

## The Corporate Saving Glut and Falloff of Investment Spending in OECD Economies

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*We explore the increase in the net lending of non-financial corporations across the OECD following the global financial crisis. We document that this rise reflects both increases in saving and declines in investment. Panel regressions reveal that the fall in investment across OECD economies was generally in line with fundamentals—GDP growth, interest rates, and profits—though in some countries the weakness was more pronounced. We find little evidence that firms were reducing investment to strengthen their balance sheets, as payments to shareholders remained strong and were uncorrelated with investment. We conclude that, at least from the investment side, the rise in corporate net lending probably does not reflect a shift in corporate behavior relative to past norms. [JEL E21, E22, G30]*

*IMF Economic Review* (2016) **64**, 777–799. doi:10.1057/s41308-016-0018-9; published online 1 November 2016

### Introduction

In the years leading up to the global financial crisis (GFC), the current account surpluses of the emerging Asian economies and Middle East oil producers received widespread attention. In a series of influential speeches, Bernanke

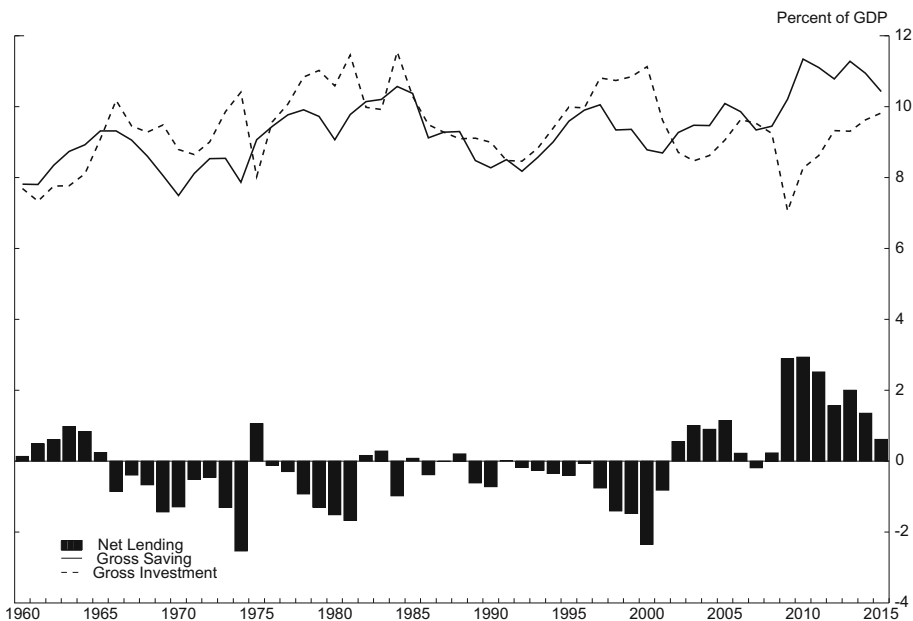
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(2005, 2007) argued that these surpluses represented a “global saving glut” that upset the international balance of supply and demand and was imposing downward pressure on interest rates around the world. In recent years, another potential source of leakage from aggregate demand has also come into view. Sometimes labeled the “corporate saving glut” (Loeys and others, 2005), it represented the excess of saving over investment among the corporations of many of the world’s leading economies. This excess did not receive as much attention as the global saving glut, but it could have considerable consequences for economic activity and external imbalances around the world, particularly as it has widened considerably in recent years.

Figure 1 plots the evolution of the corporate saving glut for the U.S. Saving (the solid line) is calculated as the undistributed profits of non-financial corporations, that is after-tax profits less dividends to shareholders. Investment (the dashed line) represents spending by non-financial corporations on capital formation. Any excess of saving over investment represents net lending to the rest of the economy, the bars at the bottom of the chart. For most of the period before 2000, non-financial corporations borrowed on net from the rest of the economy to finance their investments, as indicated by their negative net lending rates. However, during the years 2002–2005, these corporations experienced small positive net lending positions. These positions then ballooned after the GFC, exceeding 3 percent of GDP for a time. Considering the conventional view that the corporate sector borrows from the household sector to finance capital investment, this is a surprising outcome.

Figure 1. United States—Non-financial Corporations

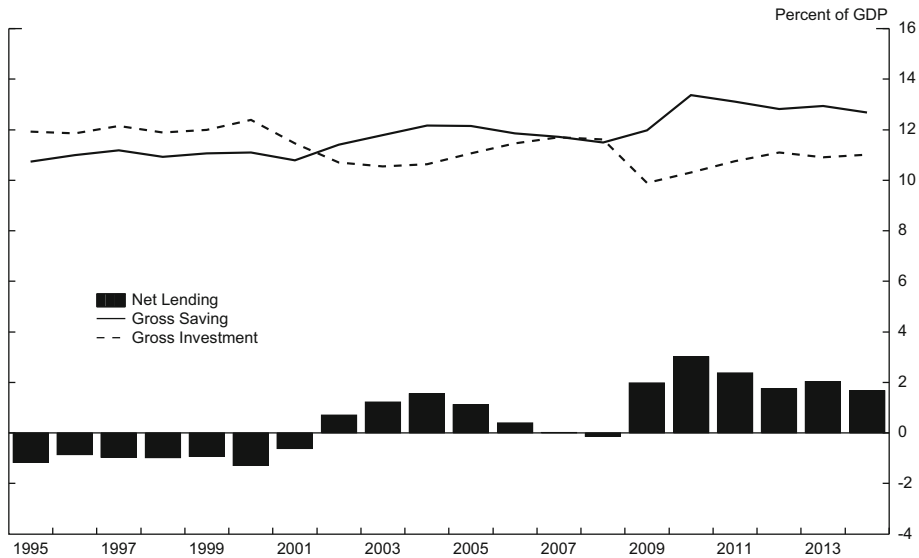


Figures 2 and 3 present analogous results for the OECD economies in aggregate. As may be seen by these results, which are available on a comprehensive, cross-country basis only since 1995, the evolution of net lending for a wide range of economies has largely mirrored that for the United States, moving sharply into positive territory immediately following the GFC.

