activity in the U.S. accelerated in the second half of 2013, but an unusually harsh winter conspired with other factors—including an inventory correction, a still-struggling housing market, and slower external demand—caused momentum to fade in early 2014, leading to a contraction in growth of 2.9 percent in the first quarter.

Over the past few months, however, a broad-based improvement appears to be unfolding as evidenced by stronger employment and industrial production numbers. Looking ahead, activity is projected to accelerate in the remainder of this year to well-above potential (in the 3–3½ percent range), although the drag on growth from the first quarter contraction will not be offset. This means growth for the year as a whole will be a disappointing 1.7 percent. More positively, barring unforeseen shocks, 2015 growth should accelerate to the fastest annual pace since 2005, propelled by strong consumption growth, a declining fiscal drag, a pickup in residential investment, and easy financial conditions.

Risks around this outlook include slowing growth in emerging markets, oil price spikes related to events in Ukraine and Iraq, and earlier-than-expected interest rate rises. However, as confidence in the recovery picks up, nonresidential investment could grow more than expected and labor force participation could bounce back.

[1] Under Article IV of the IMF's Articles of Agreement, the IMF holds bilateral discussions with members, usually every year. A staff team visits the country, collects economic and financial information, and discusses with officials the country's economic developments and policies. On return to headquarters, the staff prepares a report, which forms the basis for discussion by the Executive Board. At the conclusion of the discussion, the Managing Director, as Chairman of the Board, summarizes the views of Executive Directors, and this summary is transmitted to the country's authorities. An explanation of any qualifiers used in summing ups can be found here: http://www.imf.org/external/np/sec/misc/qualifiers.htm.

Looking at the medium term, potential growth is forecast to average just above 2 percent for the next several years, significantly below the historic average growth rate. This downgrade reflects the effects of an aging population and more modest prospects for productivity growth. This makes it critical for the authorities to take immediate steps to raise productivity, encourage innovation, augment human and physical capital, and increase labor force participation. Moreover, recent growth has not been particularly inclusive, with the latest data pointing to almost 50 million Americans living in poverty (as shown by the Census Bureau's supplemental poverty measure) and the official poverty rate stuck above 15 percent despite the ongoing recovery. In terms of policy actions, the Federal Reserve has made important and substantive efforts to increase transparency and has adopted an adaptable approach to communication. The recent shift to qualitative forward guidance provides the Fed with greater flexibility but puts an even higher premium on clear and systematic communication to guide expectations. On the fiscal side, following the debt ceiling brinkmanship and the government shutdown in October 2013, the Bipartisan Budget Act and the subsequent raising of the debt ceiling were important steps to reduce fiscal risks. However, the need for a medium-term fiscal adjustment to ensure a downward path for the public debt remains. On the financial side, progress has been achieved on variety of fronts, including implementing the Dodd Frank Act, finalizing the Volcker rule, and designating another systemic important financial institution. In addition, the U.S. recently put in place a rule to require foreign bank organizations over a certain size to incorporate as holding companies, a move that aligns the treatment of foreign and U.S. banks that are operating in the U.S. and eliminates an existing regulatory distortion.

Executive Board Assessment[2]

Executive Directors broadly agreed with the thrust of the staff appraisal. They welcomed signs of a meaningful economic rebound following a temporary setback in the first quarter of 2014. Directors noted that stronger growth is expected to be underpinned by a continuation of accommodative monetary policy, a substantial reduction in the fiscal drag, and improved labor and housing conditions. At the same time, however, risks and uncertainties continue to weigh on the outlook, including the pace of interest rate increases and market expectations, and growth prospects in other advanced and emerging market economies. Directors underscored that higher growth in, and strong policy action by, the United States would have important positive global spillovers.

Directors supported focusing policy efforts on managing monetary policy normalization, raising potential growth, reducing long-term unemployment, tackling poverty, and maintaining debt sustainability over the medium term. Achieving these objectives would call for wide-ranging measures—and, more importantly, political consensus—in such areas as

[2] At the conclusion of the discussion, the Managing Director, as Chairman of the Board, summarizes the views of Executive Directors, and this summary is transmitted to the country's authorities. An explanation of any qualifiers used in summings up can be found here: http://www.imf.org/external/np/sec/misc/qualifiers.htm.

investments in infrastructure and education, a comprehensive tax reform, active labor market policies, and a skills-based approach to immigration reform. Directors concurred that an expansion of the Earned Income Tax Credit, possibly complemented by a higher minimum wage, would help address poverty and inequality while promoting labor participation.

Directors welcomed the Bipartisan Budget Act and the subsequent raising of the debt ceiling as important steps to address fiscal risks. They emphasized the critical importance of reaching agreement on a credible medium-term fiscal consolidation plan, which would help to articulate a roadmap for achieving debt sustainability and provide an important anchor for fiscal policy to support the recovery in the short run. In this regard, while a few Directors stressed the need to stay the course of fiscal consolidation, most saw scope for expanding the near-term budget envelope in areas with a high and lasting growth impact, which would need to be funded by savings in future years, including through upfront action to control health care and entitlement spending. Directors also encouraged steps to improve budget procedures and the institutional framework more broadly, with a view to reducing uncertainty in the future.

Directors agreed that the current highly accommodative stance of monetary policy is appropriate, consistent with the Federal Reserve's objectives of maximum employment and price stability. They generally viewed that, in the case of a slow progression toward full employment and continued subdued inflation, policy rates could stay at zero for longer than currently anticipated so long as inflation expectations remain firmly anchored. Directors recommended, however, that the authorities monitor wage developments closely and remain cognizant of financial stability risks. They welcomed the Federal Reserve's forward guidance and recommended continued efforts to enhance its communications to provide greater clarity about monetary policy decisions, ensuring a smooth normalization.

Directors welcomed progress in strengthening the resilience of the financial system over the past few years. They called for continued vigilance to potential systemic risks associated with the prolonged period of very low interest rates, particularly activities of nonbank intermediaries. Directors underscored the benefits of a strong macroprudential framework, and tightened supervision and prudential norms across banks and nonbanks, with a few suggesting that care be taken to ensure a level playing field between domestic and foreign banks. Directors looked forward to continued U.S. leadership in advancing the global financial regulatory reform agenda.

Directors acknowledged recent initiatives to address remaining weaknesses in the housing market. They encouraged further steps to improve the availability of mortgage financing and to clarify the role of the government in housing finance, including through administrative action as efforts on broader legislative changes continue.

Appendix 1. Data Description

Implied volatility of swaptions. A swaption is an option that gives one party the right, but not the obligation, to swap a fixed rate for a floating rate (based on the 3 month Libor). The expiry of the option denotes the amount of time the party has to exercise the option, while the option tenor is the duration of the contract once it's exercised. The expiry can be thought of as an approximation of the interest rate horizon. For instance, an option with a 1 year expiry, 1 year tenor, represents market sentiment about the short-term rate over a year, one year from now.[39]

The dispersion of forecasts. The dispersion of the Philadelphia Federal Reserves' Survey of Professional Forecasters (SPF) forecasts is the difference between the 75th and 25th percentiles of private market participants four quarters ahead forecast of the CPI and the unemployment rate.

Time to lift-off. We construct a 36-month ahead curve from generic monthly Federal Funds futures contracts for each day and count the number of months until the interest rate exceeds 50 basis points.

VIX. Measure of the implied volatility of the S&P 500 index options over the next 30 days.

OIS-Libor Spread. Spread between the overnight indexed swap and the 3-month LIBOR rates, a commonly used measure of credit and liquidity risk.

[39] For robustness, we also run regressions using realized volatility of eurodollar futures, as well as the MOVE index of implied volatility in Treasuries as the dependent variable and other control variables. Realized volatility of Eurodollar futures contracts: Eurodollar futures contracts are derivatives based on the interest rate paid on dollar denominated short-term deposits outside of the United States. The realized volatility is computed as the 10-day standard deviation of the day-over-day rate change based on the end of day option price. Merrill Lynch Option Volatility Expectations Index (MOVE Index): the index is a weighted index of implied volatilities on 1-month Treasury options at different maturities. The weights are: 20% on 2yr, 20% on 5yr, 40% on 10yr, and 20% on 30yr. Realized volatility and the MOVE index show similar trends. We also contolled for euro area sovereign stress using the spread between euro area core versus periphery long term (10 year) bonds.

THE OPERATIONAL FRAMEWORK FOR MONETARY POLICY

E. Introduction

75. **Unconventional policies have been used for a longer period and in greater volume than originally envisaged, with focus now moving toward the Fed's preparedness to manage financial conditions during normalization.** The Fed commenced Large Scale Asset Purchases (LSAPs) in 2009, and has increased its balance sheet from $800 billion to $4.3 trillion. Tapering commenced in early-2014 with the expectation that the LSAP program would gradually be wound down and finish towards the end of 2014, if economic conditions evolve as expected.

76. **The FOMC has indicated that it wants to reduce the size of its balance sheet over time and return to targeting short-term interest rates.** It first outlined its Exit Strategy Principles in June 2011, and suggested that it wanted to return the quantity of bank reserves to *'the smallest levels that would be consistent with the efficient implementation of monetary policy.'*[40] It reviewed its Exit Strategy Principles and normalization plans in May 2013 and April 2014, noting that the Federal funds rate *may not* be the best indicator of the general level of short-term rates, and that new tools may be needed to improve control over short-term rates.[41]

77. **This paper assesses operational issues during normalization and for the longer term.** The pre-crisis framework is described, preparedness for exit is assessed, and suggestions offered on the shape of the post-normalization framework.

F. Some History

The Pre-crisis Framework

78. **Pre-crisis, the Fed targeted the federal funds rate, an overnight unsecured interest rate.**[42] Typically policy announcements had an immediate impact on money market rates, and there was little long-term relationship between excess reserves, which were very small ($1 billion to $2 billion), and trends in interest rates (Figure 1). There was however a tight connection between the level of excess reserves and interest rates within the reserve maintenance period. Excess reserves were low, reflecting a low level of demand given a high opportunity cost (excess reserves were not remunerated) in the context of a well functioning money market and efficient payments infrastructure.

[40] Minutes of the FOMC meeting held June 2011.
[41] Minutes of the FOMC meetings held April 30–May 1, 2013 and April 29–30, 2014.
[42] Simon Potter: Executive Vice President Federal Reserve Bank of New York, December 2, 2013. Recent Developments in Monetary Policy Implementation: (Potter speech).

79. **The Fed conducted monetary policy in the context of a small structural liquidity deficit using a standard set of instruments.**[43] The bulk of the deficit came through the Fed's policy of increasing its holdings of U.S. Treasury securities as the stock of Federal Reserve notes rose over time, as well as the imposition of the reserve requirement on depository institutions. In addition, the discount window (rarely used) was available to depository institutions, and fine-tuning open market operations (OMO) to adjust the supply of reserve balances with fluctuations in demand, were conducted on a daily basis with a small set of primary dealers.[44]

Figure 1. Excess Reserves of Depository Institutions and Selected Interest Rates
(Monthly average)

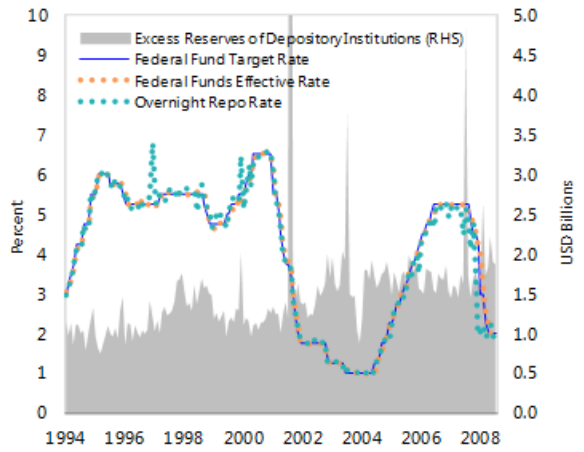
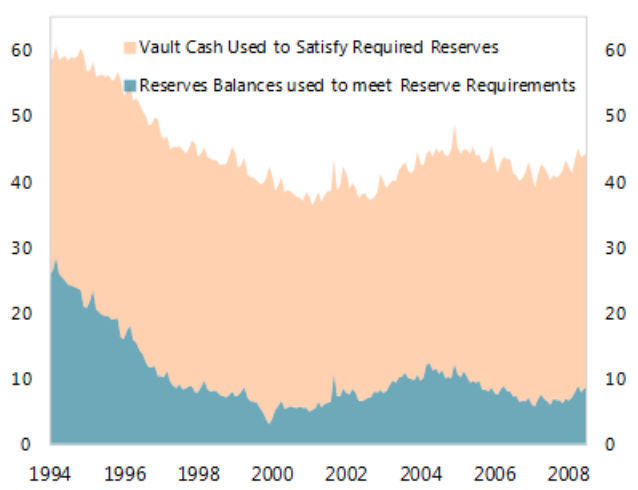


Figure 2. Composition of Reserve Requirements
(Monthly average)



Sources: Federal Reserve Bank of St. Louis and IMF calculations.

[43] The main features of the monetary policy frameworks of the Bank of Japan, the Federal Reserve and the Eurosystem: Conference paper May 2000.
[44] Primary dealers, usually numbered between 20 and 25, and were required to be a banking organization or a registered securities dealer in good standing with the regulator. Their duties included making markets to the Fed Trading desk, supporting the U.S. Treasuries market, and providing market intelligence.

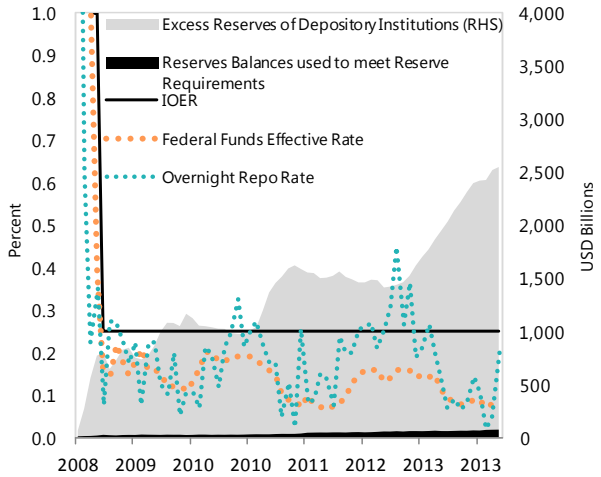
Post-Lehman Balance Sheet Expansion

80. **In response to the financial crisis, and in an effort to stabilize financial markets and promote economic recovery, the Fed introduced major changes to its operational framework:**

- To maintain control over short-term money market rates while adding liquidity to counter growing financial stability risks, the Fed started remunerating reserves balances in October 2008, which was earlier than an initially planned date of 2011.[45]
- In December 2008 the fed funds target was changed from a *point target* (1.0 percent) to a *range target* (0–0.25 percent).
- Initially various Fed lending programs and then ongoing LSAP programs significantly increased the volume of excess reserves (Figure 3). The interest rate paid on excess reserves (IOER) has been 0.25 percent for some time, while the expansion in excess reserves put downward pressure on both the fed funds rate and repo rates resulting in both trading below this level.[46] The fed funds rate has generally remained in a range of 0.05 to 0.15 percent in recent years.