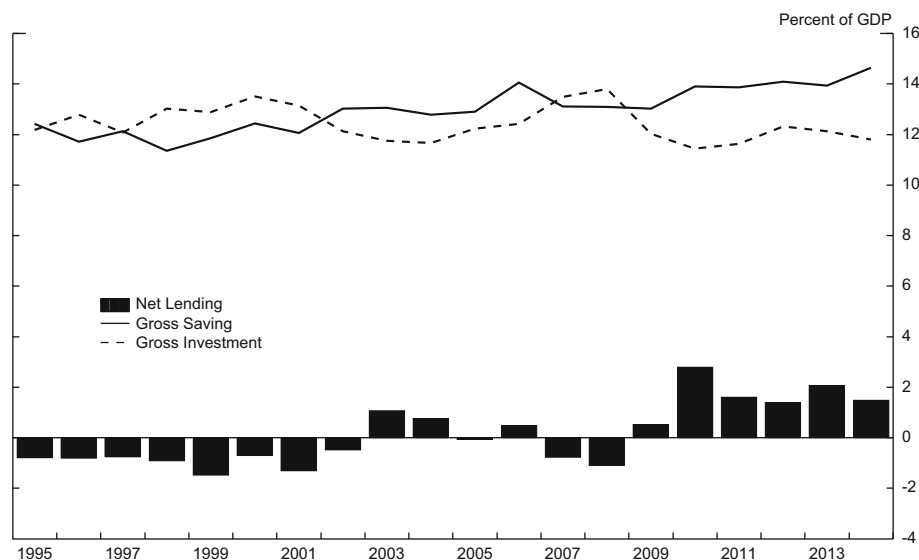
Table 1 presents country-specific data on corporate saving, investment, and net lending positions for three periods: 1995–2001, 2002–2008, and 2009–2014. In some countries, including Japan, Canada, U.K., and several others, corporations moved squarely into net lending positions in the early 2000s. Many more countries followed suit in the later period, following the GFC. All told, as shown by lines 27 and 28 of the table, the GDP-weighted mean of net lending across OECD countries rose from  $-0.97$  percent of GDP in 1995–2001 to  $0.70$  percent in 2002–2008 to  $2.14$  percent in 2009–2014; the median across countries in the three periods were  $-0.96$ ,  $-0.01$ , and  $1.63$  percent.

The fact that net lending rose at the same time in so many countries during the GFC and its aftermath is very unlikely to be a coincidence. Figures 4 and 5 show that the countries that experienced the sharpest recessions were more likely to experience a rise in corporate net lending. Figure 4 plots the change in net lending against one measure of the shortfall in growth since the GFC: the difference between average real GDP growth and its estimated potential growth rate prior to the GFC. The data suggest that countries with the greatest shortfall in recent growth have tended to experience larger increases in corporate lending. Figure 5 shows that increases in corporate net lending since the GFC are

**Figure 2. OECD Average (average across economies, weighted by share of nominal GDP)**



**Figure 3. OECD Median (annual median value across economies for net lending, gross saving, and gross investment)**



correlated with higher current account balances, suggesting that higher corporate net lending is correlated with larger declines in domestic demand relative to output.

While the rise in net lending is clearly associated with the GFC and the recession that followed, it is far from clear which caused which. More generally, it is unclear why corporate net lending rose so much. Certainly, the rise is not attributable exclusively to either a rise in corporate saving or a fall in investment; both of these took place, as made evident in Figures 1, 2, 3 and Table 1. Thus, a full explanation for the rise in net lending must address reasons both for the rise in corporate saving and decline in investment.

In this paper, as a downpayment on our ultimate objective of explaining the rise in corporate net lending since the GFC, we pursue the more limited objective of exploring the factors behind the decline in corporate investment. In particular, we explore three hypotheses for the decline in investment. The first is that the decline simply reflects an endogenous response to the GFC, both the recession and subsequent slow economic growth. To test this hypothesis, we estimate models of investment spending over the time period prior to the GFC. If these models are able to forecast the subsequent weakness of investment spending for a broad range of countries, we would view that as evidence in favor of the endogenous response hypothesis.

Our second hypothesis is that in reaction to the financial turbulence and disruptions to credit associated with the GFC, corporations cut back on investment spending in order to accumulate financial assets and bolster their balance sheets. Criticisms that corporations are holding back the recovery by building

Table 1. Average Gross Saving, Gross Investment, and Net Lending as Percent of GDP

	1995-2001			2002-2008			2009-2014			Change from 2002-2008 to 2009-2014		
	Saving	Investment	Net Lending	Saving	Investment	Net Lending	Saving	Investment	Net Lending	Saving	Investment	Net Lending
1. United States	9.39	10.45	-1.03	9.57	9.04	0.56	10.96	8.71	2.21	1.39	-0.33	1.66
2. Austria	10.51	14.23	-3.72	13.15	14.49	-1.34	15.44	13.38	2.07	2.29	-1.11	3.41
3. Belgium	12.84	12.47	0.37	12.68	13.01	-0.33	13.43	13.39	0.05	0.75	0.38	0.38
4. Canada	12.29	10.91	1.28	15.19	10.82	4.36	13.15	11.33	1.82	-2.04	0.51	-2.54
5. Czech Republic	14.57	21.27	-6.71	14.86	17.81	-2.95	13.98	16.36	-2.38	-0.89	-1.46	0.57
6. Denmark	16.60	12.09	4.52	15.66	12.12	3.54	14.04	10.31	3.74	-1.62	-1.81	0.20
7. Estonia	9.65	18.33	-8.69	15.81	21.39	-5.58	16.78	15.31	1.47	0.97	-6.08	7.05
8. Finland	16.22	12.09	4.13	16.90	12.41	4.49	14.31	11.42	2.89	-2.59	-0.98	-1.60
9. France	9.44	10.24	-0.81	9.48	10.95	-1.47	8.81	11.39	-2.58	-0.67	0.44	-1.11
10. Germany	9.60	12.05	-2.44	11.36	11.54	-0.18	12.24	11.16	1.08	0.88	-0.38	1.26
11. Greece	7.79	6.60	1.19	10.16	6.93	3.22	10.16	5.28	4.88	-0.00	-1.65	1.65
12. Hungary	9.66	14.62	-4.97	12.95	13.57	-0.62	15.84	12.79	3.05	2.90	-0.77	3.67
13. Ireland	10.34	10.74	-0.40	11.09	11.14	-0.05	15.24	12.04	3.20	4.15	0.90	3.24
14. Italy	8.11	9.77	-1.66	7.70	10.52	-2.82	7.92	9.05	-1.13	0.23	-1.47	1.70
15. Japan	14.10	14.61	-0.51	17.78	13.90	3.88	19.49	13.38	6.11	1.71	-0.52	2.23
16. Korea	11.82	19.89	-8.07	15.29	19.16	-3.87	18.63	19.19	-0.66	3.34	0.03	3.21
17. Netherlands	14.23	10.99	3.24	17.46	9.52	7.94	18.99	9.95	9.04	1.53	0.43	1.10
18. Norway	13.74	13.36	0.38	13.18	11.83	1.35	14.61	12.70	1.91	1.43	0.87	0.56
19. Poland	7.52	13.72	-5.26	12.01	10.54	1.47	15.65	9.91	5.74	3.64	-0.62	4.27
20. Portugal	8.70	11.79	-3.09	6.18	12.04	-5.86	8.23	9.94	-1.71	2.05	-2.10	4.15
21. Slovak Republic	15.22	20.92	-5.70	15.43	17.42	-1.99	14.99	13.31	1.67	-0.45	-4.11	3.66
22. Slovenia	10.85	14.84	-3.98	12.46	16.24	-3.78	12.59	11.47	1.13	0.14	-4.77	4.91
23. Spain	10.78	14.62	-3.84	9.57	15.62	-6.05	14.59	12.66	1.93	5.03	-2.96	7.99
24. Sweden	16.96	14.00	2.96	16.81	14.97	1.84	14.03	14.85	-0.82	-2.78	-0.12	-2.66
25. Switzerland	16.97	16.07	0.90	16.95	16.65	0.30	15.59	16.04	-0.45	-1.37	-0.62	-0.75