81. **In parallel to those moves, fed funds transactions contracted sharply and with a change in the nature of activity.** Initially, markets fragmented as uncertainty about the health of the banking system led to a flight to quality and less trading between financial institutions. Subsequently, the introduction of the IOER and the increase in excess reserves reduced institutions' need to actively manage liquidity. As a result, fed funds daily activity fell from an estimated $250 billion in 2006 to $60 billion at the end of the 2012. The nature of the lending to the market also changed, with Federal Home Loan Banks (FHLB), that do not have access to the IOER, now estimated to provide 75 percent of fed funds lending, up from a pre-crisis estimate of 40 percent.[47] The other

Figure 3. Reserves of Depository Institutions and Selected Interest Rates



[45] The Financial Services Regulatory Relief Act 2006 authorized the Fed to pay interest on reserves beginning October 2011. This authority was superseded by the Emergency Economic Stabilization Act 2008 bringing forward the authority to October 2008.
[46] The IOER does not act as a firm floor to the Fed Funds rate because only depository institutions have access to the IOER. Government Sponsored Enterprises do not have access to IOER and are large sellers of Fed funds.
[47] Liberty Street Economics December 2, 2013: Who's Lending in the Fed Funds Market?

large entities that do not have access to IOER—Fannie Mae and Freddie Mac—appear not to have been active in the fed funds market since 2011. U.S. branches of foreign banks now represent a bigger share of borrowing in the market. This is attributable in large part to differences in capital requirements and the FDIC's expansion of its deposit insurance assessment base (2011) [48] that increased the effective cost of fed funds for domestic banks and undermined the latter's ability to arbitrage the IOER. Deposits held by U.S. branches of foreign banks are generally not insured.[49] Despite all of these changes, the Fed considers that fed funds rate is still connected to other money market rates and remains a good indicator of banks' marginal funding costs.

G. Normalizing the Policy Stance

The Challenges Ahead

82. **The Fed has made a number of changes in preparation for rate increases, the timing of which they have stressed will be data dependent—the markets are pricing in the first rate rise in mid-2015.** The changes (below), including the testing of new instruments, are to ensure the Fed is operationally prepared to tighten conditions when the time comes:

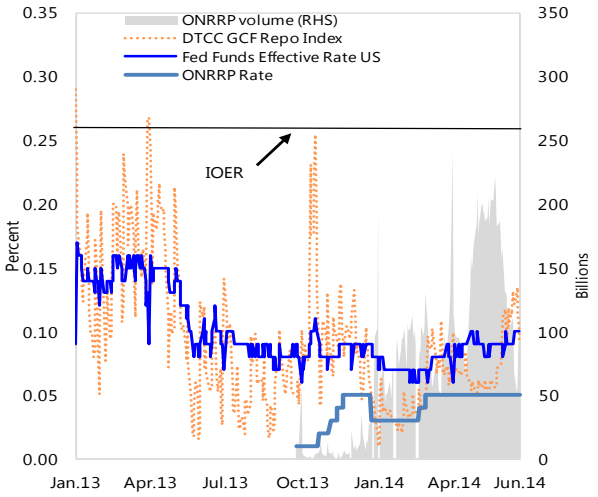
- ***The number of reverse repo counterparties has been increased*** to 139 (18 banks, 6 Government Sponsored Enterprises, 94 money funds, and the 21 primary dealers).[50]
- ***Testing of term reserves draining instruments:*** Deposits[51] and reverse repos.
- ***Testing of Overnight Fixed Rate Reverse Repos (ONRRP).*** This instrument, first introduced in September 2013**,** could be considered either as similar to a *standing facility*—if accessible without restriction, or an *OMO*—if offered with an allotment cap. The instrument has been tested at fixed rates from 1 to 5 basis points and up to a recently increased cap of $10 billion per counterparty. Testing is partly aimed at identifying how the instrument impacts money market rates and intermediation flows, and its effectiveness in establishing a floor for overnight market rates.[52] The evidence to date suggests that the instrument *has* been effective in setting a floor under rates (Figure 4).

[48] In December 2013 U.S. branches of foreign banks held $1 trillion of the reserves at the Fed representing 43 percent of total reserves but accounted for only 13 percent of banking assets in the U.S.A.
[49] Liberty Street Economics December 9, 2013: Who's Borrowing in the Fed Funds Market?
[50] These counterparties account for 25 percent of all overnight Treasury tri-party repo volume—(Potter speech).
[51] All banks are able to participate in term deposit auctions and not just those in the reverse repo counterparty list.
[52] FOMC Minutes: September 17–18, 2013.

83. **In preparation for normalization, *decisions* and *clear communication* regarding two key parameters are vital: the *operating target* and its *positioning*.**

- **The fed funds rate should remain as the operational target during most (if not all) of the normalization period.** The prior is to change the operating parameters only where there is a clear benefit in doing so. At this point, there seems no clear benefit in moving away from the fed funds target, while there could be risks in doing so, given the uncertainties about the behavior of interest rates in different market segments going forward. The use of the fed funds rate in financial contracts would also suggest that any change should be communicated well in advance, to allow market participants sufficient time to adjust their contractual arrangements.

Figure 4. Selected Interest Rates and the Fed's ONRRP



Source: Bloomberg and IMF estimates.

- **The Fed should target a single rate in the context of a floor system; with the target rate set equal to the IOER**. While a fed funds *target range* (0–0.25 percent) makes sense at interest rates close to zero, continuing with a *policy range* once the tightening phase has begun could undermine the clarity of the policy signal. If a policy range were to be retained, there is a question of whether the Fed would be indifferent to the fed funds rate trading anywhere within the announced range, or whether the mid-point of the range was in fact the implicit target. And if it were the latter, then why not return to a single-point target; and in the context of a floor system, *the fed funds target would equate with the rate set on the IOER*.[53]

[53] The Fed should move away from the current approach of paying interest at the top of announced interest rate range. In all other cases, central banks pay interest on reserves to signal and set a floor under market rates.

- **The ONRRP, with an allotment cap to mitigate financial stability risks, would be the primary *monetary policy tool* to engineer an increase in the fed funds rate to, or slightly above, the IOER (Box 1).** With uncertainty about the ONRRP rate that is consistent with a fed funds rate trading at the IOER, the Fed could gradually increase the ONRRP rate until it achieved the fed funds objective. Periodically, given seasonal influences in the net-issuance of securities, the ONRRP rate may need to be changed to control the fed funds rate as desired, but any such change in the rate would *not* signify a change in policy – to be clear, the ONRRP is a *monetary policy tool* and *not a target*.

- **Using the new tools in an environment of abundant liquidity could result in more variation in the fed funds rate from the target than in the past, which should not be of concern given clear communication.** Moving back to a single rate policy target could be challenging but would not need to be achieved immediately upon announcement. A modest first step in the tightening cycle would be from the current target of 0–0.25 percent to 0.25 percent. That the fed funds rate does not immediately adjust to the target should not be a concern given an initial small change in the policy target, when combined with a credible commitment to achieve the target over the short-term (maybe one to three weeks). The Fed should also communicate clearly about the likely *challenges* of controlling the fed funds rate, suggesting that somewhat more volatility is possible, especially early on in the tightening cycle given the uncertainty about the demand for its new tools.

84. **Preparations for the effective control of money market conditions during normalization appear to be on track, but there are uncertainties ahead:**

- ***The ONRRP may not always be sufficiently effective to move the fed funds rate to the IOER.*** It is not certain that the counterparty list has been sufficiently expanded to control rates in a rising rate environment. Testing so far suggests that ONRRP rate has placed a floor under repo rates but volumes have been low with rates still compressed close to zero. It is not clear whether significantly larger volumes would be required once tightening begins, in order to have the desired impact on the fed funds rate; and if larger volumes were required, potentially more counterparties may also be needed. Further, limited access (12.45pm–1.15pm) may undermine the efficacy of the ONRRP once policy rates are increased, as up to half of tri-party repo (the bulk of the repo market) activity is reportedly conducted after 3pm (although as noted earlier the ONRRP has thus far set an effective floor).

Box 1. The Mechanics of Draining Reserves: the ONRRP and the Fed Funds Rate

The fed funds rate is determined by the interaction between the supply and demand for fed funds (Fed Funds Figure below) and the Fed's policy interest rates.[1] For any given demand curve, Fed operations that drain liquidity—whether overnight or for a term—move the supply curve left, resulting in an increase in the fed funds rate.[2] Currently the fed funds rate trades below the IOER because of: 1) abundant liquidity (S1), and 2) constraints on some banks' ability to arbitrage between the providers of fed funds that are not able to receive the IOER and the IOER. These constraints are largely regulatory in nature—capital, leverage, liquidity, and the FDIC levy—but may also reflect an unwillingness of the GSEs to make placements with certain banks.

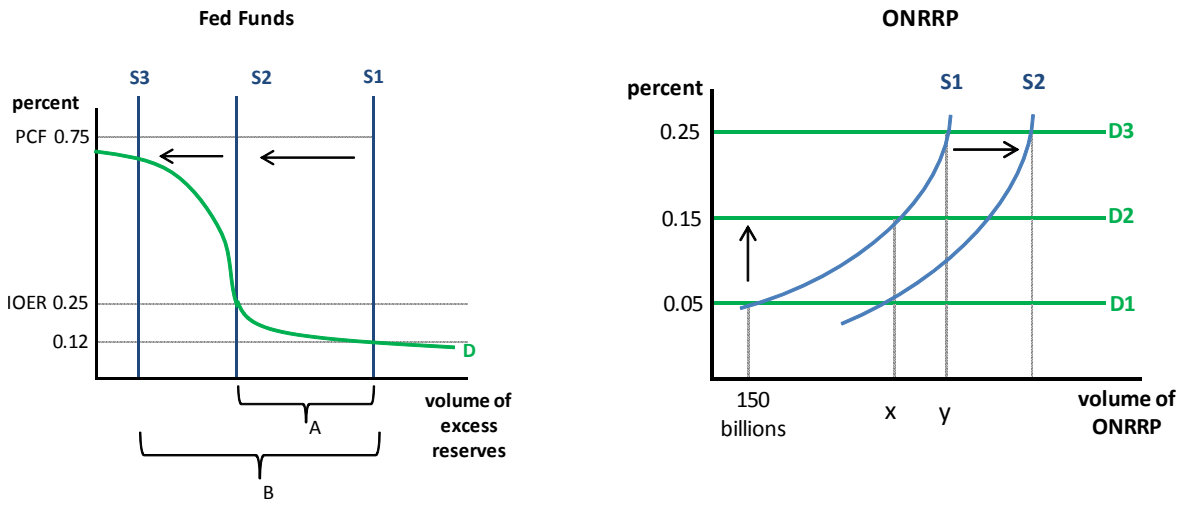
If the Fed wanted to increase the fed funds rate to a level *at or slightly above the IOER*, then it would have to reduce the supply of fed funds by magnitude "A." This objective could be achieved in principle by offering the fixed volume 'A' of term sterilization instruments, but in doing so the Fed would have to accept the market clearing rate on the instruments. This approach is problematic from two perspectives: 1) significant uncertainty about the demand curve for fed funds makes it difficult to assess "A," and 2) term instruments would incur a term premium.

The ONRRP is a fixed rate instrument offered by the Fed. The Fed's demand for funds (i.e., the scale of ONRRP operations) is perfectly inelastic while the market's supply curve of funds is upward sloping (ONRRP Figure below). There are two impacts here: 1) The ONRRP rate sets *a floor under repo rates*; participants would not deal at a rate lower than what the Fed was offering. The solidity of this floor is however contingent on the breadth of the counterpart list – which has been addressed through the increase in the number and type of counterparties. 2) Funds placed in the ONRRP are funds that are withdrawn from banks, therefore the supply of fed funds falls (the fed funds supply curve moves left), putting *upward pressure on the fed funds rate*.

The Fed is acquiring information about the market's supply curve for the ONRRP by varying the rate but the information to date is limited given the highest rate offered is 5 basis points, and the volumes have been capped. Consequently, there is considerable uncertainty about market behavior when ONRRP rates approach the IOER. However, when the time comes for an interest rate rise, the Fed can move slowly, increasing the ONRRP rate in small steps until the desired fed funds rate is achieved. This process would further reveal the supply curve for ONRRP and the demand curve for Fed funds, recognizing that these curves move over time. Market commentators have variously suggested that the ONRRP rate could be set at 0 to 15 basis points below the IOER. A driver of this spread is the FDIC levy which is around 12 basis points; a spread lower than this level provides the money market mutual funds with an advantage (since they don't pay the levy) allowing them attract more funds from banks thereby putting upward pressure on the Fed funds rate. And a higher spread could well result in the fed funds rate remaining below the IOER. But only when the time comes, will it be clear where ONRRP rate will need to be, to exert the desired pressure on the fed funds rate.

Box 1. The Mechanics of Draining Reserves: the ONRRP and the Fed Funds Rate (Continued)

The ONRRP offers Fed counterparties with a *safe asset* given the use of Treasuries and Government guaranteed mortgage backed securities, and with the Fed as counterparty. The supply of this safe asset is limited only if the Fed limits access to the ONRRP, for example with the allotment cap (currently set at $10 billion per counterparty). Financial stress would increase the demand for safe assets—moving the ONRRP supply curve to the right (S2), and the fed funds supply curve to the left. The more acute the financial stress the further the curves move, with potential to push banks to the Fed's Primary Credit Facility (S3)—the demand curve for fed funds would also move up exacerbating the impact on the fed funds rate. Counterparty caps limit the extent to which the ONRRP supply curve could move to the right, and as such are useful to contain disintermediation pressures in the banking sector. And lowering the rate on the ONRRP also could reduce flows into the instrument. However, it is unclear that fine-tuning the counterparty cap and/or the ONRRP rate would provide a sufficiently effective response in a severe stress scenario; a more targeted approach may be required depending on the circumstance.



[1] The demand curve is a stylized illustration of what is may look like.
[2] To the extent the demand curve is sloping; at current levels of oversupply it is virtually flat.

- ***Financial stability risks arising from disintermediation of the banking sector.***[54] These risks could arise if deposits are attracted out of banks and into money market mutual funds—increasing the size of the less-tightly regulated shadow banking system.[55] Further, in times of financial stress there could be runs *into* money funds— exacerbated by some funds having publicized their access to an unlimited volume of safe assets (i.e. the ONRRP). Risks of disintermediation increase if the instrument is offered without an allotment cap.

- ***Operational challenges of conducting large volumes of overnight transactions.*** Each day, transfers of *securities* and *cash* will be required. While only small volumes of transactions are currently conducted, much larger volumes may be required to move the fed funds rate closer to the IOER (maybe in excess of $1 trillion), which could potentially double the current tri-party repo volumes. Such a surge in volumes would increase the operational and financial risks related to settlement.[56]

Steps to Improve Implementation and to Mitigate Risks

85. **Measures could be considered to increase the solidity of the interest rate floor:**

- *Further expanding the number of counterparties,* if rates traded below the ONRRP rate. There could be important segments of liquidity unable to access the instrument (e.g., a large number of investment intermediaries which fall below the threshold to become counterparties); this could be addressed by further expanding the counterparty list. The resulting increased risks of disintermediation (i.e., funds flowing out of banks into money market funds) would need to be mitigated by:

  - *Maintaining and managing the allotment cap on the ONRRP*. The allotment cap impacts only on the non-banks, as banks will not use the ONRRP because of access to IOER (which pays a higher interest rate). The caps should be maintained to mitigate financial stability risks (see Box 1) and be set at a level that allows the Fed to meet its operating objectives. A uniform cap across counterparties is the easiest to administer, while recognizing proportionally larger counterparties may be disadvantaged with this approach.

  - *Managing the ONRRP rate, relative to the IOER*. A significant move of funds out of banks would push the fed funds rate up which could be countered by a lowering of the ONRRP

[54] William Dudley, President FRBNY Speech May 20, 2014: The Economic Outlook and Implications for Monetary Policy.
[55] Regulatory arbitrage is likely given that banks are subject to capital, liquidity and FDIC costs and other counterparties are not.
[56] Because haircuts are not applied to reverse repo transactions, the Fed is exposed to market risk if a counterpart defaults and if the value of the security has increased – albeit a small risk in the context of overnight transactions. Further large volumes of overnight deals increase the intra-day exposures in the tri-party system, something that has been the focus of the Tri-party Repo Infrastructure Reform Task Force to reduce.

rate. *The ONRRP will probably be set below the IOER to compensate for the FDIC levy and other regulatory costs that fall on banks but not on money market funds.*

- *Extending the timing of the operation.* When the ONRRP is not available there would be no effective lower bound on rates. Therefore, it may be necessary to extend the ONRRP operation to much later in the day when a significant volume of overnight deals are done.