Table 1. (Continued)

	1995–2001		2002–2008		2009–2014		Change from 2002–2008 to 2009–2014		
	Saving	Investment Net Lending	Saving	Investment Net Lending	Saving	Investment Net Lending	Saving	Investment Net Lending	
26. United Kingdom	12.51	11.95	12.41	9.76	11.30	8.37	-1.11	-1.39	0.27
27. GDP-weighted mean	10.97	11.96	11.79	11.11	12.78	10.63	0.99	-0.48	1.45
28. Median	11.99	12.80	13.14	12.50	13.86	11.87	0.72	-0.63	1.65

Figure 4. Net Lending and Real GDP Growth, 2009–2014 vs. 2002–2008

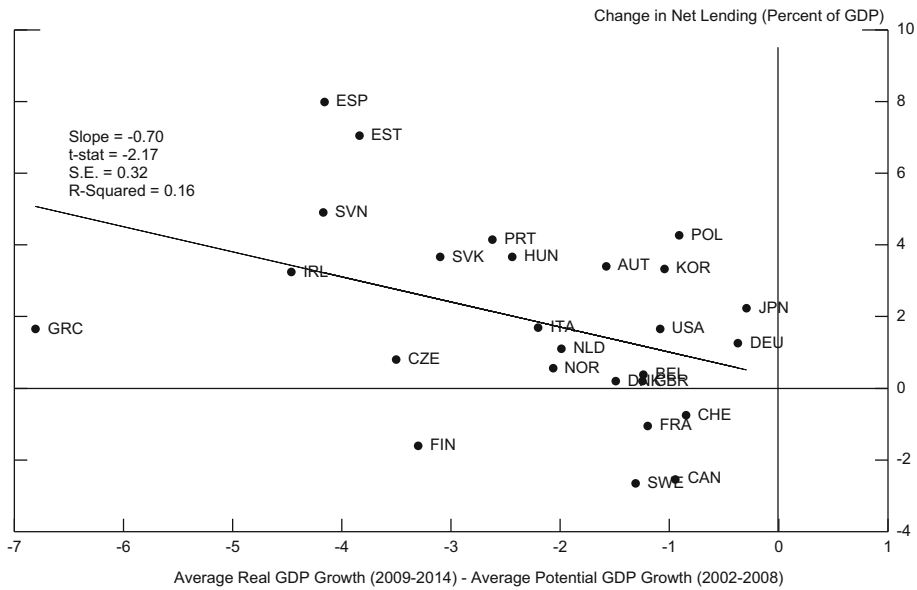
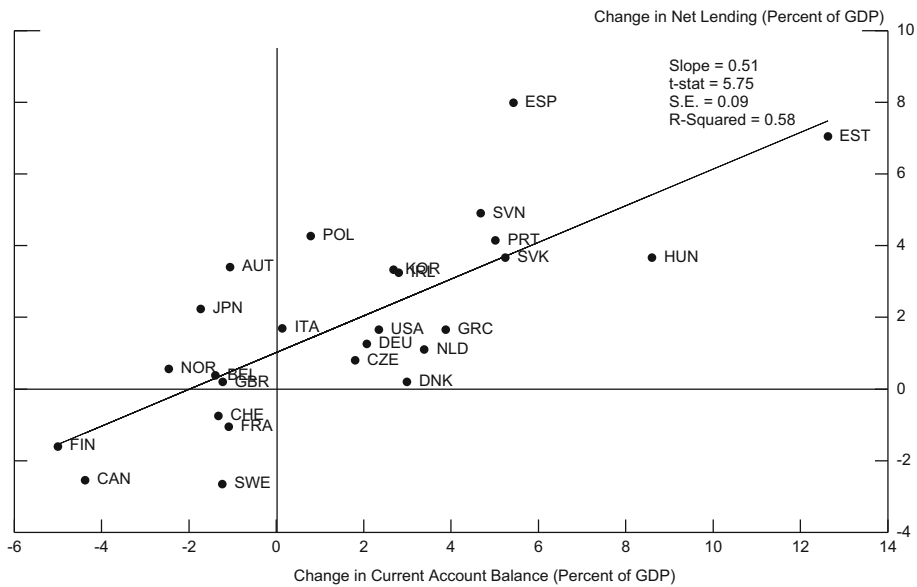


Figure 5. Net Lending and Current Accounts, 2009–2014 vs. 2002–2008



cash rather than investing may be related to this type of consideration. We would view evidence in favor of this “corporate caution” hypothesis to include (1) that investment models estimated prior to the GFC would over-predict investment in the 2009–2014 period, and (2) shortfalls in investment would be correlated with other indications that corporations were cutting outlays to build up cash buffers, such as reducing dividend payments and pulling back on buybacks of equity.

Finally, it is possible that investment has weakened not because of corporate caution, but because of other, as yet unclear, reasons, why the investment function might have shifted so that, for the same GDP growth and interest rates as before, firms might be pursuing less investment. It might be that the GFC persistently raised the level of uncertainty about future demand, or, as a related matter, that corporations are requiring higher returns (i.e., higher “hurdle rates”) to initiate that same investment projects as in the past. These possibilities recall concerns about secular stagnation, implying that investment may be depressed for a protracted period, as discussed in Summers (2014). As with the corporate caution hypothesis, this would be supported by evidence that models estimated through the period up to the GFC were over-estimating subsequent actual investment, and to a statistically significant extent; however, this hypothesis would receive support relative to the corporate caution hypothesis if outlays on dividends and equity buybacks appeared to hold up even as spending on investment fell short of the model’s prediction.

Our empirical strategy is as follows. We first estimate standard investment equations based on a panel dataset for the OECD countries and use these estimates to assess whether the relationship between investment and its fundamental determinants shifted after the GFC. For the OECD countries in aggregate, we find that the post-GFC weakness in investment was largely in line with its fundamental determinants, but in some countries, investment fell significantly below our model’s out-of-sample predictions.

Next, we note that standard investment equations generally do not include measures of corporate profits as an explanatory variable. Therefore, they cannot tell us whether the recent weakness of investment spending has been especially unusual, considering the observed strength of corporate profits. To address this issue, we add a measure of corporate profits as an explanatory variable in the investment equations. We assess whether movements in corporate profits historically have influenced aggregate investment spending, and whether, considering how corporate profits have held up in recent years, declines in investment spending have been especially unusual. We find that corporate profits generally do boost investment, but the effect is small and inclusion of profits in the investment model does not materially change the model’s predictions.

Finally, we assess the evidence that corporate caution may be inhibiting investment. Specifically, we evaluate the relationship between investment spending and corporate equity buybacks and dividend payments: If concerns about being caught short without sufficient liquid assets or financing were inhibiting investment as corporations sought to build up cash buffers, weak investment should be associated with weak buybacks and dividends as well;



conversely, if, as some assert, corporations are not being cautious but instead are deliberately reducing investment spending in order to finance greater dividends and share buybacks, we would expect a negative relationship between investment spending and dividends/buybacks. In fact, we find no apparent relationship between investment and dividends/buybacks, suggesting that neither a buildup in precautionary cash buffers nor a desire to return cash to shareholders explains the post-GFC weakness in investment spending.

The plan of this paper is as follows. The following section briefly surveys the limited literature on the corporate saving glut. The subsequent section describes our standard investment equation estimates, their out-of-sample performance, and the light this sheds on whether the behavior of investment has shifted in recent years. The next section re-examines this issue in light of the sustained strength of corporate profits, while the final section addresses the relationship between investment, share buybacks, and dividends in recent years.

### Literature Review

In contrast to the dynamics of aggregate investment, the corporate saving glut has not garnered a very long literature, in part because, as discussed above, it only emerged in the mid-2000s and became especially prominent after the GFC in 2007–2008. One of the first mentions of the phenomenon appears in Loays and others (2005), which noted the rise in corporate saving relative to investment around the world, especially in the advanced economies, and attributed the rise to a desire to restructure corporate balance sheets in response to earlier excesses, including equity market bubbles. This theme was taken up by *The Economist* (2005), and also attributed, particularly in Japan, to the desire to reduce debt and strengthen balance sheets. The IMF (2006) attributed the increase in corporate net lending in the 2000s to a number of factors, including declines in interest rates and taxes that improved profitability, declines in the relative price of capital goods that lowered investment spending, and the increased importance of passing profits to shareholders through equity buybacks (which do not reduce measured corporate saving) rather than dividend payments (which do reduce this saving). Andre and others (2007) identified many of the same factors as the IMF (2006) paper, and also cited the importance of the cyclical downturn in the early 2000s as a factor weighing on investment and boosting net lending.

Both IMF (2006) and Andre and others (2007) predicted that corporate net lending would likely decline as economic growth strengthened and the process of balance-sheet restructuring was completed. In the event, as described above, the corporate saving glut returned with a vengeance after the GFC. A number of subsequent papers further examined the causes of this glut, although taking a longer view of the process rather than focusing on the GFC and its aftermath. Karabarounis and Nieman (2012) develop a general equilibrium model to show that declines in the price of investment goods could have led to increases in corporate saving relative to investment. Armenter and Hnatkovska (2012) also

develop a general equilibrium model to explain the emergence of net lending by the corporate sector. This model focuses on the precautionary motive of firms seeking to accumulate financial assets in order to avoid being financially constrained in the future.

The precautionary motive of corporations plays an important role in researchers' explanation of a phenomenon that is related to but not the same as the rise in corporate net lending: the rise in corporate cash hoardings.<sup>1</sup> Bates and others (2009) attribute these cash hoardings to increases in volatility and uncertainty about earnings that motivates precautionary saving, as does IMF (2006) and Sanchez and Yurdagul (2013). Falato and others (2012) argue that as intangible capital (such as technology) has grown as a fraction of total non-financial capital holdings of firms, this reduces the firms' access to collateral for borrowing and leads them to hold greater cash reserves. Finally, many observers have noted that tax laws encourage the holding of cash overseas, although this does not explain the emergence of the corporate saving glut in countries outside the U.S. (Sanchez and Yurdagul, 2013).

While studies of recent developments in corporate net lending (and corporate saving) are relatively sparse, the dynamics of aggregate investment are examined by an abundant literature, including a number of papers particularly focused on investment post-GFC. Studies of the post-GFC drop in investment generally fall into one of the two camps, those that argue that the fall in investment is in line with the typical cyclical pattern of investment and those that attribute an additional drag from particularly high levels of uncertainty (either economic or policy-related) that would negatively affect the expected return on capital. Among those of the first ilk are IMF (2015) and Pinto and Tevlin (2014), which find that post-GFC investment in the U.S. and other advanced economies is well explained by a simple accelerator model, and Kothari and others (2013), which finds that all the decline in U.S. corporate investment during the crisis can be explained by the change in GDP and profits. Among those studies attributing a role to heightened economic uncertainty as well are Lewis and others (2014) and Banerjee and others (2015).

### Estimation of Traditional Investment Equations

In this section, we estimate panel data models of investment in the OECD countries, based on traditional accelerator and neoclassical models as developed in Oliner, Rudebusch, and Sichel, 1995 (ORS). We then examine out-of-sample

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<sup>1</sup>Cash hoarding may be associated with corporate net lending, either because corporations have increased their saving relative to investment in order to bolster their cash holdings, or merely because corporations are parking their excess saving in liquid assets. But there is no direct relationship between corporate net lending and cash hoarding. For example, if corporations desired to strengthen their liquidity positions, they could issue long-term liabilities and acquire liquid assets, without any change in their net lending positions. By the same token, if corporations boosted their saving relative to investment but used these extra resources to repay debt, this would show up as a rise in net lending but no change in their cash holdings.

forecasts of these models to assess whether investment in recent years has weakened by more than one would expect, based on the historical relationship between investment and its fundamental determinants.

### Empirical Methodology

In our empirical research, we estimate panel regressions of the following form, based on ORS's definition of a "neoclassical" investment model, in which investment is related to current and past changes in economic activity as well as the cost of capital:

$$\frac{I_t}{K_{t-1}} = c + a_1 \frac{I_{t-1}}{K_{t-1}} + a_2 \frac{\Delta Y_t}{K_{t-1}} + a_3 \frac{\Delta Y_{t-1}}{K_{t-1}} + a_4 \frac{\Delta Cost_t}{K_{t-1}}$$

The data on investment ( $I$ ), GDP ( $Y$ ), and the capital stock ( $K$ ) are annual and expressed in real terms, consistent with standard investment models. The cost of capital ( $Cost$ ) is determined by the relative price of capital goods, the real interest rate, and the depreciation rate:

$$Cost_t = \frac{P_t^I}{P_t^Y} \left( r_t + \delta_t - \Delta \log \left( \frac{P_t^I}{P_t^Y} \right) \right),$$

where  $P^I$  is the price deflator for investment,  $P^Y$  is the GDP price deflator,  $r$  is the real interest rate, and  $\delta$  is the depreciation rate for the capital stock.

In our discussions of investment above, we focused on the ratio of nominal investment to GDP; however, movements in real and nominal investment are well correlated over time, and both fell after the GFC. Precise definitions and data sources for the explanatory variables are provided in Appendix A. In our panel regressions, we also include country-specific fixed-effect dummy variables in order to account for idiosyncratic differences in corporate saving and investment behavior across countries that are unlikely to be explained by our macroeconomic variables.

Finally, all regressions were estimated through two end-points: 2008 and 2014. The estimation results for the shorter period are used to compute out-of-sample predictions, to be described below.