Table 1. Summary of Instruments' Costs and Impacts

	Counterparty Relevance	Format	Costs	Reserves Draining Impact	Post-Normalization
Reserve requirement	Banks	Administrative	IOER [1]	Permanent (until changed)	Not recommended
IOER (policy rate)	Banks	Standing facility [2]	IOER	None	Yes
Term deposits	Banks	Auction (fixed price or fixed quantity)	IOER *plus* term premium	Temporary	Not required
ONRRP	Non-banks	Standing facility (maybe capped)	IOER *minus* margin	Temporary	Not recommended
Term RRP	All	Auction (fixed price or fixed quantity)	ONRRP *plus* term premium	Temporary	Yes (small volume)
Asset sales	All	Auction / Bi-lateral transactions	At market prices	Permanent	Not required [3]

[1] This assumes the current policy of remunerating required reserves at the same rate as excess reserves, although the Fed could choose to apply different rates to each category of reserves.
[2] A standing facility is an arrangement offered by the central bank that can be utilized at the discretion of depository institutions and generally without restriction. Payment of interest on excess reserves (IOER) has these characteristics.
[3] The FOMC has suggested there could be residual MBS sales after normalization.

86. **Term sterilization instruments would reduce the heavy reliance on overnight operations but would carry additional cost.**[57, 58] A mix of term deposits and term reverse repos could be used to tighten liquidity conditions, thereby reducing segmentation and operational risks. Term deposits, would incur a term premium above the IOER, while term reverse repos would incur a term premium above the ONRRP (but could still be below the IOER). The liquidity premium on term reverse repos is to some extent, a function of the liquidity constraints on money market mutual funds, something that could be mitigated by attaching a 7-day put option to the instrument; something the Fed has also tested.

H. Considerations for the Future Shape of the Operating Framework

87. **The current juncture provides an opportunity for a broader review of the operating framework.** The post-exit framework will be different to that of today, and probably that of the pre-crisis period. Abundant liquidity currently limits operational choices, yet it should still be possible to implement changes along the path to normalization; i.e. that being the point where the Fed's balance sheet reverts to a *steady state*.

88. **Differences in interest rate targeting frameworks come down to a few key areas:** (1) Specification of the operating target; (2) positioning of the operating target; (3) instrument design; (4) counterparty selection; and (5) collateral policy. Each of these issues except collateral policy is discussed in subsequent sections and Table 2 provides a country comparison.[59]

Specification of the Operating Target

An implicit or explicit operating target?

89. **Central banks can influence financial conditions by targeting interest rates, either implicitly or explicitly.**[60]

- **With an implicit target there is no market rate announced as a target.** The *policy target* is tied to a central bank instrument in the expectation that short-term *money market rates* will remain close to the level at which there is commitment to add or withdraw liquidity.[61] Idiosyncratic movements in individual market rates therefore matter less. However, market

[57] Some central banks use foreign exchange swaps as a liquidity management instrument but this is not feasible for the Fed as it has few foreign reserves to swap into dollars and borrowing the reserves could be costly.
[58] Higher reserve requirements could complement the toolkit during normalization. However statutory limitations on the types of reservable accounts and the maximum level restrict the potential impact.
[59] With Fed's balance sheet returning a small deficit and with abundant supply of US government securities, there no requirement to expand the collateral pool used for normal monetary operations. Further, the collateral policy for the Discount Window (LOLR) is well defined and sufficiently broad to meet current needs.
[60] Conventional monetary policy works through *actual and expected real short-term risk free rates* while unconventional policy aimed to impact expectations of short-term rates (through forward guidance) and the term premium through the asset rebalancing channel (LSAPs).
[61] This excludes transactions at central bank standing facilities which are priced at penalty rates.

rates may move away from the policy rate when the interbank market is fragmented and some banks have a higher demand for liquidity than others (e.g., Euro area).

- **An explicit target involves a commitment to guide an identified market rate (or rates) consistent with an announced policy target.** This option may require a more active approach, as operational credibility relies on central bank actions to contain deviations of the targeted rate from the announced target.

Table 2. Operational Features of Interest Rate Targeting Regimes

	USA	ECB	BOE	Sweden	Australia	Canada	Brazil	Chile
Operating Target								
Explicit or Implicit	Explicit	Implicit	Implicit	Implicit	Explicit	Explicit	Explicit	Explicit
Which (explicit) rate	Unsecured	NA	NA	NA	Unsecured	Composite	Repo	Unsecured
Floor or Mid-corridor								
Pre-crisis	No Floor defined	Mid	Mid	Mid	Mid	Mid	Mid	Mid
Current	Above the floor	Mid	Floor	Mid	Mid	Mid	Mid	Mid
Corridor Width	75 bps	25 bps	75 bps	150 bps	50 bps	50 bps	160 bps	50 bps
Main instrument (pre-crisis)	Overnight repos	1-week repos	1-week repos	1-week repos [1]	OMOs [2]	Overnight repos	OMOs	OMOs
Reserve requirements	Yes	Yes	Suspended in 2009	No	No	No	Yes	Yes

[1] More recently liquidity has been withdrawn at the weekly operation owing to a structural surplus.
[2] Open Market Operations (OMOs) comprise a range of transactions conducted by the central bank including repos, reverse repos and outright purchases and sales of securities.

90. **The Fed should continue to announce an explicit operating targeting.** Central banks have successfully employed both implicit and explicit approaches to the operating target (Table 2). As neither approach has been proven demonstrably superior, the Fed should retain an *explicit target* recognizing there is no clear advantage in changing.

Options for an explicit operating target

91. **Post-normalization, the choice of *operating target* will be guided by an assessment of the relevance of interest rates in different segments of the money market.** And, with more regulatory changes to be phased in over the years ahead, there is uncertainty about how the different segments will function. Three main options for targeting short-term interest rates are available—the fed funds rate (an unsecured overnight rate), a repo rate (a secured overnight rate) and a composite (reflecting money market conditions with indicators of which rates are most important).

Maintaining the fed funds rate

92. **The fed funds market has shrunk and it is uncertain by how much it will recover.** Risk aversion during the crisis reduced activity in the unsecured markets globally, in absolute terms and relative to activity in secured markets. In the U.S. a number of regulatory changes—capital, leverage, liquidity, and the FDIC levy—require banks to have more stable funding, relative to short-term financing. And there is evidence of diminished transmission of the fed funds rate to longer rates, but this should be treated with caution given the prolonged period of compressed rates.[62] Undermining the case for retaining the fed funds target is the likelihood that activity in the unsecured market is likely to remain subdued. It could be retained if activity did recover, and providing there was a sufficiently close relationship with movements in other money market rates.

The General Collateral Repo Rate (GCRR)

93. **The treasury GCRR is an alternative to the fed funds rate.**[63] The value of tri-party repo transactions is around $1.7 trillion with about one third relating to the treasury general collateral category, although the breakdown between overnight and term transactions is not available.[64] However, using the FICC-GCF repo data[65] as a proxy, around one third of the transactions may be overnight—equating to $190 billion (compared to fed funds estimated at $60 billion). With money

[62] Klee and Stebunovs December 2012: Target Practice: Monetary policy implementation in a post-crisis environment—page 22.
[63] The GCRR is based on a daily survey conducted by the FRBNY which is not publicly available. The DTCC General Collateral Finance (GCF) repo rate for treasury securities is suggested as a good proxy for the GCRR: Klee and Stebunovs 2012**.**
[64] FRBNY Tri-party repo data April 9, 2014. Data is obtained on the 7th business day each month, selected as being typical business day.
[65] Fixed Income Clearing Corporation (FICC)—General Collateral Finance (GCF) repos are transactions between dealers.

market mutual funds active in tri-party repos and other segments—short-term US treasury and corporate securities and the bi-lateral repo market—arbitrage ensures that changes in the GCRR are widely transmitted. Also relevant is the transmission from the GCRR to the repo yield curve, which appeared to remain more stable when compared to the unsecured lending curve.[66]

94. **The Fed could exert control over the GCRR—albeit with added complexity given the role of collateral.** Pre-crisis, the GCRR responded predictably to movements in the fed funds rate, but this relationship weakened at the onset of the crisis as risk premiums and liquidity increased.[67] Repo rates are affected not just by changes in liquidity, but also by seasonal influences affecting the net-issuance of treasury securities.[68] While abundant liquidity has weakened the short-term liquidity effects, when excess reserves run down, the liquidity effects should strengthen, with arbitrage activity recovering. With a balance sheet back at *steady state*, the Fed should then be able to manage the GCRR in a similar way to the fed funds rate pre-crisis, albeit with added complexity given the role of collateral and the uncertainty about the extent to which arbitrage activity recovers.

A composite approach could be considered

95. **Individual rates—including the GCRR—have been hit by idiosyncratic shocks complicating policy implementation.**[69] Going forward, the GCRR is certainly a viable option for a *single rate* operating target, yet it was impacted during the financial crisis (2008) when risk aversion resulted in a sharp fall in the rate, and again during the debt ceiling negotiations (2013) when, as the default risk on short-term treasuries spiked, so too did the rate. Rigid implementation responses in these circumstances, when a single rate is targeted, could exacerbate volatility in other markets undermining policy signals and effectiveness.

96. **To get around this problem the Fed could target *the general level of short-term rates,* while providing clear guidance on which rate was the most important indicator.** When a single-targeted rate moves but other short-term rates do not (or move by much less), from a policy perspective, there is no need for an immediate response to bring the rate back to the target; yet failure to act could pose communication challenges and risk credibility. To get around this problem, a combination of money market rates could be considered. The GCRR could be of primary importance—and communicated as such—but the fed funds rate and EURO dollar rates could also be used with lesser emphasis, as well as term rates (repo and bank certificate of deposits).

[66] Klee and Stebunovs December 2012: Target Practice: Monetary policy implementation in a post-crisis environment—page 22.
[67] Bech, Klee and Stebunovs 2011: Arbitrage, liquidity and exit: The repo and federal funds markets before, during and emerging from the crisis—Tables 4, 5 and 6.
[68] Klee and Stebunovs 2012: Target Practice: Monetary policy implementation in a post-crisis environment – page 20.
[69] Incorporating Financial Stability Considerations into a Monetary Policy Framework Jeremy Stein, March 21, 2014: Highlights the frequency of events that impact term and credit risk premiums.

97. **A less rigidly specified target rate would need to be clearly communicated.** In choosing between a single rate target and one more loosely defined, the trade-off is clear: *signaling clarity* vs *flexibility*. The signaling challenges can be met by communicating which rates are important, and why. And it should be noted that a moderate amount of volatility in all rates is expected and would not undermine the operational objective.

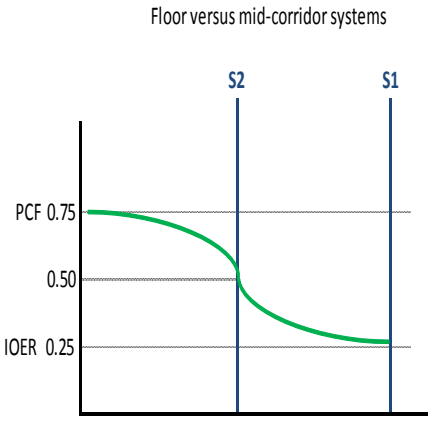
Positioning of the Operating Target

98. **Interest rates are targeted either at the floor or the mid-point of the corridor.** Prior to the financial crisis many central banks targeted the mid-point of the corridor, but liquidity injections aimed at addressing financial stability concerns subsequently pushed rates to the bottom of the corridor (a *floor system*) in a number of cases (e.g., BOE, ECB, and U.S.). In the U.S., bank reserves are currently remunerated at the top of the announced policy range (0.25 percent) with discount window borrowings available at a 50 basis points higher rate (0.75 percent). During normalization there is little choice for the Fed other than to adopt a type of floor system—determined by the interest rates applied to IOER and the ONRRP. As structural liquidity declines however, there will be the option to revert to a mid-corridor system.

99. **There is a good case to retain the floor system beyond normalization because it is operationally less complicated and more robust through the risk cycle (Appendix I).** The potential loss of bank information from subdued trading—an often-cited benefit of retaining a mid-corridor system—is countered through the stringent reporting requirements of the new liquidity regulation. And retaining the floor system post-normalization reduces the need for change once the Fed's balance sheet has reverted to a steady state.

Instrument Design

Figure 5. Floor versus Mid-Corridor Systems



100. **The supply of reserves should be *just* sufficient to keep rates at or slightly above the floor, to ensure institutions have some *liquidity risk* to manage.** To illustrate (Figure 5), with a mid-corridor system and an assumed policy rate of 50 basis points and amount of reserves at S2 would be required to meet the policy target. In the case of a floor system and with a policy rate of 25 basis points, then S1 volume of reserves is required. Strictly defined, implementation of a floor system would require the level of reserves to be at some point to the right of S1; thereby always pushing rates always to the floor. However, more liquidity means less liquidity risk, and less market activity. Therefore, a less rigidly applied approach to the floor system with liquidity provided at S1, would retain some liquidity tension, increasing trading, but with a consequence that the rate may on occasion trade above the floor.

101. ***Standing facilities* at the floor and the ceiling of the corridor are needed:**

- **The IOER will again become effective as the large structural surplus shrinks, allowing for a withdrawal of the ONRRP in its current form.** Active arbitrage will reduce market segmentation, thereby establishing the IOER as an *effective floor* under rates. While high liquidity and segmentation necessitated the introduction of ONRRP—*to fix the floor*—a return to tighter conditions means this instrument is no longer needed, and given the disintermediation risks it should be removed as soon as possible.

- **The Primary Credit Facility (PCF) establishes a ceiling rate, but this may involve stigma.** The PCF is for highly rated banks and intended to provide a safety valve for liquidity pressures. [70] It still may not be fully effective because of stigma as the Fed must, with a two year lag, disclose its lending activity.

102. **Instruments to manage short term liquidity fluctuations are still needed.** Fine-tuning operations will need to offset seasonal influences given the GCRR may respond to changes in both reserves, and the net-issuance of collateral. The Fed would need to use its portfolio of treasury securities through repo operations best offered as a variable rate/fixed volume format. This approach differs to its operations pre-crisis in that while the operations were variable rate, it did not announce an amount, thereby providing greater flexibility to determine an outcome consistent with its interest rate objective. If the Fed wishes to continue with this approach, information should—as before—be provided post-auction on the results of operation, to help market participants better assess liquidity conditions in support of more stable market conditions. Noted is that the Fed's auction facilities during the crisis involved detailed pre- and post-auction information on volumes and rates.[71]

[70] A Secondary Credit Facility is available to lesser rated institutions with restrictions on the use of fund—it is therefore more akin to a lender of last resort arrangement. It is currently priced 50 basis points above the PCF.
[71] Armantier and Sporn: Federal Reserve Bank of New York Staff Report 635 September 2013: Auctions implemented by the Federal Reserve Bank of New York during the Great Recession

103. **The reserve requirement no longer meets any monetary policy or liquidity management objective and can be withdrawn (Appendix II).** Eliminating the reserve requirement would free up reserves, thereby increasing excess reserves and reducing the need to inject additional liquidity.[72] There would also be administrative savings.

Counterparty selection

104. **Counterparty selection can be differentiated on the basis of instrument type:**

- *Standing facilities:* The IOER and the discount window facilities are limited to depository institutions, and this should not change.

- *Open market operations:* Regulatory developments (LCR and the supplementary leverage ratio) are likely to have undermined the Fed's ability to implement policy through the traditionally narrow set of primary dealers. However, beyond normalization, and in the context of an increased focus on the GCRR, the Fed may need to transact in larger volumes. With these considerations the expanded counterpart list is appropriate and should be retained, with an additional benefit of enhanced competition in the Fed's OMOs. A caveat being, only banks should have access to standing facility-type instruments (i.e. fixed rate instruments with or without limits) to mitigate disintermediation and subsequent financial stability risks.