### Estimation Results

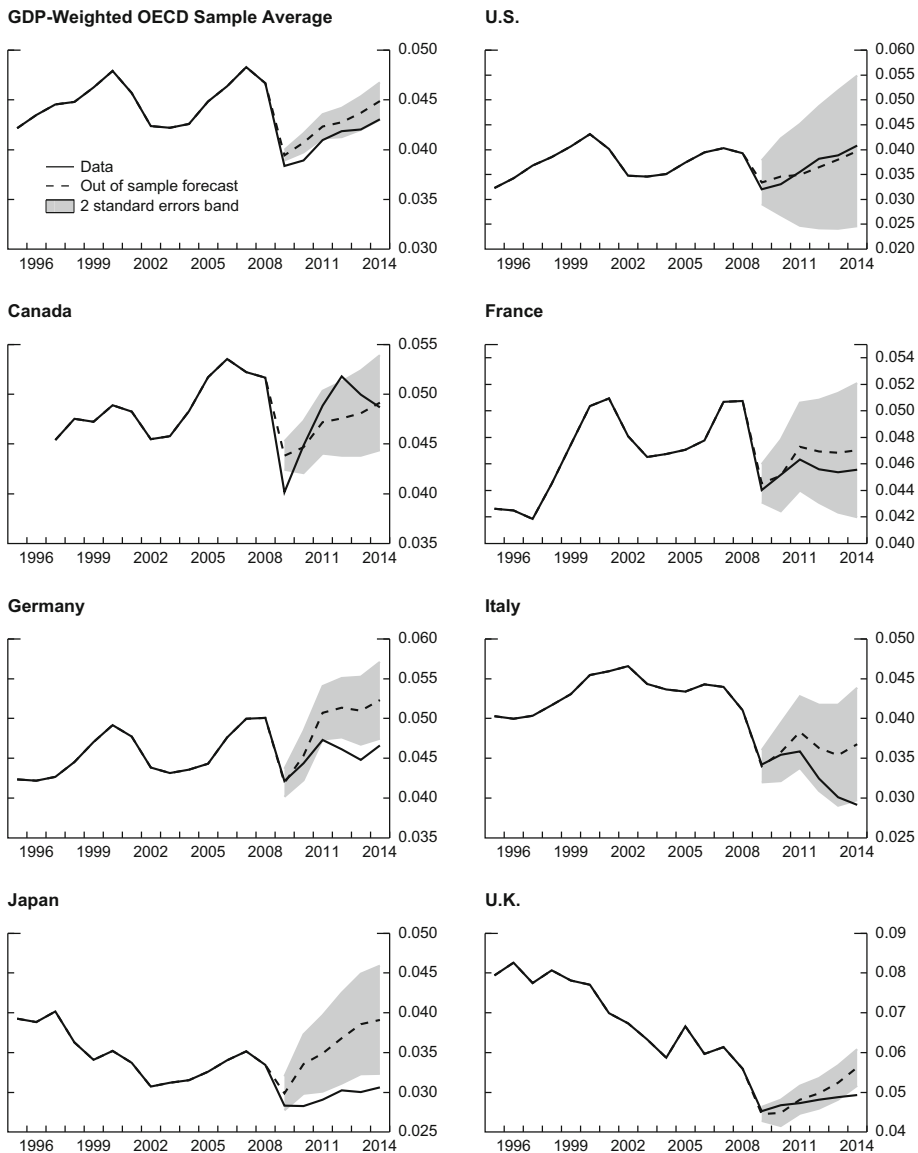
Table 2 summarizes our estimation results. Equation (1) represents the exact version of the ORS accelerator model: investment depends only on current and past lags of real GDP growth (as well as the reciprocal of the lagged capital stock). The Durbin–Watson statistic is close to zero, indicating substantial serial correlation of the residuals. Accordingly, Equation (2) adds a lagged dependent variable to the model, a feature we will retain in the remainder of the paper. In

Table 2. Panel Regression

Dependent Variable: $I_t/K_{t-1}$	(1)		(2)		(3)		(4)		(5)		(6)	
	1995-2014	1995-2008	1995-2014	1995-2008	1995-2014	1995-2008	1995-2014	1995-2008	1995-2014	1995-2008	1995-2014	1995-2008
$\Delta Y_t/K_{t-1}$	0.17*	0.18*	0.26*	0.27*	0.27*	0.29*	0.27*	0.30*	0.26*	0.27*	0.25*	0.25*
$\Delta Y_{t-1}/K_{t-1}$	6.33	5.08	15.94	11.78	16.10	12.48	16.12	12.86	13.55	10.35	12.56	9.28
$I_{t-1}/K_{t-1}$	0.33*	0.34*	0.06*	0.11*	0.04*	0.07*	0.05*	0.07*	0.04*	0.07*	0.07*	0.12*
$\Delta Cost_t/K_{t-1}$	11.74	7.76	3.06	3.82	2.23	2.12	2.54	2.28	2.20	2.10	3.66	3.43
Time Trend $\times 1000$			0.78*	0.76*	0.79*	0.79*	0.80*	0.80*	0.79*	0.79*	0.74*	0.73*
Profits/ $K_{t-1}$			29.73	21.18	29.83	21.87	29.63	22.21	28.62	21.91	23.20	17.14
Net Dividend Payments/ $K_{t-1}$					9.93*	13.02*	9.79*	12.96*	10.39*	13.67*	9.90*	11.60*
Equity Buybacks/ $K_{t-1}$					2.92	3.96	2.89	3.98	3.06	4.21	2.98	3.72
#Observations	494	339	479	324	462	307	462	307	461	307	409	291
$R^2$	0.82	0.87	0.94	0.95	0.94	0.95	0.94	0.96	0.94	0.96	0.94	0.96
SER	0.0063	0.0055	0.0037	0.0033	0.0037	0.0033	0.0037	0.0033	0.0036	0.0032	0.004	0.003
D-W Statistic	0.49	0.58	1.69	1.68	1.70	1.69	1.72	1.73	1.71	1.74	1.73	1.84

Note: All regressions include unreported constant,  $1/K(t-1)$ , and country fixed effects.

\* indicates significance at the 5 percent level. \*\* indicates significance at the 10 percent level. T-statistics reported under coefficients

**Figure 6. Out of Sample Forecast For  $I/K(-1)$  Using Regression 4 from Table 2**

this specification, the coefficients on current and lagged GDP growth are positive and significant, consistent with most other research on this topic. Equation (3) adds the change in the cost of capital, consistent with the ORS neoclassical model; surprisingly, the coefficient is positive and statistically significant, contradicting standard theory; however, with this explanatory variable on the order of  $-0.000001$ , because the change in cost is divided by the lagged capital stock, the measured effect is extremely small. Finally, Equation (4) adds a time trend to

capture a host of factors—demographic changes, increases in the share of intangible investments, etc.—that are not explicitly specified in the ORS model but might be relevant in practice. The coefficient on this time trend is small but statistically significant and positive.