I. Summary

105. **The recommendations for the *normalization period* are summarized:**

- Continue with the fed funds rate as the operating target of monetary policy.

- Announce that a floor system will be used during most, if not all, of the normalization period, and therefore the rate set on the IOER will equate with the fed funds target.

- Use the ONRRP, with counterparty allotment caps, as the primary monetary policy tool to manage the fed funds rate at or slightly above the IOER.

- Assess the need for further expanding the counterpart list if the ONRRP is not sufficiently effective.

- Manage the dis-intermediation and shadow banking risks of the ONRRP by announcing that it is unlikely that the instrument will be used post-normalization and that allotment caps may be changed to contain flows.

[72] The amount of reserve balances used to meet reserve requirements in March 2014 was $78 billion.

- Re-instate the single rate policy target; with the first modest move from the current 0–0.25 percent to 0.25 percent. Communicate the prospect that given abundant liquidity, there could be somewhat higher variation around the policy target than in the past.
- Explore the use of term sterilization instruments—deposits and reverse repos—to lessen operational risks. Small term premiums could be justified to reduce the burden of a daily rollover of large transaction volumes.

106. ***Post-normalization* considerations:**

- Consider alternate operating targets after it is clear how markets have adapted to the regulatory changes. Consider de-emphasizing the importance of a single rate in favor of focus on the *general level of money market rates*, while highlighting what the Fed considers to be the most important indicators (e.g., GCRR, Fed funds rate).
- Continue with the floor system.
- Withdraw the ONRRP: because the IOER will provide an effective floor once liquidity conditions tighten.
- Use short-term repos and reverse repos to manage the operating target close to floor.
- Abolish the reserve requirement, as it provides no benefit and is administratively cumbersome.

Appendix 1. Floor versus Mid-Corridor Systems

This appendix outlines the considerations when deciding between implementing a floor system, where the policy target rate is set at the *floor of the corridor*, and a mid-corridor system where the policy target rate is set *away from the floor* (but not necessarily at the mid-point).

Floor System

Advantages

There may be less variability between market and target rates. The combination of abundant liquidity and an *effective floor* anchors rates at the floor, thereby aligning market rates more precisely with the targeted rate.[1]

Higher reserve balances (than required in a mid-corridor system) may facilitate an increased supply of high quality liquid assets (HQLA).[2] Higher reserves levels could help alleviate a shortage of HQLA—although not a current concern in the U.S.—and support the function of the payments system.

The price/quantity nexus is removed, thereby providing more flexibility in times of stress. The IOER was introduced in 2008 at time when the Fed sought to put a floor under rates, while simultaneously increasing liquidity to counter mounting financial stresses. In these situations rates trade at the floor, facilitating a break in the price/quantity nexus—quantity can be increased—to a point—without impact on price (subject to the solidity of the interest rate floor and market segmentation issues which will impact at some point). A floor arrangement is therefore likely to be more robust across different phases of the risk cycle.

Less operational resource and fewer monetary instruments are required. Larger reserve balances would mean less need for accurate forecasting of the influences on reserves, and most likely, less fine-tuning operations to offset those influences.

There would be a positive impact on central bank profitability given the somewhat larger balance sheet. The higher level of reserves, incurring interest costs at the policy rate, would be matched against term assets earning the term premium.

[1] An important operational decision is the extent to which liquidity is *oversupplied*, as greater oversupply reduces the prospect of rates moving away from the floor.

[2] The impact on HQLA will depend upon how the reserves are supplied to the system. If they are supplied through the purchases of HQLA, then there will be no net change in the volume of HQLA. However, HQLA will increase when non-HQLA transactions are undertaken (e.g., repos with non-HQLA or foreign exchange swaps).

Disadvantage

Abundant liquidity reduces both liquidity risks and the incentive to trade in interbank markets, with a potential loss of information. The question arises whether less activity reduces the incentives and scope for peer-monitoring, leading to a loss of information about individual banks solvency, with negative financial stability consequences. While some literature supports this view,[3] others highlight that because interbank trading is very short-term, there is little focus on the long-term solvency of the borrowing bank.[4] Active interbank markets did not prevent the recent financial crisis (much of which was bank-sourced), so the benefit of active interbank markets should not be overstated.

Mid-corridor System

Two-way liquidity risk encourages trading and perhaps better transmission along the yield curve. With a greater incentive to manage liquidity, transmission along the short part of the yield curve would be stronger, given that rates are not forced to the floor.

Liquidity management is more challenging but could be mitigated by the use of a reserve requirement (or some form of contractual reserves) with averaging. With no liquidity buffer, frequent fine-tuning operations would be required to manage supply against forecasted demand in order to meet the targeted rate. Reserve requirements with full averaging would reduce interest rate volatility that would arise when supply and demand were not aligned on a particular day. A contractual reserves approach requires banks to reveal their demand for precautionary reserves, and combines incentives for them to manage their position in a manner consistent with their stated reserves position.[5]

[3] Rochet and Tirole 1996: Interbank Lending and Systemic Risk.
[4] Bernhardsen and Kloster, Norges Bank, 2010: Liquidity Management System: Floor or Corridor?
[5] The BOE pre-crisis, allowed banks to nominate their reserves levels at the start of each maintenance period.

Appendix 2. A Short History of and the Case Against Reserve Requirements

History

The use of reserve requirements in the USA can be traced back to voluntary redemption arrangements in the 1820s. Bank notes were used as a medium of exchange, but limited information on the solvency of the issuer meant the geographical coverage for an individual bank's notes was narrow. Banks in New York and New England agreed to redeem each others' notes at par, providing the issuing bank maintained sufficient specie (gold or its equivalent) at the redeeming bank. This first use of required reserves was, in essence, for prudential reasons.

On a nationwide basis reserve requirements were first established under the National Bank Act (1863). The charter established a network that banks could join, requiring them to hold a 25 percent reserve against bank notes and deposits. This network facilitated greater countrywide acceptance of notes of the participating banks. From that point until the establishment of the Fed, reserve requirements continued to be viewed as a prudential measure to support the liquidity of bank notes and deposits (under the prevailing gold standard, by linking them to physical gold reserves), yet financial panics still occurred.[1] By 1931, after the establishment of the Fed, and with it a lender of last resort function, reserve requirements were used to influence the expansion of bank credit and were no longer viewed as a prudential tool. Membership of the Fed was optional for state-chartered banks and some began leaving the system to take advantage of lower reserve requirements imposed by state authorities. By the late 1970s, less than 65 percent of total transaction deposits were held at Fed member banks. Congress introduced the Monetary Control Act (1980) mandating the Fed to set reserve requirements universally across all depository institutions.

From the early 1980s, the Fed aimed to influence monetary and credit conditions by adjusting the cost of reserves to depository institutions. Actual reserve balances were stabilized around the minimum level needed to meet requirements and clearing purposes (as reserves were not remunerated, banks kept balances as low as possible). Individual banks could however, contract to hold more reserves if they deemed their clearing needs were higher than the requirement, and this excess earned credits that could be offset against Fed priced services. The reserve requirement was averaged over the two-week maintenance period for larger banks and one week for smaller banks.

[1] The U.S.A. experienced a number of financial panics during 1869, 1873, 1893, and 1901.

The Fed was first able to remunerate reserve balances in October 2008.[2] The rate paid on *required reserves* was originally set at the average of the Fed funds target over the maintenance period less 10 basis points, while *excess reserves* were remunerated at the lowest Fed Funds target rate during the period, less 75 basis points. These margins were removed from early 2009: both categories of reserves are now remunerated at 25bp, the top end of the fed funds target rate.

The Case for Abolishing Reserve Requirements in the U.S.A.

The current arrangements are complex and administratively burdensome.[3] Depository institutions report either on a weekly or quarterly basis, depending on the size of their net transactions accounts and other accounts.[4] Reserves are maintained over a two-week period, which in the case of institutions reporting weekly, is based on two reporting periods and lagged to the computational period by 17 days. The computation period for institutions that report quarterly is the 7-day period beginning on the third Tuesday of the report month, with compliance lagged by four, or in some cases five weeks. The reservable base covers *net transactions accounts* split in three tranches—up to $13.3 million is reservable at 0 percent (referred to as the low reserve tranche), $13.3.million to $89 million is reservable at 3 percent, and more than $89 million is reservable at 10 percent.[5] The low reserve tranche is adjusted each year by 80 percent of the annual increase or decrease in net transaction accounts at all depository institutions. The impact of reserve requirements was reduced in 1990 when the ratio on non-personal time deposits and Eurocurrency liabilities was set to zero.

Institutions can satisfy their reserve requirements through holdings of vault cash and reserve balances.[6] Vault cash covers in excess of 40 percent of the requirement for the system as a whole, and more than 100 percent of the requirement for some banks. A penalty-free band is calculated as the greater of $50,000 or 10 percent of the reserve requirement. When an institution has more than the sum of its reserve requirement plus the penalty free band, it is deemed to be in excess.[7] If it has less than the reserve requirement minus the penalty-free band, then it is in deficit and will be subject to penalty set at the rate on the Primary Credit Facility plus one percentage point.

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[2] The Financial Services Regulatory Relief Act (2006) originally authorized the Fed to pay interest on reserves beginning October 2011. This authority was superseded, as a result of the financial crisis, by the Emergency Economic Stabilization Act (2008), bringing forward the authority to October 2008.
[3] Board of Governors of the Federal Reserve System: Reserve Maintenance Manual—November 2013.
[4] There are two further categories of reporting—annual and non-reporters. Institutions in these categories have net transactions accounts of less than the amount specified as the low reserve tranche.
[5] Net transactions accounts are total transaction accounts, less amounts due from other depository institutions, and less cash items in the process of collection. Total transactions accounts include demand deposits automatic transfer service accounts, NOW accounts, telephone and pre-authorized transfer accounts, and others.
[6] There are also pass-through arrangements that allow institutions to meet their requirements through a correspondent bank.
[7] The distinction between required reserves and excess reserves is less relevant now that both categories of reserves are remunerated at the same rate.

Reserve requirements in the U.S.A. no longer play a prudential or monetary role *and* may not be needed for liquidity management. Many central banks now operate an effective operational framework without reserve requirements.[8] Other central banks that use them aim to stabilize the demand for reserves, thereby improving liquidity management outcomes. The key features of these arrangements are requirements that result in reserve levels close to that which is voluntarily demanded for a given remuneration rate (typically at the policy rate or up to 25bp below it), a relatively long maintenance period (around a month), and full averaging.

Monetary policy could be implemented effectively in the USA using a floor system and without reserve requirements.[9] Liquidity management in a floor system involves keeping interest rates at, or close to the floor. Consequently there is a one-way risk of not meeting the operational target—assuming that there is an effective interest rate floor, the market rate can only be too high. With rates pushed to floor of the corridor, there is less of a requirement to fine-tune operations, and as a result, less need to accurately forecast and stabilize the demand for reserves. However, there is still a need for periodic operations, perhaps in both directions (injecting and withdrawing liquidity) as the objective should be to *over-supply* liquidity only by a small margin, to ensure that money market activity is not undermined by a high volume of excess liquidity (as it is currently). A flexible form of required reserves (contractual reserves) where banks reveal their demand for reserves could however be useful in a mid-corridor system to reduce uncertainty.[10]

[8] From the IMF - ISIMP 2013 survey, 10 central banks implement monetary policy without using reserve requirements, these include Australia, Canada, Denmark, Mexico, New Zealand, Norway and Sweden.
[9] Current examples of counties using the floor system are Norway, and New Zealand.
[10] In 2006 the Bank of England (BOE) operated a mid-corridor system and introduced a *contractual reserves,* system which forced banks to reveal their demand by nominating the amount of reserves they intended to hold during a given maintenance period. The maximum amount a bank could nominate was limited to the lower of; two percent of their sterling liabilities, or £3 billion. Banks were remunerated at the policy rate when they held average balances through the maintenance periods of within +/- 1 percent of their nominated amount. No remuneration was paid if the balances were above this range, and a penalty was charged for balances below this range. This system was suspended during the financial crisis, as the BOE embarked on a policy of quantitative easing which pushed rates to the floor of the corridor.

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FISCAL RISKS AND BORROWING COSTS IN STATE AND LOCAL GOVERNMENTS[88]

State and local governments (SLGs) face important fiscal challenges, most notably because of the unfunded liabilities they have under public employee pension plans and related to other post-employment benefits. This chapter examines the state of SLG finances with a focus on how challenges posed by such liabilities and political polarization that may hinder implementation of policies to address them are priced in by municipal bond markets. Analysis suggests that state borrowing costs will increase if unfunded liabilities are left unchecked and that certain budget institutions may help contain the negative impact of unfunded liabilities and political polarization on borrowing costs. This highlights the need for public pension and budget process reform.

A. Introduction

107. **In the wake of the Great Recession, fiscal imbalances in the U.S. have surfaced at all levels of government**. The federal budget deficit as a percentage of GDP widened rapidly from 1¼ percent in 2007 to 11½ percent in 2009 and remained above 3 percent in 2013, while debt held by the public rose from 35 percent of GDP in 2007 to 74 percent in 2013. The aggregate SLG deficit as a percentage of GDP, measured on an annual basis, reached 2½ percent in 2009—the widest since 1980s—with gross debt increasing considerably from 25 percent of GDP in 2007 to 29 percent in 2013.[89]

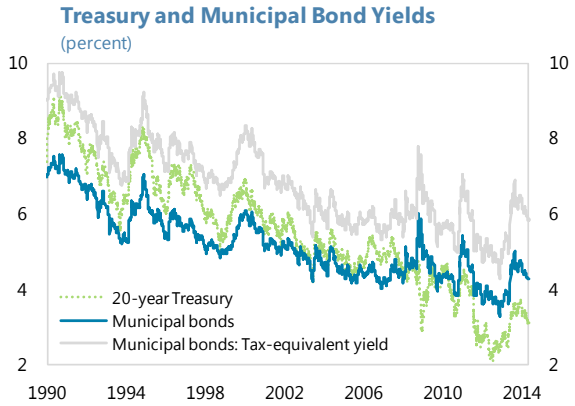
108. **These imbalances raise concerns about the sustainability of public finances and, for SLGs, put upward pressure on financing costs**. Indeed, municipal bond spreads over Treasuries rose sharply during the crisis and remain well above historical averages (Chart).[90] Moreover, several states suffered from credit downgrades in 2009–11, including those with large stocks of debt such as California, Illinois, and New Jersey. Admittedly, the reserve currency status of the dollar and safe haven flows into the Treasury market have, so far, helped keep federal borrowing costs at historical lows despite the sharp rise in federal debt held by the public. However, the lack of a consolidation plan to stabilize medium-term debt dynamics and doubts about the effectiveness and predictability of policymaking amidst political polarization led to a sovereign credit rating downgrade in August

[88] This chapter was prepared by Madelyn Estrada, Deniz Igan, and Dinah Knight. It has greatly benefited from discussions with Rabah Arezki, Ravi Balakrishnan, Kathleen Byrne, Roberto Cardarelli, Nigel Chalk, Matt Fabian, Tracy Gordon, David Jones, Lusine Lusinyan, Marcelo Pinheiro, and Tigran Poghosyan.

[89] All years refer to calendar years. Federal government deficit figures include IMF staff's adjustment for financial sector support costs. It should be noted that all states save Vermont have a balanced budget rule in place on a fiscal year basis (over two fiscal years in some states), but how binding the rule is varies across states. Technically, SLGs may not issue debt to close budget gaps (although they sometimes find ways around this constraint or legislate one-time fixes), hence the smaller increase in the SLG debt level compared to the federal debt held by the public.

[90] In fact, municipal bonds tend to have lower yields than Treasuries because of their tax advantage, offsetting their illiquidity. Since the crisis, the "muni/Treasury ratio" has consistently exceeded 100 percent.