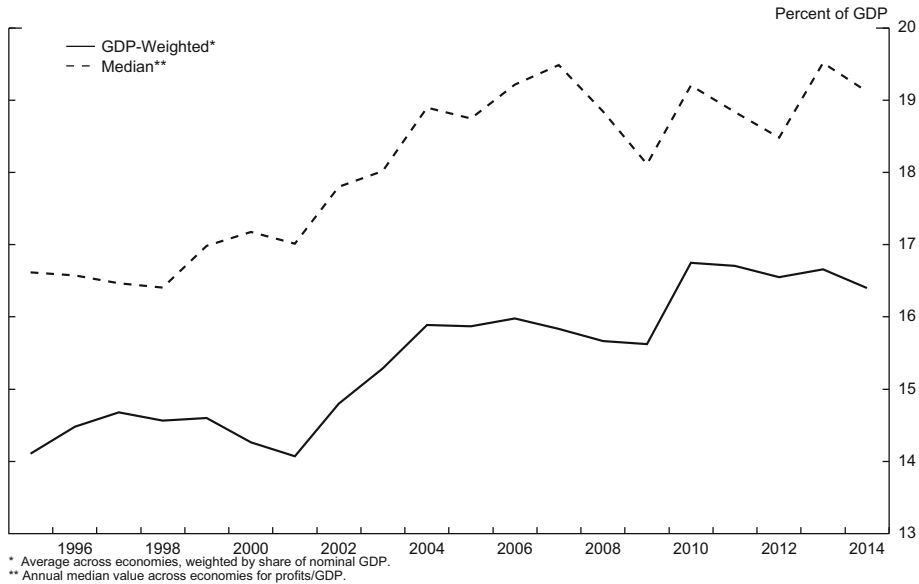
It should be acknowledged that traditional accelerator and neoclassical models of investment, such as those estimated here, may suffer from endogeneity bias, as shocks to investment may lead to movements in GDP, one of the explanatory variables. We have adopted this approach in order to root our analysis firmly in the existing literature on this topic, but we would note a number of mitigating considerations. First, because the dependent variable is specified as the *level* of investment, whereas the explanatory variable is specified as the *change* in GDP, the likelihood of reverse causality working through the national income identity is considerably lessened. Second, what we are attempting to identify are shifts in the relationship between investment and GDP growth, and such shifts may be informative even if the structural relationship linking the two variables is not precisely captured.

### Out-of-sample Forecast

Based on Equation (4) above, estimated through 2008, we compare actual real investment spending in 2009–2014 to its forecasted path, shown in Figure 6, for the GDP-weighted aggregate of the countries in our sample and for selected individual countries. The forecast is based on dynamic simulations of the model: the model prediction for the dependent variable in time  $t$  is used for the lagged dependent variable in the prediction for time  $t + 1$ . The solid line depicts actual investment, while the dashed line indicates the out-of-sample forecast. The shaded region indicates the width of the 2-standard-error bands spanning these forecasts.

The forecast tracks the basic contour of investment during and after the GFC relatively well. This result is similar to that found by Pinto and Tevlin (2014) and Kothari and others (2013) for the U.S. (where our model tracks actual investment quite closely) and IMF (2015) for advanced economies in general, as discussed in Section Literature Review. It thus reinforces the view that there was nothing extraordinary about the GFC in terms of its effect on investment: investment retained its prior relationship with its forcing variables. By the same token, our finding—at least for the OECD countries in aggregate—provides no support for the argument by Lewis and others (2014) and Banerjee and others (2015) that heightened economic uncertainty significantly exacerbated the weakness in investment above and beyond the direct effect of weaker economies. Accordingly, our results are consistent with our first hypothesis, that the decline in investment spending, and hence the increase in corporate net lending, has been mainly an endogenous response to the decline in economic growth associated with the GFC.

That said, we should qualify this interpretation by noting that for the aggregate result shown in the first panel, average investment is consistently below predicted and skirts the bottom of the 2-standard-error confidence interval. Moreover, for a number of individual economies, including Germany and Japan shown in the

**Figure 7. GDP-Weighted and Median OECD Profits**

figure, investment falls below the confidence interval. Accordingly, while we find no evidence of a significant OECD-wide downshift in investment relative to its fundamental determinants, we would not rule that out for various individual economies and believe this matter bears further investigation.

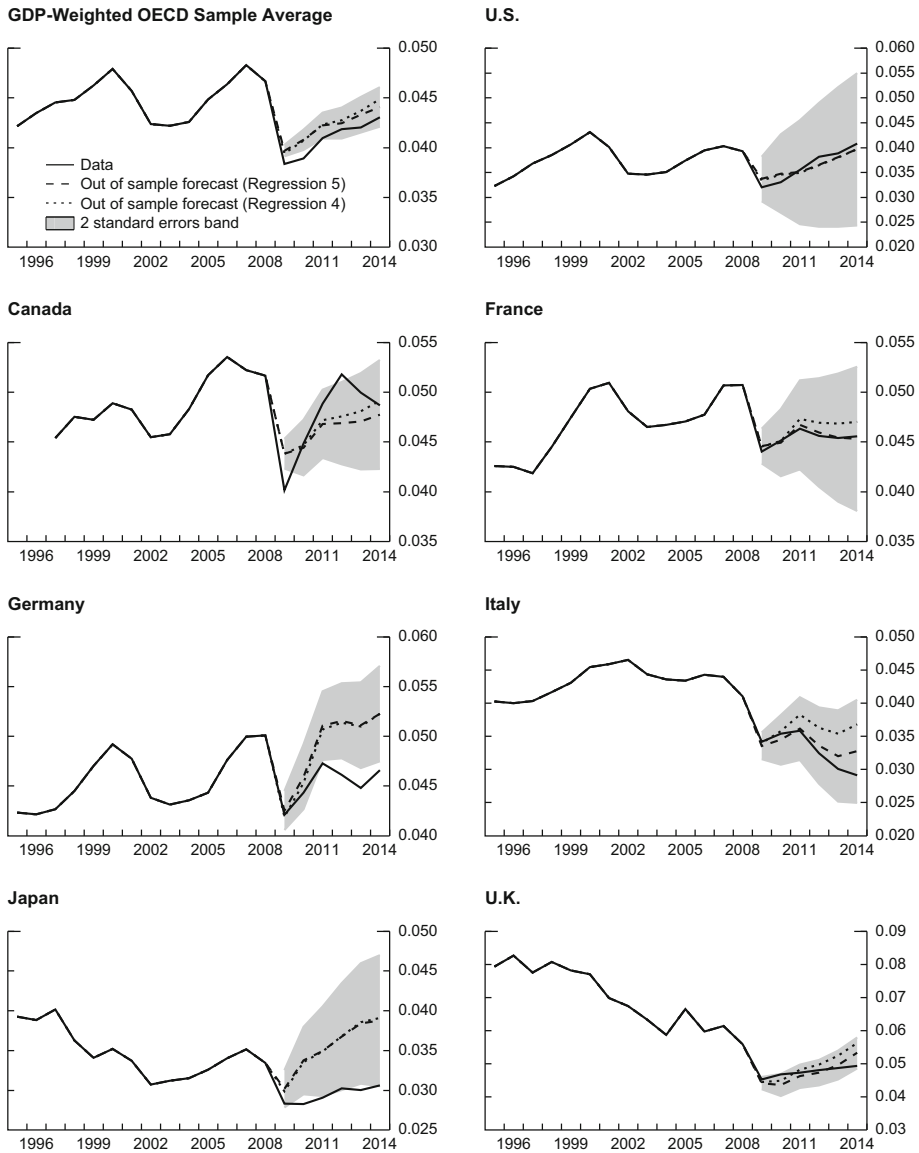
### The Effect of Corporate Profits on Investment