2011.[91] Consequently, a spike in Treasury yields as a result of sustainability concerns building up poses an important risk, with implications for SLGs.



Sources: Bloomberg; IMF staff calculations.
Note: Municipal bonds refer to the Bond Buyer 20-Bond Index, consisting of 20 general obligation bonds that mature in 20 years. The average rating of these bonds is equivalent to Moody's Aa2 and S&P's AA. Tax-equivalent yields are computed using the marginal tax rate on interest income from NBER's TAXSIM.

109. **Post-employment obligations and the associated uncertainty keep concerns about SLG finances alive even as short-term fiscal balances improve, including the crowding out of much needed education and infrastructure spending**. The losses suffered by public pension funds during the crisis and high-profile municipal bankruptcies brought awareness about the long-term challenges. Increasing underfunding in government-sponsored pension plans means additional unsecured debt.[92] Moreover, legal uncertainties exist when it comes to the seniority status of existing, general obligation debt to such additional debt. As a result, borrowing costs for SLGs may come under pressure. Furthermore, the higher debt service costs materializing as a result of unchecked post-employment obligations compete for resources that could otherwise be devoted to education and infrastructure spending. Already plagued with narrow, eroding tax bases and volatile revenues, SLGs also face a reduction in the sources provided by the federal government. As resources dwindle, health care expenditures and pension promises may increasingly crowd out spending on essential services, with implications for potential growth.

110. **This chapter, relying on econometric analyses and case studies, seeks answers to the following questions**:

- How do state credit ratings and borrowing costs vary with unfunded pension and other post-employment benefit obligations?
- Do credit ratings and borrowing costs reflect the political and institutional characteristics of state legislatures?

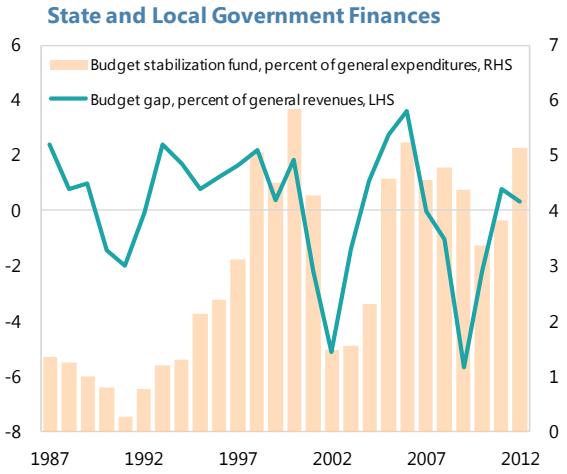
111. **The rest of the chapter is structured as follows**. We start with a brief discussion of the medium-term outlook and long-run challenges as well as the uncertainties surrounding them. Then we present the regression results and the case studies looking at the relationship between credit ratings and unfunded liabilities and the political and institutional characteristics of the state

[91] http://www.standardandpoors.com/ratings/articles/en/us/?articleType=HTML&assetID=1245316529563.
[92] Such debt does not have to correspond to actual securities. Indeed, ratings agencies have recently started to combine outstanding market debt and unfunded retirement obligations into a single measure to assess the total financial burden on SLGs.

legislature. We conclude with a discussion of the policy implications emerging from the empirical analyses.

B. Outlook and Risks: A Bird's Eye View

112. **SLGs are in better shape than they were in the immediate aftermath of the Great Recession**. Tax receipts were hit hard by the recession and, even with the rainy-day funds providing some breathing room and the federal emergency funds mitigating some of the damage on the revenue side, difficult decisions had to be made to cut spending on education, health, transportation, and welfare. As tax receipts picked up with the ongoing economic recovery, SLG finances have improved and rainy day funds have been replenished (Chart).



Sources: NASBO, Haver Analytics; IMF staff calculations.

113. **With the cyclical rebound, the SLG fiscal drag on growth is expected to turn into an impulse in the near term**. Revenues are gradually recovering, but have not yet returned to pre-recession levels, and, hence, could have a further bounce-back barring a permanent loss in tax bases. As housing and labor market recoveries continue, tax receipts will rise while spending pressures related to the recession (e.g., unemployment benefits and welfare payments) will ease. These dynamics should give SLG consumption and gross investment enough room to start reverting back to their long-term averages.

114. **Soon enough though, SLGs will have to address the structural challenges, most notably, public sector employee retirement plans and health care expenditures**.

- Public sector employee retirement plans: Many public sector employee pension plans are seriously underfunded and promises made under these plans may have to be reconsidered. But it is not even clear how large the funding needs are. The estimates are sensitive to actuarial assumptions and put unfunded liabilities in defined-benefit public pension plans somewhere between $¾ trillion and $3 trillion (Table). Moreover, legal protections under some state constitutions and political economy considerations make it difficult to take measures that would help reduce the funding gap. Finally, ongoing bankruptcy cases will set precedents as to the extent local governments can force various stakeholders to take haircuts.

How Large are Unfunded Pension Liabilities?

Study	Coverage	Investment Return (percent)	Funding Ratio (percent)	Unfunded Liability (billions of $)
Novy-Marx and Rauh (2009)	116 major pension plans sponsored by the 50 U.S. states as reported in their Comprehensive Annual Financial Reports	Treasury yield	38	3,230
Munnel et al (2010)	126 pension plans accounting for about 80 percent of the entire SLG retirement system	Alternative assumptions varying from 4 to 8 percent	between 48 and 79	between 700 and 2,900
Pew Charitable Trusts (as of April 8, 2014)	233 pension plans and 166 retiree health care and other benefit plans as reported in the states' Comprehensive Annual Financial Reports	states' own assumptions; most use 8 percent	72	915
Public Fund Survey Scorecard (as of May 16, 2014)	126 pension plans with the combined market value of system assets amounting to $2.63 trillion (85 percent of the entire SLG retirement system)	7.9	73	971

- Health care benefits for public sector retirees[93]: Although total unfunded liabilities for non-pension post-employment benefits are smaller in size at an estimated $600 billion and easier to address than pensions at least from a legal perspective, many states have not been adequately prepared to meet the commitments they have made under these programs. The average funding ratio across states is estimated to be less than 10 percent while only about 40 percent of required contributions are actually made. Moreover only three states (Alaska, Arizona, and Ohio) have other post-employment benefits funded at 50 percent or more because generally these benefits are funded on a pay-as-you-go basis.[94]

- Health care cost growth and the Affordable Care Act: Medicaid is a large spending category in state budgets (estimated to account for 20 percent in FY2012, ranking second after K-12 education) and enrollment in the program is expected to increase significantly in 2014 and thereafter as a consequence of the Affordable Care Act, but by how much remains to be seen. The Government Accountability Office (GAO) projects that SLG health care spending will increase by about 2 percentage points of GDP over the next two decades (about $350 billion in current dollars). Additional uncertainty comes from the difficulty in predicting how fast health care costs will rise in the future, including whether efforts to bend the cost curve will be successful or not.[95]

[93] There may be other post-employment benefits but health care plans constitute the major portion. We use the terms health care benefits and other post-employment benefits interchangeably in the rest of the chapter.
[94] For comparison, 40 out of 50 states report pension funding of at least 60 percent.
[95] Chapter 3 of the IMF Country Report No. 13/237 looks at the factors driving health care spending growth and discusses the policy options to contain future health care spending.

115. **Other sources of risk surrounding the outlook for SLG finances include:**

- Fiscal policy uncertainty at the federal level: Uncertainty about federal fiscal policies translates into uncertainty at the SLG level. Moreover, fiscal consolidation at the federal government level has important consequences for SLGs. This is especially the case in places with closer ties to federal government activities (e.g., District of Columbia) and in places with greater reliance on federal grants (e.g., New Mexico).

- Reliance on procyclical taxation and shrinking tax bases: Over the last half century, SLGs have increasingly become more reliant on procyclical revenues, in particular personal income taxes (Table). Combined with balanced budget requirements and SLG responsibilities for social safety net expenditures, this trend has been manifested in larger and more volatile deficits. In addition, structural changes in the economy (e.g., shifting of consumption from goods to services and increase in cross-border activities) and some legislative actions (e.g., introduction of sales-tax holidays) have led to an erosion of the SLG tax bases. These trends will need to be addressed in order to avoid self-inflicted fiscal distress during recessions and to maintain the level and quality of essential services provided by SLGs.

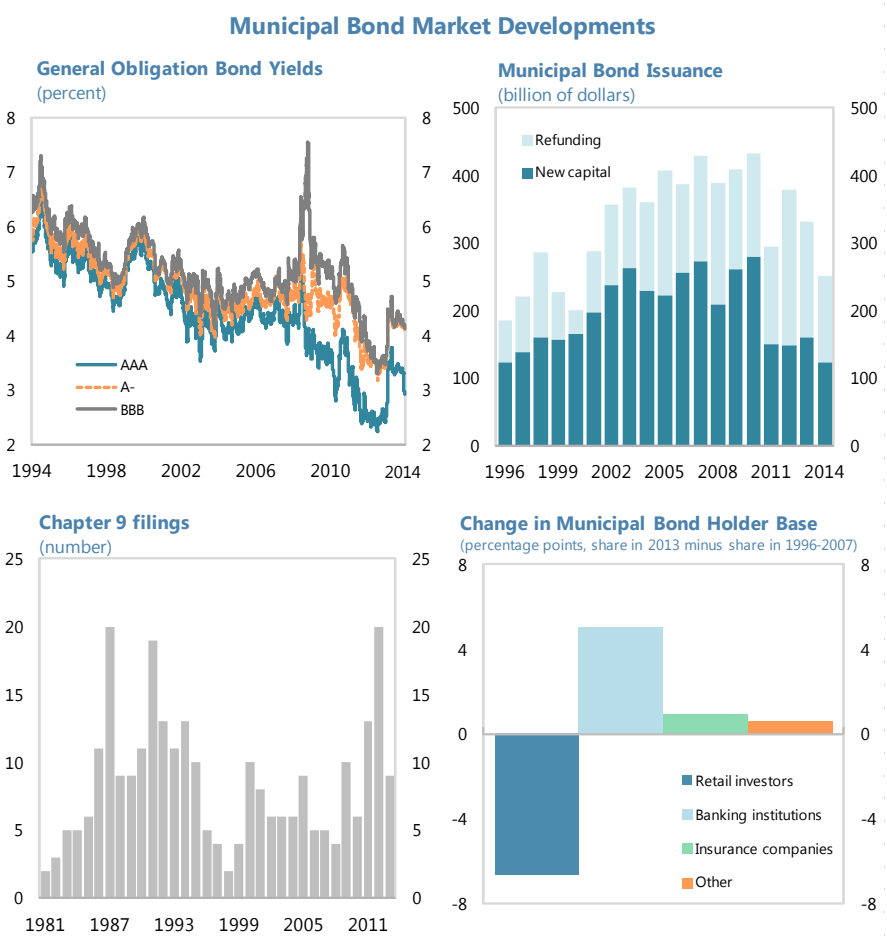
Reliance on Procyclical Taxes

Year	General sales	Personal income	Property	Corporate income	Other
1950	21.1	9.1	49.6	7.4	12.8
1960	23.9	12.3	46.1	6.5	11.2
1970	29.6	19.2	34.7	7.8	8.7
1980	31.5	27.1	22.9	9.7	8.8
1990	33.2	32.0	19.8	7.2	7.8
2000	32.3	36.1	18.0	6.0	7.6
2010	31.9	33.6	21.9	5.2	7.4

Sources: Census Bureau; IMF staff calculations.
Note: Taxes are ordered based on the correlation between their growth rate and the gross state product growth.

- Options available at times of distress: Recent high-profile bankruptcy cases have reopened the question regarding what legal options are actually available to financially-distressed local governments and what different stakeholders should expect in the aftermath of a Chapter 9 filing (see Boxes 1 and 2; Appendix includes a partial list of recent bankruptcy cases). Political economy factors, including frameworks that would ensure timely and sound policy decisions even when the degree of political polarization is high, and relationships between a state government and local governments as well as those with the federal government, are also likely to come into play.

116. **Municipal bond market developments since the crisis in part reflect the increasing awareness of the challenges faced by SLGs**. Not only has the spread over the Treasuries widened (as mentioned in the Introduction), but also the spread between high-quality and low-quality municipal bonds have increased (Chart). While the Build America Bonds (BABs) have kept issuance levels at pre-crisis levels in 2009–10, issuance to raise new capital since the expiration of the BAB program has dropped to levels seen in the 1990s (in nominal terms).[96] Increased number of Chapter 9 filings and headline-grabbing distress stories (often citing unfunded pension liabilities), in addition to the anticipation of tapering by the Federal Reserve, led to a sell-off in 2013. The composition of the holder base has shifted from retail investors to banks and, to a much smaller extent, insurance companies and other investors, although retail investors continue to be the major group with more than two-thirds of the holdings.



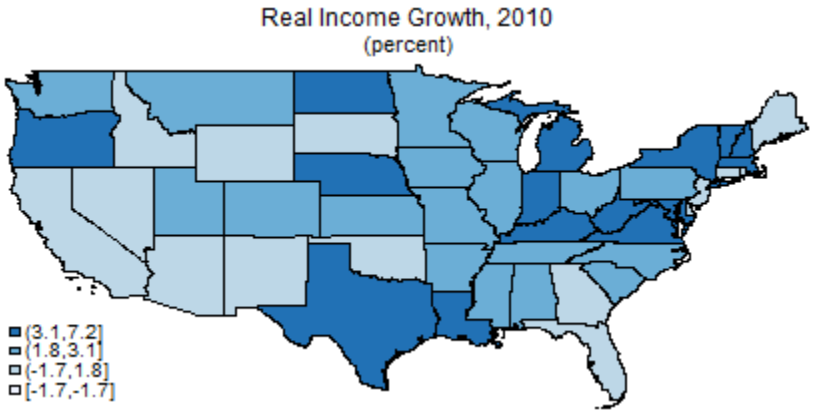
Sources: American Bankruptcy Institute; Bloomberg L.P.; Securities Industry and Financial Markets Association (SIFMA).

[96] Established through the American Recovery and Reinvestment Act of 2009, the two-year BAB program authorized SLGs to issue special taxable bonds that received either a 35 percent direct federal subsidy to the borrower ("Direct Payment BABs") or a federal tax credit worth 35 percent of the interest owed to investors ("Tax Credit BABs"). BABs proved wildly popular, financing one-third of all new state and local long-term debt issuances from 2009 through the program's expiration in 2010. In total, the Joint Committee on Taxation (JCT) identified more than 2,275 separate bonds that were issued to finance $182 billion in new infrastructure investment, with participation from all 50 states, the District of Columbia, and two territories.

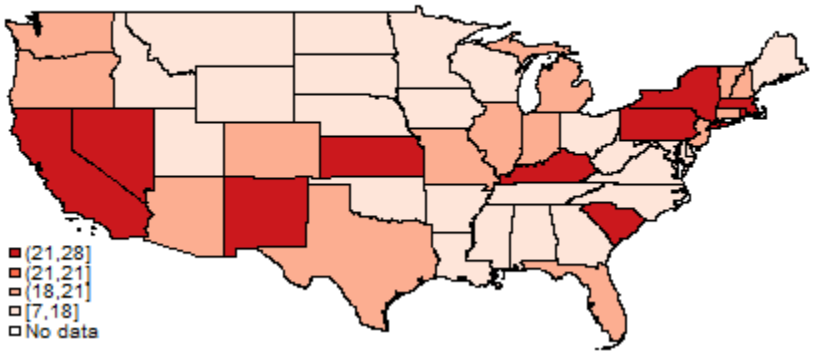
C. Empirical Analyses

Are They All in the Same Boat?

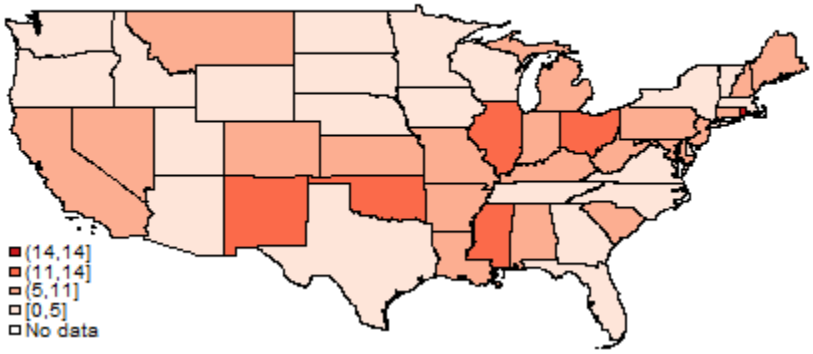
117. **Aggregate statistics for SLGs mask a great degree of cross-sectional variation**. States, as well as local governments, have different economic, fiscal, and political risk characteristics and, these differences are reflected in the states' credit ratings and borrowing costs (Maps). For instance, North Dakota has enjoyed large budget surpluses even during the Great Recession in part thanks to strong economic activity driven by the shale gas boom. The state's credit rating was upgraded from AA in 2008 to AAA in 2013. Meanwhile, Arizona was hit hard by the housing boom-bust and struggled with budget deficits. Unsurprisingly, its credit rating was downgraded in 2010 from AA to AA-. The contrast between California and Pennsylvania on the one hand and North Carolina and Virginia on the other with respect to their debt levels also seems to be carried over to their credit ratings and bond spreads. The former two states are among the most heavily indebted and the lowest rated, and pay some of the highest borrowing costs. The latter two, in part thanks to their low debt levels, enjoy the low yields that come with their stellar AAA credit ratings. Similarly, liabilities related to public employee pensions and other post-employment benefits vary considerably across states. For example, with regard to pensions, Wisconsin has negligible unfunded liabilities with a pension plan that is 99.9 percent funded, while Illinois has very high unfunded liabilities (about 12 percent of gross state product) and the worst funding ratio in the nation at about 55 percent in 2010. High unfunded liabilities for pensions do not necessarily translate into high unfunded liabilities for other post-employment benefit plans. For example, Oklahoma has one of the highest unfunded pension liabilities as a percentage of gross state product at 10 percent but it has very small unfunded liabilities under its health care plan for public sector retirees. In terms of political polarization in state legislature, California ranks as one of the most polarized and Louisiana as one of the least.



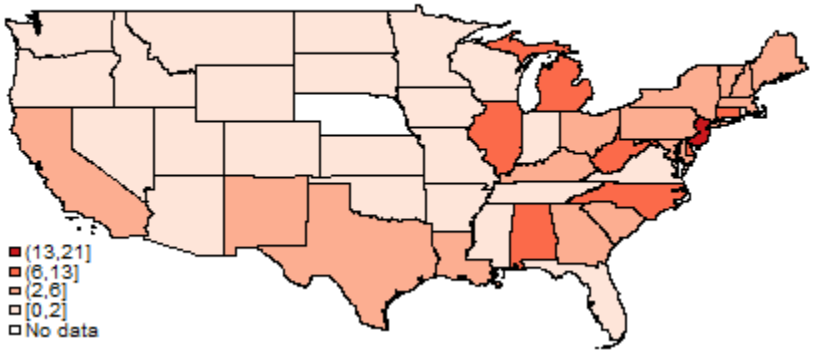
Market Value of Outstanding Bonds, 2010
(percent of GSP)



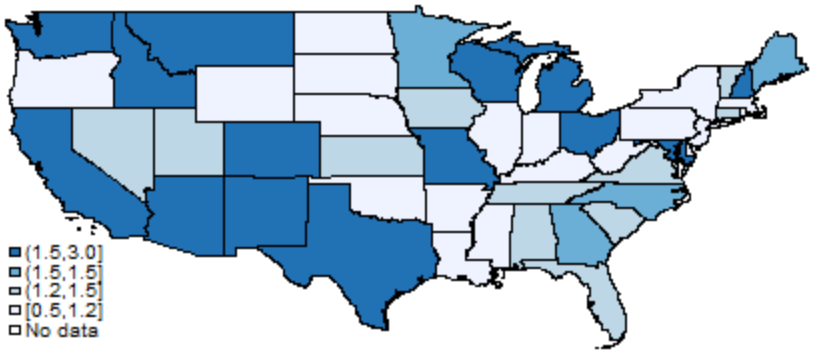
Unfunded Pension Liabilities, 2010
(percent of GSP)

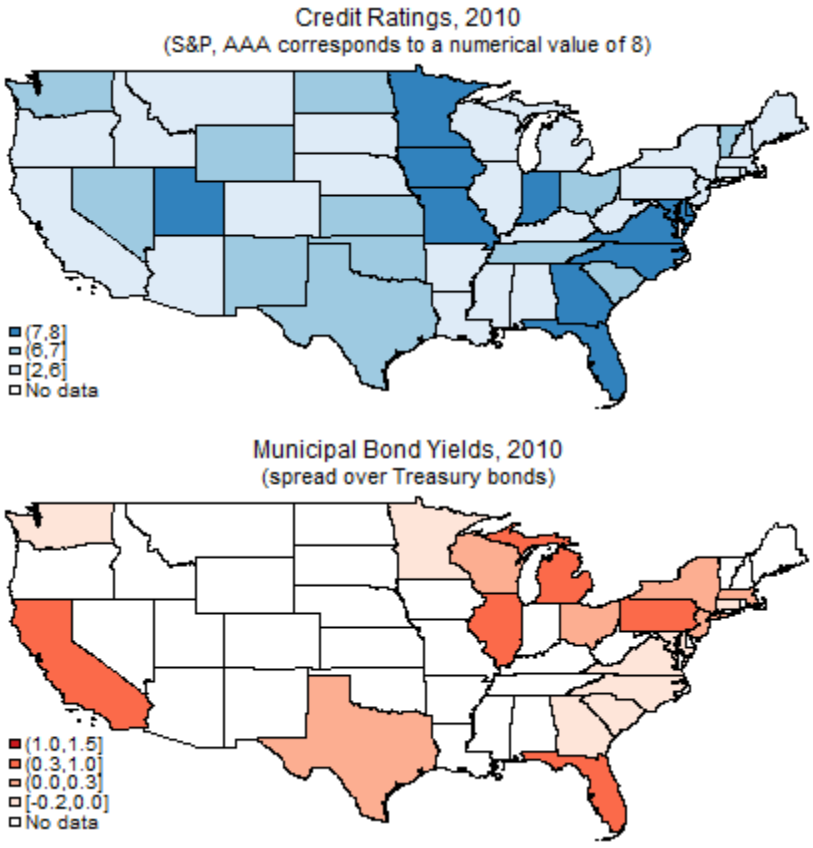


Unfunded Other Post-Employment Benefits, 2010
(percent of GSP)



Political Polarization, 2010
(Shor & McCarthy, 2013; higher values indicate more polarized legislature)





Econometric Setup and Findings

118. **The baseline regression explores how credit ratings and municipal bond spreads relate to state economic and fiscal characteristics**.[97] We estimate the following equation using OLS:

$$\mathrm{CR}_{\mathrm{it}} = \alpha + \beta_1 UPL_{it-1} + \beta_2 UHL_{it-1} + \beta_3 DEBT_{it-1} + \beta_4 BBAL_{it-1} + \beta_5 IG_{it-1} + \beta_6 UR_{it-1} + \beta_7 TAX_{it} + \beta_8 POL_{it} + \gamma_t + \varepsilon_{it}$$

where *CR* is the credit rating (or bond spread, when available) for state *i* in year *t*. *UPL* and *UHL* stand for unfunded pension liabilities and unfunded other post-retirement benefits (mostly health care), respectively. *DEBT* and *BBAL* are the outstanding debt and the budget balance. The right-hand-side variables so far are all expressed in percent of the state's gross product (GSP). *IG* and *UR* are the real income growth and the employment rate, respectively. *TAX* is the tax rate applicable to the marginal investor. Finally, *POL* is a measure of political polarization in the state legislature. The regression results are summarized in the text table.

[97] See Appendix for details of the econometric analyses.

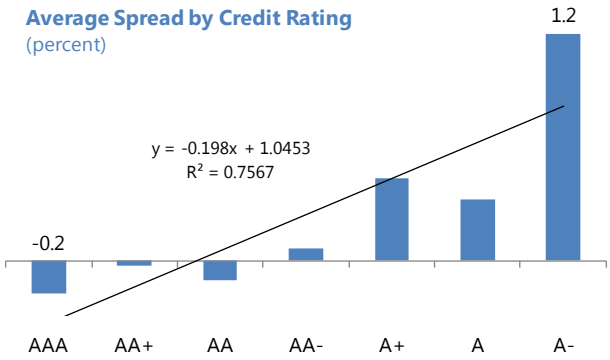
119. **We focus the discussion of the results mostly on the regressions where the dependent variable is the credit rating**. The findings for bond spreads are qualitatively similar to those for credit ratings but the sample size is much smaller and the relationships are often either not statistically significant or less robust to alternative specifications. As one would anticipate, spreads tend to be higher for lower-rated states (Chart). Hence, we use "borrowing costs" interchangeably with credit ratings when discussing the results.

Summary of Regression Results

Variable	Rating	Spread
UPL	-	+
UHL	n.s.	n.s.
DEBT	-	+
BBAL	+	-
IG	n.s.	n.s.
UR	n.s.	+
TAX	-	n.s.
POL	-	n.s.

Sign of the coefficient obtained in the regressions for each variable is shown.

120. **Not surprisingly, state credit ratings are negatively correlated with debt levels**. Econometric analysis exploiting the variation across states reveals that states with higher levels of debt (in percent of gross state product) have lower credit ratings. As expected, budget surpluses and lower marginal taxes are also associated with better ratings. Links with income growth and unemployment rate are not statistically significant.



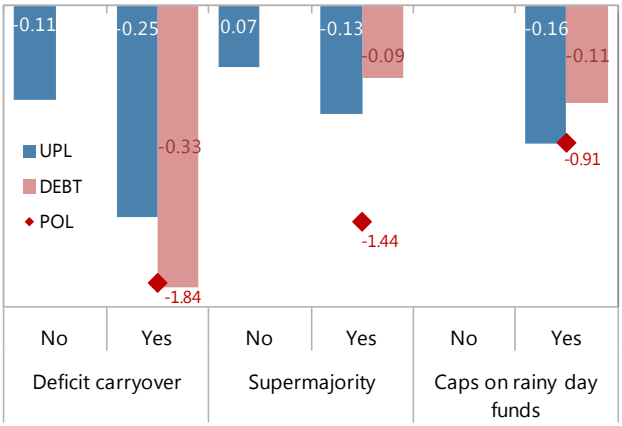
121. **Increased awareness about unfunded pension liabilities appears to be reflected in the ratings**. States with larger unfunded pension liabilities have lower credit ratings and face higher borrowing costs. Interestingly, unfunded liabilities under health care and other benefits, which are not only smaller and but also received much less attention than pensions, are negatively related to credit ratings but this relationship loses significance when unfunded pension liabilities are also included in the regression. Also noteworthy is the fact that unfunded liabilities in the regressions are as reported by the states themselves, that is, likely assuming more generous rates of return. Under more prudent return assumptions, these liabilities would be larger—and upward revisions to unfunded liability estimates are indeed expected to take place once the recent change to the Governmental Accounting Standards Board (GASB) rules is fully implemented.[98]

[98] Unlike private pension systems, which are governed by federal law and regulations, state and local pension plans are not required to follow specific methods in calculating funding adequacy. Most plans adhere to the guidelines issued by the GASB but the board has no enforcement authority. Moreover, until June 2012, GASB rules allowed plans to use discount rates based on the expected rates of return, typically around 8 percent, to calculate pension liabilities and determine the degree of underfunding. The high discount rate underestimates the present value of promised benefits, which should instead be discounted by the riskless rate of return because these payments are certain to be made. With the rule change, the high discount rate can be used only for the funded portion of pension liabilities (i.e., the part backed by underlying pension assets) and the rest has to be discounted using a riskless discount rate, leading to a funding ratio that would be some 20 percentage points below the one estimated under the old rule.

122. **Political polarization has some bearing on market perceptions of a state's creditworthiness as well**. States with less polarized legislatures tend to have higher ratings. This is likely to reflect uncertainty pertaining to fiscal policies and the propensity for fiscal showdowns.

123. **Budget institutions also relate to borrowing costs**. This relationship is, however, more difficult to detect in econometric specifications, perhaps due to the fact that these variables have relatively higher degree of persistence within a state. Still, there is some regularity when the sample is split based on certain budget practices, suggesting that good budget institutions can mitigate the adverse effects of low funding ratios, high outstanding debt levels, and high degrees of polarization in local politics. In particular, unfunded post-employment benefit liabilities are priced in the state credit ratings if budget deficits are allowed to be carried over, if there is a supermajority requirement to pass revenue increases, and if there are caps on rainy day funds (Chart).[99]

Credit Ratings, Challenges, and Budget Institutions



Source: IMF staff estimates.
Note: The bars show the magnitude of the coefficient on unfunded pension liabilities (UPL), outstanding debt (DEBT), and political polarization (POL) when the sample is split based on a budget institution indicator. Dependent variable is the credit rating. Only statistically significant coefficients are shown. The differences between coefficients obtained in the subsamples are also statistically significant.

124. **Teasing out robust, causal relationships is a difficult task and several caveats should be taken into account when interpreting these findings**. Given that many of the variables of interest change minimally from one year to the next in the same state, introducing state fixed effects in the regression equation is problematic and, hence, any correlation may well be driven by some omitted state characteristic. Another issue is related to the measurement of borrowing costs: municipal bond markets are loosely-regulated, decentralized, over-the-counter markets.[100] That is why we primarily focus on credit ratings. Reverse causality is also a problem as states may take actions to improve indicators of fiscal health in response to a ratings downgrade and a rise in borrowing costs. Therefore, the results of the econometric analyses should be taken with a grain of salt.

[99] Tests confirm that the coefficients obtained in the subsamples based on a budget institution indicator are statistically different from each other. These results are further confirmed when the difference between the actual and the predicted credit rating is regressed on budget institution indicators.

[100] Municipal bond markets have been given generous exemptions under the Securities Act of 1933 and the Securities Exchange Act of 1934, except for antifraud cases. A limited regulatory scheme requiring dealers to register with the Securities Exchange Commission (SEC) and giving Municipal Securities Rulemaking Board (MSRB) authority to issue rules governing trades was introduced under the Securities Acts Amendments of 1975, but the "Tower Amendment" kept issuers exempt from requirements to file any presale documents. The Dodd-Frank Act expanded the MSRB's authority and brought municipal advisors into the regulatory circle, but did not change the provisions applicable to issuers. Concerns about timeliness and comparability of financial information, lack of disclosure by conduit borrowers, adequacy and accuracy of disclosure regarding funding obligations under pension and other post-retirement benefits, and the illiquid, opaque, and fragmented market microstructure make it particularly difficult to construct bond yields at the state level and extract information from these series.

Case Studies

125. **The importance of sound fiscal policies and budget institutions can be further illustrated with case studies**. Regression analyses shed light into the role played by budget outcomes, unfunded pension liabilities, and political polarization in municipal bond markets and hinted at the interactions with institutional characteristics. Nonetheless, given the lack of variation in some of the variables used, we use case studies to complement this evidence (especially that on the role of budget institutions). We look at the experience of four states where the credit rating is much higher or lower than that implied by the "fundamentals".[101] Good news is that blemished credit can be fixed and market pressures can be alleviated when necessary actions are taken (also see Box 2 on Detroit and Puerto Rico).