Figure 7 plots aggregate measures of OECD corporate profits, defined as the gross operating surplus of non-financial corporations less taxes and net interest payments, as a percent of nominal GDP.<sup>2</sup> Many observers find the weakness of investment around the world to be particularly surprising in light of the continued strength of corporate profits shown in the figure. Yet, while studies of corporate behavior at the firm level often find indications that higher cash flow leads to higher investment,<sup>3</sup> traditional models of aggregate investment focus on the rate of return on prospective investment as the sole determinant of investment spending, and ignore variations in corporate profits. Accordingly, it is an open

<sup>2</sup>The difference between corporate profits and the corporate saving discussed earlier is that corporate saving is defined as profits minus net dividend payments.

<sup>3</sup>Different definitions of cash flow are used in the literature; we use profits after payments of taxes, interest, and rents, because those payments are not controlled by the firm in the short run. For discussions of cash flow and investment, see, among others, Fazzari and others (1988), Hubbard (1998), and Cummins and others (2006).

**Figure 8. Out of Sample Forecast for  $I/K(-1)$  Using Regression 5 From Table 2**



question whether the weakness of investment seen in recent years is all the more unusual, given the strength of profits.

To shed some light on this question, we added real after-tax profits, divided by the lagged real value of the capital stock (symmetric with the specification of the other variables) as an explanatory variable in our investment model.



Equation (5) in Table 2 presents the estimation results. The coefficient on profits is positive, as we would expect, and significantly different from zero; this is consistent with the correlation between cash flow and investment identified by many studies, as discussed by, among others, Fazzari and others (1988), Hubbard (1998), and Cummins and others (2006). However, the estimated coefficient is rather small in magnitude; based on the 1995–2008 estimate, a \$100 dollar rise in profits leads to only a \$5 rise in investment in the same year and about a \$25 rise in the long run. The coefficient for the entire 1995–2014 period is smaller still, suggesting some decline in the correlation of profits and investment after 2008.

If investment had continued to be as sensitive to corporate profits after 2008 as it had been earlier, how much higher would investment have been? To address this question, we repeat the exercise described in Section [Estimation of Traditional Investment Equations](#) and create out-of-sample forecasts of investment using Equation (5). This is shown in Figure 8, along with the out-of-sample forecasts of the more traditional investment equations presented in Figure 6. They show that inclusion of profits as an explanatory variable doesn't change the picture much: the weakness of investment after the GFC is still broadly explained by the model, and there are still individual countries where investment has proven significantly weaker than model predictions.

### Buybacks, Dividends, and Investment

The results shown so far indicate that the weakness of investment spending following the GFC appears generally well-explained by movements in its fundamental determinants, especially the sharp decline in economic growth. Therefore, it does not appear to be the case that corporate caution in response to the GFC, and the desire to build up precautionary cash buffers, was the primary motivation for the slowdown in investment in most countries. Even so, aggregate investment across the OECD economies was indeed a little weaker than the model prediction, and significantly so in some individual economies. Therefore, there may still have been some role for corporate caution. In this section, we explore what we can learn about this from the recent behavior of stock buybacks and dividends.

Equity buybacks and dividend payments are ways that corporations can return profits to their shareholders. As discussed above, the evolution of buybacks and dividends in recent years may reveal something about the causes of weakness in corporate investment. A decline in buybacks and dividends that takes place at the same time and in the same countries as declines in investment spending may be evidence for the corporate caution hypothesis: corporations are reducing investment spending and returns to shareholders in order to build cash buffers. Conversely, a rise in buybacks in dividends, especially if coupled with declines in investment spending, may indicate that firms see no viable investment projects and are thus returning surplus resources to their shareholders.

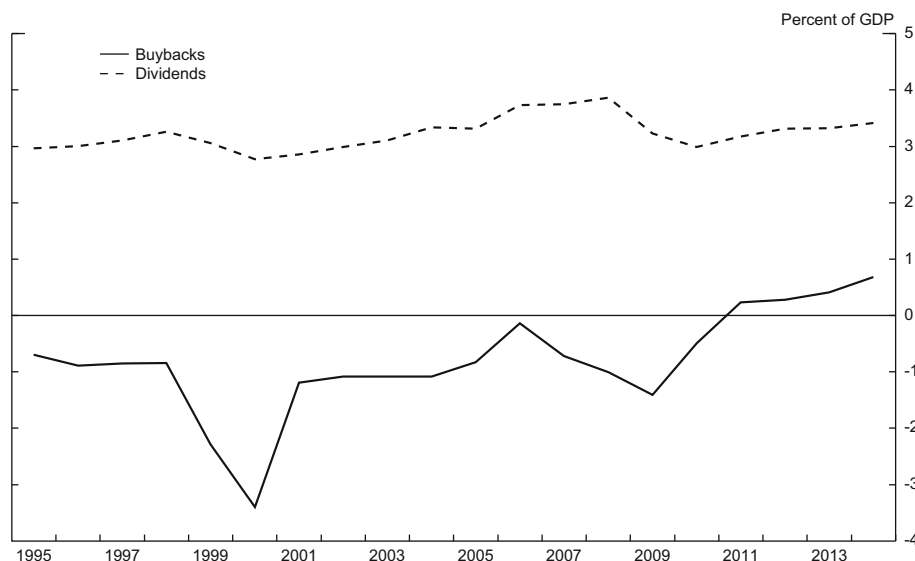
**Figure 9. Buybacks and Dividends (average across economies, weighted by share of nominal GDP)**

Figure 9 plots the evolution of equity buybacks and net dividends for the OECD countries in our sample. It shows an upward trend in both of these payments in recent years.<sup>4</sup>