Alaska

126. **Alaska demonstrates how flexible yet conservative budget institutions can help offset the impact of moderately high liability levels**. Alaska has an inherent vulnerability due to its economy's dependence on the natural resource industry. To mitigate the volatility induced by energy-related revenues, the state has set aside very large reserves for general fund operating needs (principally in the Constitutional Budget Reserve Fund and the Statutory Budget Reserve Fund). There are no caps on these funds and repayment provisions are flexible in that there is no fixed time limit to replenish the reserves. Moreover, Alaska projects revenues for a ten-year window—at least twice longer than any other state. Although the funding ratios of major statewide pension systems are weak at about 55 percent compared to the national average of 70 percent, Alaska has kept up with its contributions and taken steps to address the issue, including closing of defined benefit plans to new employees in 2005. These actions seem to have helped maintain the state's AA+ rating in 2010 despite a budget deficit of almost 3 percent of GSP and get an upgrade to AAA in 2012.

California

127. **California exemplifies how markets reward active deficit reduction and improvement in budget institutions**. Faced with immediate liquidity pressures as the deficit soared in the aftermath of the dot-com boom, California enacted Proposition 57 and 58 in 2004, authorizing issuance of long-term bonds to pay off accumulated deficits. However, they also prohibited any future deficit bonds and required enactment of a balanced budget and the establishment of a budget stabilization account. As a result, the state got a three-notch boost in its bond rating from BBB to A. The state's effort to balance its general fund budget through tax hikes enacted in 2012 also led to a ratings upgrade while its revenue-anticipation notes issued in August 2013 had the lowest yields since the 1970s. But California's current rating of A is still about two notches below

[101] Specifically, we use the estimated coefficients to predict the credit rating for each state based on their economic, fiscal, and political characteristics. The four states chosen have the largest differences between the actual and predicted credit ratings consistently (that is, not only in a single year but consecutively over a three-year period).

what one would expect based on its fundamentals, especially considering its relatively small unfunded pension liabilities. Instead, it seems that remaining weaknesses in budget institutions—including the ability to spend unanticipated funds without legislative approval, the scope to carry over deficits, and the supermajority requirement for revenue increases—have weighed on California's credit rating.

Illinois

128. **Illinois shows how inaction to correct imbalances and adopt good budget institutions can calcify into a bad reputation and translate to higher borrowing costs**. Illinois currently has the lowest credit rating across U.S. states at A-, although the econometric model would predict three notches higher. The state was not always at the bottom: actually, Illinois and Alaska had the same rating as late as 2007. However, several decades of skipping or skimping on payments for the required contributions to pension plans resulted in the state having the worst funding ratio (at about 40 percent) in the nation. While all other states that faced similar challenges have taken some sort of action, Illinois became known for its political gridlocks and repeated failures to deliver on pension reform. Moreover, a budget stabilization fund was introduced in 2000—Illinois was one of only five states that did not have one at the time—but design flaws led to the fund being used for the alleviation of ongoing cash flow problems rather than for fiscal emergencies. These factors have produced what has become known as the "Illinois effect," whereby similarly structured and rated municipal bonds carry higher interest rates if the issuer is located in Illinois.

New Jersey

129. **New Jersey confirms that failing to address structural imbalances and implement sound fiscal management practices can hurt creditworthiness**. With a volatile income tax base heavily dependent on a small number of high-income residents, the state had difficulty meeting the challenges posed by the Great Recession, and was forced to make deep cuts in school funding and aid to local governments. The latter, in turn, were forced to raise property taxes. The state has underpaid its pension contributions for years, even before the recession started and made only 14 percent of the required pension contributions in 2012 after failing to make any payments in 2010 and 2011. Overly optimistic revenue forecasts spanning only one year coupled with one-off moves to plug annual deficits rather than implementation of permanent solutions are all factors that have raised concerns about budget processes. In addition, liquidity has become a concern as rainy day funds, drained in 2009, have not been replenished. The state's credit rating has been downgraded three times from AA+ in 2002 to A+ in 2014.

D. Policy Implications

130. **There are important challenges facing SLGs on the horizon**. Problems such as rising health care costs and underfunding of promises made under public employee benefit plans mean that tough choices will have to be made if SLGs are to avoid large cutbacks to other essential functions, such as in education and infrastructure investment. Moreover, federal government consolidation efforts will reduce financial resources potentially available to SLGs. The significant

fiscal adjustment in the past few years has improved fiscal balances, but this should not give a false sense of safety. SLGs will have to tackle the ticking time bombs of public sector employee retirement and health care plans soon. Many states have enacted reforms in this area recently but these tend to remain on the margin and be limited to new hires only (see Appendix for a partial list of recent pension reform actions).

131. **Empirical analyses point to unfunded pension liabilities being associated with lower credit ratings, especially when budget institutions are weak**. If left unchecked, these liabilities will continue to grow as the population ages and may increase borrowing costs. Moreover, such implicit liabilities are likely to weigh on credit risks with potential to raise financing costs and weaken SLG finances more broadly.

132. **In order to keep future borrowing costs in check, SLGs should**:

- assess the extent of their unfunded liabilities under more realistic actuarial assumptions, move away from defined-benefit plans, pursue reforms as necessary to ensure fiscal health, enhance risk sharing, and establish separately-governed trust funds if they choose to maintain pay-as-you-go financing[102];
- improve their budget frameworks, including adoption of multi-year plans laying out conservative revenue forecasts, better enforcement of balanced budget rules and rules governing the use of unanticipated funds, and introduction of more flexible revenue-increase and rainy-day fund rules.

[102] The new GASB rules take steps in this direction by requiring more realistic appraisal of the unfunded portion of pension obligations as well as higher required contributions and more transparency in the reporting of obligations.

Box 1. Legal Options Available to Financially Distressed Local Governments

Aside from undertaking a voluntary, out-of-court debt workout, legal options for a financially distressed local government to reduce, extend, and/or restructure outstanding debts are limited. Moreover, uncertainties surrounding privileged debt render outcomes unpredictable, regardless of the restructuring scenario.

Some—but not all—local governments may be eligible to seek protection under Chapter 9 of the U.S. Bankruptcy Code. As a general matter, the U.S. Constitution allocates powers to the federal government but preserves State sovereignty in accordance with the Tenth Amendment. Thus, while bankruptcies are carried out exclusively in federal courts under the U.S. Bankruptcy Code, its application to the States is carefully circumscribed. Eligible debtors under the Bankruptcy Code include local governments, but not States. For a local government to file a bankruptcy petition, in addition to other preconditions, it must obtain State approval. Many States limit which entities can file and under what circumstances. Even when the Bankruptcy Code does apply, the court's powers over the operations of the local government are limited. For example, the court could not direct the local government to sell assets nor could it appoint a trustee or receiver to oversee its affairs. Local legislation may empower a State to exercise this type of control, in tandem with, or independently from, federal bankruptcy proceedings. For example, the State of Michigan appointed an emergency manager to Detroit before bankruptcy proceedings commenced, and has continued to exercise this authority throughout the bankruptcy proceedings.

Currently, the U.S. Bankruptcy Code does not apply to the Commonwealth of Puerto Rico (or the District of Columbia). In contrast to States where sovereignty is constitutionally protected, Congress retains full legislative control over U.S. territories, including Puerto Rico. Such powers would allow Congress to intervene prior to default (for example, to impose tighter fiscal controls) or post default (for example, to amend the U.S. Bankruptcy Code to ensure its application or to create a special insolvency procedure). As a matter of policy, however, several factors would likely influence a decisive exercise of this authority, including whether doing so would impose a burden on U.S. taxpayers more broadly or unduly undermine the historical local self-governance enjoyed by Puerto Rico.

Under any restructuring scenario, a key issue will be ascertaining the extent to which debt incurred by the local government is privileged. In particular:

- State constitutions and local labor laws may place restrictions on the ability of the local government to restructure public employee and retiree benefit plans. While this could serve as an impediment to a debt workout, the Bankruptcy Code generally allows a municipal debtor to adjust or eliminate these obligations. However, there may public policy reasons to limit the scope of such adjustments, which would need to be balanced against the Bankruptcy Code's requirement to ensure that similarly situated creditors (i.e., other unsecured creditors) are treated in a fair and equitable manner.
- State constitutions and local law may grant privileges to certain bondholders, and thus the treatment of general obligation bonds across the States and territories may not be uniform. General obligation bonds, which are backed by general tax revenues and the "full faith and credit" of the issuing entity are presumed to be unsecured debt, unless State laws provides otherwise. California legislation, for example, establishes a lien in favor of general obligation bondholders; this is not the case in Michigan. Also, the Puerto Rican Constitution provides that the public debt of the Commonwealth, constitutes a first claim on available resources and empowers bondholders, to bring suit to require application of available resources to the payment of principal of, and interest on, public debt when due.

Box 2. 2013 Municipal Bond Market Distress

Recent high-profile cases of financial distress have brought U.S. municipal bond markets and the state of SLG finances to the spotlight. In the largest U.S. municipal bankruptcy ever, the city of Detroit filed for bankruptcy on July 18, 2013, while yields on Puerto Rican bonds have soared in the fall of 2013 on concerns of the island's debt sustainability. Considerable uncertainty remains, also reflecting uncharted legal questions raised by these episodes.

Detroit's bankruptcy filing occurred after decades of decline due to a depressed local economy (severely affected by the scaling down of local auto industry employment), declining tax revenues (driven by falling house prices and population loss, especially in higher-income segments), and deteriorating quality of city services. The bankruptcy was highly anticipated and already priced in. Yields on 10-year benchmark municipal bonds rose by 15 basis points between July 18 and July 25 before receding. They stood at 2.3 percent on June 17 [lower than the July 18, 2013 level of 2.66 percent]. The legal process will take a long time. Currently, the goal is to finish the process by early fall 2014. Along the way, important precedents may be set at least in two main areas.[1]

- There is a legal gray area on how public pensions will be treated. Michigan is one of nine states that explicitly protect public employee pensions in the state constitution but, under the federal bankruptcy law, a judge may be able to subvert the state constitution to reduce the Detroit's obligation to its pensioners. A legal battle is expected, perhaps ultimately reaching the Supreme Court.

- The haircut the bondholders would take under Detroit's restructuring proposals is generally higher than what the market currently assumes for loss-given-default in municipal bankruptcies. Re-pricing risk across the municipal market cannot be ruled out if Detroit is successful in negotiating higher haircuts.

Highly dependent on federal aid and tax incentives, Puerto Rico has been in recession since 2006, when the phase-out of an important tax credit was completed. The recession exposed long-standing structural problems. These include high public debt ($70 billion, around 100 percent of GDP); heavy government involvement financed by subsidized debt (Puerto Rican bonds are "triple-tax-free," meaning that they are exempt from federal, state, and local taxes, and the government sector accounts for 27 percent of total nonfarm employment); and lack of competitiveness, in part because of high labor costs relative to Caribbean neighbors (the U.S. federal minimum wage applies in Puerto Rico) and a low labor force participation rate (emigration to the mainland is common and residents often qualify for direct transfers from the U.S. federal government).

Doubts about Puerto Rico's debt sustainability surfaced in the summer of 2012 and intensified in the fall of 2013. The island's increasing reliance on bank credit and other short-term measures to fund budget gaps came into the spotlight against the backdrop of a struggling economy. The government unveiled plans—including pension reform, tax hikes, spending cuts, a balanced budget proposal, and incentives to attract businesses to the island—to address the problems but flows out of Puerto Rican debt continued. In February 2014, all three major credit rating agencies downgraded Puerto Rico to junk status. Paradoxically, Puerto Rican debt rallied after the downgrade, thanks to the removal of uncertainty regarding credit rating agency action and the island was able to raise $3.5 billion in bond sales in March. Yields on 10-year Puerto Rican bonds stood at 8.8 percent on June 17, up from 6.2 percent at the end of August 2013 but down from above 10 percent observed in early late January/early February. Moreover, Puerto Rico was able to tap the markets and raise $3.5 billion in general obligation bonds in March 2014.

Box 2. 2013 Municipal Bond Market Distress (Continued)

Unlike Detroit, Puerto Rico cannot file for bankruptcy under Chapter 9. With the standard bankruptcy procedure off the table, a potential default would fall in the legal twilight zone and set new precedents. Some of the issues highlighted above for Detroit also apply to Puerto Rico, but the fact that the island is not eligible to file for bankruptcy under current law further complicates the legal questions (see Box 1).

While these cases may set precedents on a range of legal matters regarding municipal bond distress and create some ripple effects, there is little risk of immediate contagion and a negative systemic impact. Historically, municipal bankruptcies have been rare and idiosyncratic, and recovery rates have been close to 100 percent even in the case of default—and default rates are much lower than comparable corporate bonds (Table). Indeed, Arezki, Candelon, and Sy (2011) find that an increase in financing costs of a state results in more favorable borrowing conditions for other states, perhaps reflecting the captive municipal bond demand in retail investor portfolios and consistent with the widening of spreads between high- and low-quality municipal bonds documented in Section B. Limited exposure by foreign investors given that they cannot take advantage of the tax-exempt status of these bonds should reduce the potential spillovers to international markets.

Default Rates

S&P rating	Munis	Corps
AAA	0.00	0.60
AA	0.00	1.50
A	0.23	2.91
BBB	0.32	10.29
BB	1.74	29.93
B	8.48	53.72
CCC-C	44.81	69.19
Investment grade	0.20	4.14
Non-investment grade	7.37	42.35
All	0.29	12.98

Historical default rates for municipal and corporate bonds rated by Standard & Poor's. Cumulative default rates up to 2007 expressed in percent.

Detroit and Puerto Rico experiences have, so far, continued to demonstrate that individual municipal bankruptcy and distress cases do not generate waves of defaults. Detroit's estimated $18.5 billion in liabilities (nearly half of which are for retiree benefits) are small relative to the $3.7 trillion size of the U.S. municipal bond market. Puerto Rico arguably poses a bigger risk. An estimated 75 percent of mutual funds have exposure to Puerto Rico. Disclosures by UBS and Citigroup (the top two under-writers of Puerto Rican debt) suggest that spillovers may occur since Puerto Rican debt is used as collateral. That said, damage may still be contained and there is no obvious trigger event that would lead to a Puerto Rican default. Even with debt at three times that of Detroit, Puerto Rico is less than 2 percent of the municipal bond market and other municipal issuers are in much better shape than they were only a few years back.

[1] Early in the bankruptcy process, the emergency financial manager of Detroit proposed to classify all general obligation (GO) bonds as unsecured debt, leading creditors to argue that the city had a statutory requirement to levy taxes as necessary and segregate certain tax proceed to pay for a particular class of GO bonds. This classification proposal, which would have had important ramifications for creditor rights in the municipal bond market, has since been dropped from the debt restructuring proposal.

Appendix 1. Details on the Econometric Analyses and Recent Developments

The econometric specification we use to examine the relationship between municipal bond market's perception of a state's creditworthiness and state characteristics builds the list of variables to include based on the analyses in Bayoumi, Goldstein, and Woglom (1995), Poterba and Reuben (1999), Novy-Marx and Rauh (2009b), and Grizzle (2010).

Data come from a variety of sources including Bloomberg, Bureau of Labor Statistics, Census Bureau, National Association of State Budget Officers, Pew Center, and NBER TAXSIM. Sample period covers 2008 through 2014.

We present the results under two main specifications: first with the credit rating as the dependent variable and then with the bond spread as the dependent variable. The latter is available only for 19 states (and Puerto Rico but Puerto Rico is not included in the regressions because of missing information on some of the control variables). The baseline regression results are in Tables 1 and 2.

These results are robust to several changes to the specification including addition of other macroeconomic and fiscal controls (such as log level of state per capita income, revenue-to-GSP ratio, and average growth rate of revenues in the last three years) and different lags of the control variables.

An obvious concern is the endogeneity of outstanding debt levels. If a state is perceived to be in better fiscal health (e.g., because of its economic potential or because it has better budget institutions) and faces lower borrowing costs, it may opt for higher levels of debt because it can afford to do so. To address this concern and check the robustness of the coefficients on unfunded pension and other post-employment benefit liabilities and political polarization, we use an instrumental variables approach. Noting that most general obligation debt is long term and issued to finance infrastructure spending, the instrument we use is the population density of the state: more densely populated states tend to have higher demand for infrastructure and, hence, higher debt levels but population density is not related to credit ratings or bond yields. The instrumental variable regression results are in Table 3. First-stage results (available upon request) confirm the suitability of population density as an instrument for outstanding debt level. The main coefficients of interest on unfunded pension liabilities and political polarization remain largely unaltered in the IV regressions while the coefficient on outstanding debt is no longer significant. The latter may be an indication that the municipal bond market does take into account the fact that most debt is issued to finance capital projects with potential to benefit long-term growth.

Finally, Tables 4 and 5 provide a partial list of recent municipal bankruptcy filings and pension reform actions.

Table 1. Determinants of State Credit Ratings

	Full sample			Before 2010			After 2010		
UPL	-0.101***		-0.098***	-0.077***		-0.079***	-0.119***		-0.112***
	[0.019]		[0.018]	[0.027]		[0.029]	[0.024]		[0.024]
UHL		-0.039**	-0.018		-0.033	-0.019		-0.049***	-0.029
		[0.016]	[0.017]		[0.021]	[0.020]		[0.016]	[0.018]
DEBT	-0.083***	-0.094***	-0.080***	-0.077***	-0.080***	-0.073***	-0.084***	-0.102***	-0.081***
	[0.011]	[0.014]	[0.011]	[0.020]	[0.023]	[0.021]	[0.013]	[0.018]	[0.013]
BBAL	0.322**	0.258**	0.322**	0.039	0.037	-0.01	0.424***	0.298***	0.441***
	[0.143]	[0.115]	[0.153]	[0.248]	[0.264]	[0.270]	[0.144]	[0.113]	[0.163]
IG	-0.018	-0.009	-0.017	-0.002	-0.015	-0.005	-0.034	0.006	-0.041
	[0.034]	[0.034]	[0.037]	[0.047]	[0.051]	[0.049]	[0.039]	[0.040]	[0.040]
UR	-0.051	-0.075*	-0.054	0.014	-0.032	-0.012	-0.073*	-0.090*	-0.068
	[0.035]	[0.040]	[0.037]	[0.076]	[0.083]	[0.079]	[0.041]	[0.048]	[0.045]
TAX	-0.090***	-0.088***	-0.084***	-0.06	-0.064	-0.052	-0.095***	-0.091***	-0.084**
	[0.026]	[0.028]	[0.029]	[0.047]	[0.049]	[0.048]	[0.032]	[0.034]	[0.036]
POL	-0.484**	-0.405**	-0.520***	-0.479	-0.457	-0.559	-0.482**	-0.397*	-0.521**
	[0.190]	[0.203]	[0.198]	[0.389]	[0.395]	[0.396]	[0.219]	[0.239]	[0.227]
Cons	10.036***	9.856***	10.088***	9.087***	9.215***	9.381***	10.472***	10.165***	10.455***
	[0.481]	[0.502]	[0.512]	[1.081]	[1.110]	[1.127]	[0.548]	[0.572]	[0.592]
Obs	290	284	284	100	98	98	190	186	186
R-squared	0.35	0.29	0.35	0.20	0.18	0.22	0.43	0.34	0.43

Notes: The sample consists of 50 states. The credit rating is the Standard & Poor's rating of a state's general obligation bonds. UPL stands for unfunded pension liabilities, UHL stands for unfunded retiree health benefits, DEBT is the market value of a state's outstanding bonds, BBAL is the budget balance. UPL, UHL, DEBT, and BBAL are expressed as percent of gross state product and lagged by one year. IG is real income growth over the previous year. UR is the unemployment rate in the previous year. TAX is the top marginal tax rate on interest income (source: TAXSIM). POL is a measure of political polarization in the state legislature (source: Shor and McCarthy, 2013).

Table 2. Determinants of Municipal Bond Spreads

	Full sample			Before 2010			After 2010		
UPL	0.032***		0.035***	0.011		0.011	0.042***		0.046***
	[0.010]		[0.011]	[0.010]		[0.011]	[0.012]		[0.013]
UHL		0.002	-0.009		0.002	-0.001		-0.002	-0.018
		[0.007]	[0.009]		[0.008]	[0.010]		[0.010]	[0.013]
DEBT	0.030***	0.029***	0.029***	0.039***	0.038***	0.038***	0.025***	0.025**	0.025***
	[0.004]	[0.006]	[0.005]	[0.006]	[0.006]	[0.006]	[0.006]	[0.010]	[0.006]
BBAL	-0.434***	-0.433***	-0.460***	-0.367***	-0.371**	-0.369**	-0.733***	-0.691**	-0.801***
	[0.144]	[0.155]	[0.148]	[0.130]	[0.138]	[0.136]	[0.271]	[0.310]	[0.271]
IG	-0.008	-0.014	-0.007	-0.016	-0.016	-0.016	0.043	0.027	0.053
	[0.017]	[0.016]	[0.018]	[0.025]	[0.026]	[0.025]	[0.037]	[0.039]	[0.039]
UR	0.045**	0.060**	0.055**	0.037	0.042	0.038	0.046**	0.070**	0.067**
	[0.018]	[0.028]	[0.025]	[0.038]	[0.046]	[0.043]	[0.020]	[0.035]	[0.029]
TAX	-0.015*	-0.009	-0.012	-0.009	-0.008	-0.009	-0.008	0.001	0.001
	[0.008]	[0.011]	[0.010]	[0.016]	[0.018]	[0.018]	[0.011]	[0.017]	[0.013]
POL	0.138	0.069	0.113	0.375***	0.353**	0.372***	-0.056	-0.142	-0.118
	[0.087]	[0.120]	[0.098]	[0.119]	[0.136]	[0.128]	[0.108]	[0.178]	[0.129]
Cons	-0.772***	-0.651***	-0.789***	-1.312***	-1.281***	-1.311***	-0.509**	-0.356	-0.570**
	[0.216]	[0.208]	[0.225]	[0.360]	[0.343]	[0.363]	[0.244]	[0.245]	[0.272]
Obs	112	112	112	38	38	38	74	74	74
R-squared	0.53	0.44	0.53	0.69	0.68	0.69	0.52	0.36	0.54

Notes: The sample consists of 19 states. The municipal bond spread is calculated as the difference between the yield on a state's general obligation bonds, as reported by Bloomberg, and the 10-year Treasury bond yield. UPL stands for unfunded pension liabilities, UHL stands for unfunded retiree health benefits, DEBT is the market value of a state's outstanding bonds, BBAL is the budget balance. UPL, UHL, DEBT, and BBAL are expressed as percent of gross state product and lagged by one year. IG is real income growth over the previous year. UR is the unemployment rate in the previous year. TAX is the top marginal tax rate on interest income (source: TAXSIM). POL is a measure of political polarization in the state legislature (source: Shor and McCarthy, 2013).

Table 3. Instrumental Variable Estimates

DV -->	Credit Rating			Municipal Bond Spread		
UPL	-0.104***		-0.104***	0.030**		0.034***
	[0.023]		[0.024]	[0.012]		[0.011]
UHL		-0.050***	-0.021		0	-0.012
		[0.018]	[0.018]		[0.008]	[0.010]
DEBT	-0.069	-0.016	-0.047	-0.028	0.013	0.002
	[0.060]	[0.067]	[0.062]	[0.049]	[0.025]	[0.025]
BBAL	0.322**	0.245**	0.320**	-0.464***	-0.444***	-0.481***
	[0.137]	[0.101]	[0.146]	[0.176]	[0.157]	[0.150]
IG	-0.02	-0.016	-0.02	0.007	-0.01	0.001
	[0.033]	[0.033]	[0.037]	[0.028]	[0.020]	[0.022]
UR	-0.065	-0.156*	-0.087	0.094*	0.075*	0.080*
	[0.065]	[0.085]	[0.070]	[0.056]	[0.045]	[0.042]
TAX	-0.090***	-0.083***	-0.082***	-0.027*	-0.011	-0.016
	[0.026]	[0.027]	[0.029]	[0.016]	[0.010]	[0.011]
POL	-0.481**	-0.388*	-0.521***	0.002	0.029	0.043
	[0.189]	[0.209]	[0.194]	[0.186]	[0.166]	[0.144]
Cons	9.953***	9.031***	9.807***	0.113	-0.419	-0.427
	[0.795]	[0.875]	[0.796]	[0.803]	[0.452]	[0.436]
Obs	290	284	284	112	112	112
R-squared	0.35	0.23	0.34	0.18	0.42	0.46

Notes: Population density is used as an instrument for the debt level because most long-term general obligation bonds are issued to meet infrastructure needs. The credit rating is the Standard & Poor's rating of a state's general obligation bonds. The municipal bond spread is calculated as the difference between the yield on a state's general obligation bonds, as reported by Bloomberg, and the 10-year Treasury bond yield. UPL stands for unfunded pension liabilities, UHL stands for unfunded retiree health benefits, DEBT is the market value of a state's outstanding bonds, and BBAL is the budget balance. UPL, UHL, DEBT, and BBAL are expressed as percent of gross state product and lagged by one year. IG is real income growth over the previous year. UR is the unemployment rate in the previous year. TAX is the top marginal tax rate on interest income (source: TAXSIM). POL is a measure of political polarization in the state legislature (source: Shor and McCarthy, 2013).

Table 4. Recent Municipal Bankruptcies

Date	City, State	Reason/Amount
2008	Gould, Arkansas	Municipality filed a chapter 9 case as a strategy **to forestall several lawsuits**.Case was dismissed after debtor regained financial stability.
2008	Vallejo, California	**Pension obligations and operational budget;** Financial distress stemmed mainly from the city's inability to pay pension benefits to government employees.
2009	Westfall Township, Pennsylvania	**Debt or payments related to public services or owed to private litigants.** Filed a chapter 9 case in the face significant debts resulting from a $20.8 million decision in favor of a resident who had sued the municipality after the township had sought to prevent the resident from building a housing development.
2009	Washington Park, Illinois	**Debt or payments related to public services or owed to private litigants**. Washington Park, Illinois filed a chapter 9 case due in part to mounting payments owed to trash collectors. Washington Park's debts also stem from litigation brought by private citizens, including litigation brought by a private strip club that resulted in the city being unable to continue to realize significant annual revenue from strip club licenses and becoming liable for the strip club's attorneys fees. The municipality has also faced litigation related to certain government employees' corrupt practices.
2009	Prichard, Alabama	**Pension obligations and operational budget;** The municipality was under significant financial pressure regarding its operational budget and its pension reserves for retired government employees. It was able to revise its budget, so that it would no longer operate at a deficit, but it could not come up with the funds to pay its pension obligations. In the face of litigation from retirees, the municipality filed a chapter 9 case.
2011	Central Falls, Rhode Island	**Pension obligations and operational budget**; Owed more than $80 million in unfunfed pension and retiree health benefit liability.
2011	Harrisburg, Pennsylvania	**Debt or payments related to construction of facilities for public services;** chapter 9 filing, due largely to $282 million of debt associated with the construction of a trash incinerator.
2011	Jefferson County, Alabama	**Debt or payments related to construction of facilities for public services.** $3 billion in sewer debt.The "sewer debt" was further exacerbated by an interest rate swap transaction that failed.
2012	Stockton, California	**Pension obligations and operational budget;** Unable to meet financial obligations; $319m in outstanding debt, plus $450m in health insurance and pension liabilities for city retirees.
2012	San Bernardino, California	**Pension obligations and operational budget;**Pension obligations; over $17 million.
2013	Detroit, Michigan	**Pension obligations and operational budget;** Largest municpal filing in U.S. history. Debt estimated 18-20 billion.

Table 5. Recent Pension Reforms

Year	State	Actions taken
2003	Oregon	Restructured to a hybrid plan with a DB and DC component;Capped COLA at 1.5% on all benefits above $20,000.
2005	Alaska	Created a defined contribution plan for new employees.
2008	Kentucky	2008: Extends the period of calculation for FAS; Reduces COLAs (House Bill 1); 2013: Created a hybrid plan for new employees
2009	Mississippi	Increased employee contribution rates; Changed eligibility requirements for new employees.
2009	Colorado	Changed COLA terms; Increased employee contributions; Modified formula used to calculate benefits 2011;
2009	New Hampshire	Increased contribution rates.
2009	New Mexico	Temporarily increased employee contributions; Created new tiers for state and educational employees;
2010	South Dakota	Removed COLAs for first year of retirement; Tied future COLA payments to system funded status.
2010	Delaware	Increased retirement age for new hires; Increased employee contributions.
2010	Pennsylvania	Created a shared risk DB plan for new employees, where employee contribution rates rise and fall based on investment returns; Changed the formula used to calculate benefits.
2010	West Virginia	Teachers' plan converted back to DB after 17 years of DC.
2010	Virginia	Employees required to contribute to pension (employer previously picked up); Change made to the calculation of average final salary; COLA match reduced.
2010	Vermont	Increased contributions for all TRS members ;Increased contributions for SRS members from 2011-2016.
2010	Missouri	Employee contributions raised; Retirement age raised.
2010	Minnesota	SRS: Reduced COLA;PERA: Increased contribution rates;TRS: Increased contribution rates incrementally.
2010	Wyoming	Requires employee contributions for the first time since 1991 ; Created a new tier for new employees with reduced benefits.
2010	Nevada	Allows for an increase in employee contributions; Reduced COLA for new employees; Modified the formula used to calculate benefits for new employees
2010	Utah	Closed the DB plan to new hires; created a Tier II retirement system for new employees, who choose between a DC plan and a hybrid plan (S.B. 63)
2010	Michigan	Created a hybrid plan for new school employees; Increased contribution rates for the two defined benefit tiers which were closed by the 2010.
2011	Arizona	Increased contribution rates; Modified the formula used to calculate benefits.
2011	New Jersey	Increased employee contributions; Modified formula used to calculate benefits.
2011	Kansas	Created a cash balance plan for state employees and teachers hired after.
2011	Rhode Island	Increased the normal retirement age; Temporarily suspended COLA.
2011	Wisconsin	Requires employees to pay half of the actuarially required contribution (employers have previously picked up employee contributions).
2011	Massachusetts	Future Employees: Increased retirement age and modified the formula used to calculate benefits; Current and Future Employees: Changed method used to calculate.
2011	Georgia	Created a hybrid plan for new employees.
2011	Maryland	Increases employee contributions.
2011	Florida	Increased employee contributions.
2011	Montana	Increased contribution rates for new employees; decreased cost-of-living adjustment for current retirees.
2011	Maine	Froze Cola for three years; Raised retirement age for all members with less than five years of service.
2011	North Dakota	Increased state employee contributions; Increased teacher contributions.
2012	South Carolina	Changed benefit calculations for new employees.
2012	California	Increased employee contributions; increased retirement age.
2012	Virginia	Created a hybrid plan; Reduced the pension multiplier; Modified the formula used to calculate pension benefits.
2012	New York	Created a new tier (Tier VI) for newly hired employees which features a higher normal retirement age, a lower pension multiplier, and higher employee contributions.
2013	New Mexico	PERA: Reduced COLA for retirees receiving $20,000 or less; changed COLA eligibility for new hires. Increased employee contributions for all workers; ERB: Reduced COLA for current retirees and increased contributions for current members.
2013	Louisiana	Created a cash balance plan for state employees and teachers hired after July 1, 2013 .
2013	Puerto Rico	Increased the retirement age; increased employee contributions; reduced benefits; created a hybrid plan.
2013	Oklahoma	Increased the retirement age and vesting period for new firefighters. Increased firefighter contribution rates.
2013	Nebraska	Created a new tier for newly hired school employees with a longer period used to calculate FAS and a reduced COLA.
2013	Tennessee	Closed the DB plan to new state and higher education employees and teachers hired after July 1, 2014. Created a new combination (DB/DC) hybrid plan for these employee groups.