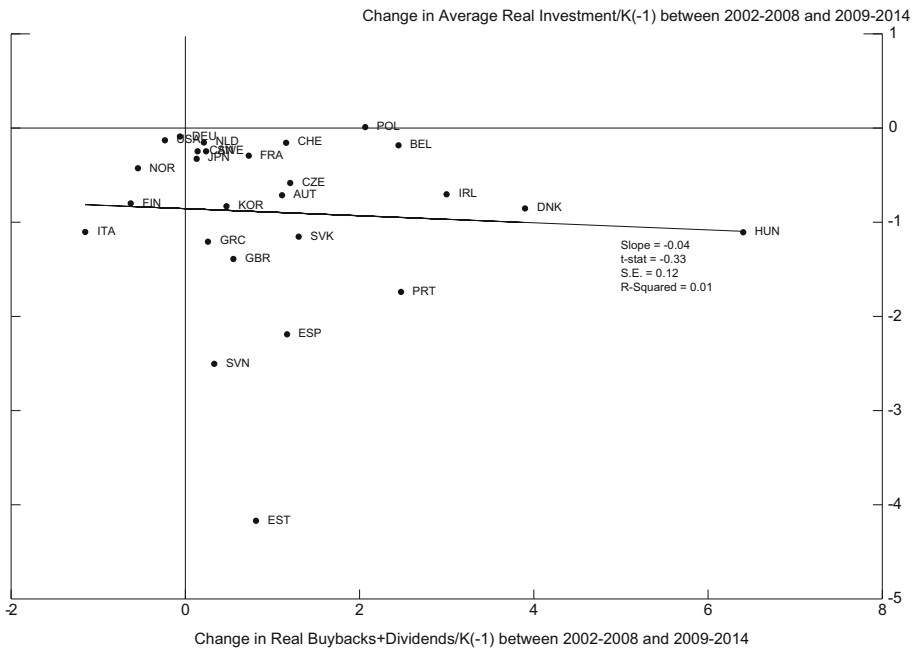
As a starting point for our analysis, Equation (6) in Table 2 shows the results of adding real dividends and buybacks as explanatory variables to the investment model. Over the periods shown, the coefficients on neither variable are statistically significant, suggesting that historically, dividends and buybacks have not been correlated with corporate investment.

Turning to the more recent period, Figure 10 plots the change in buybacks and dividends since the GFC against the change in investment across the countries in our sample. (These data are divided by the capital stock to be consistent with the econometric methodology.) Although the figure indicates that most countries experienced increases in buybacks and dividends even as investment spending declined, it shows no significant relationship between the two variables across countries.

Figure 10 does not provide a clear reading on the relationship between buybacks, dividends, and investment; however, since it does not hold constant the other factors that might also influence investment. To address this problem, for each country, we compute the difference between actual investment spending and investment predicted by Equation (5), described in Section [The Effect of Corporate Profits on Investment](#); this measure represents that part of investment

<sup>4</sup>Buybacks are negative when equity issuance exceeds share repurchases by firms.

Figure 10. Buybacks + Dividends vs. Real Investment



spending not already explained by the model. Figure 11 shows the correlation across countries between the change in buybacks and dividends since the GFC, on the  $x$ -axis, and the unexplained part of the change in investment, on the  $y$ -axis. Again, there is no significant relationship between the two variables.

All told, the evidence provides little support for the hypothesis that corporate caution and the desire to hoard cash explain the fall in investment spending after the GFC. In fact, most of the observations are in the lower right quadrant: increases in buybacks and dividends since the GFC combined with lower-than-predicted investment. Precautionary motives may still explain the desire to accumulate cash and other financial assets, as argued (see Section [Literature Review](#)) by Armenter and Hnatkowska (2012), Bates and others (2009), IMF (2006), and Sanchez and Yurdagul (2013). But given the continued strength of dividends and buybacks, increased caution does not explain the falloff in investment after the GFC.

## Conclusion

In this paper, we have demonstrated that after the GFC, levels of corporate net lending—saving minus investment—rose significantly in most OECD economies, raising questions about why this increase took place and what implications it might have for the pace of economic recovery. Increases in corporate net lending reflected both increases in corporate saving (i.e., undistributed after-tax profits) and declines in corporate investment. We focused on the causes of the decline in investment. Using aggregate macroeconomic and flow-of-funds data, our research suggests that for the OECD economies as a group, the sharp declines in corporate investment since 2007 were generally consistent with past responses of investment to movements in its fundamental determinants, and thus most likely an endogenous response to the macroeconomic disruptions associated with the GFC.

Our result matches up well with findings by Pinto and Tevlin (2014) and Kothari and others (2013) for the United States, and IMF (2015) for the advanced economies more generally. However, in a number of economies, investment fell below our model's prediction by a statistically significant extent, and we would not rule out the possibility that in some cases the investment function had shifted downwards since the GFC.

In any event, however, the weakness in investment spending does not appear to reflect corporate caution in response to the GFC. Many studies, including Armenter and Hnatkowska (2012), Bates and others (2009), IMF (2006), and Sanchez and Yurdagul (2013), have attributed corporate accumulations of cash and other financial assets in the past 1½ decades or so to a desire to build up a buffer against future financial shocks. It is plausible that such precautionary motives might have strengthened after the GFC and led firms to hoard resources by reducing investment. However, corporate payouts to investors in the form of dividends and equity buybacks, which had generally trended up since the early 2000s, remained strong even after the GFC, and showed no relationship to

investment; such behavior seems inconsistent with a desire by corporations to cut back spending to rebuild balance sheets.

These considerations suggest that if the sharp increase in corporate net lending across OECD countries represented a break with the past in some manner, the shift in behavior may well have been concentrated in the rise in corporate saving, as corporate investment behaved largely as might be expected given the persistence weakness in growth. Alternatively, the rise in corporate saving rates may also have been an endogenous response to the GFC and its aftermath. Finally, as noted above, we identified some economies in which investment weakened to a greater, and statistically significant, extent than our model predicted, and this bears further investigation. We hope to explore these issues in future research.

## Appendix A: Data Description

**Country Sample:** Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Ireland, Germany, Italy, Japan, Korea, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States.

### Data Sources and Descriptions

**GDP:** Real and nominal GDP are from the OECD Economic Outlook.

**GDP and Investment Deflators:** From the OECD Economic Outlook with the exception of the U.S. which are taken from the BEA National Accounts. The OECD investment deflators are for Gross Fixed Capital Formation. For the U.S., the investment deflator is for Private Fixed Investment.

**Real Capital Stock:** From the OECD Economic Outlook.

**Investment, Profits, Net Dividends:** All data are for the non-financial corporate sector with the exception of Switzerland where the data are for the total corporate sector. Data are from the OECD National Accounts, with the exception of the U.S. and Canada where data are from their respective national Integrated Macroeconomic Accounts.

- **Investment** is defined as gross fixed capital formation.
- As described in the text, **profits** are defined as the gross operating surplus less net interest payments, rent, and taxes.
- **Net dividends** are the distributed payments of corporations plus reinvested earnings on foreign direct investment in the domestic economy less the distributed income of corporations and reinvested earnings of domestic corporations abroad.

**Share Buybacks:** The negative of the net incurrence of equity liabilities from the OECD National Accounts. Except for the U.S. and Canada, where the data are from national Integrated Macroeconomic Accounts.

**Interest Rates:** 10-year sovereign bond yields from the OECD Economic Outlook. Except for Estonia where the lending rate as reported in the World Bank World Development Indicators was used.

**Depreciation Rate:** Productive capital stock scrapping rate as reported in the OECD Economic Outlook.

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**Electronic supplementary material** The online version of this article (doi:[10.1057/s41308-016-0018-9](https://doi.org/10.1057/s41308-016-0018-9)) contains supplementary material, which is available to authorized users.

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