



## How do sovereign credit rating changes affect private investment?



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### ARTICLE INFO

#### Article history:

Received 25 February 2013

Accepted 1 September 2013

Available online 10 September 2013

#### JEL classification:

F21

F34

G11

G24

H63

#### Keywords:

Sovereign credit rating

Private investment

Irreversible investment

### ABSTRACT

Sovereign credit rating changes have an influence on real private investment of re-rated countries. We find significant increases in private investment growth following upgrades in sovereign ratings. These increases, however, are transitory. We also find significant, temporary declines in private investment growth following sovereign rating downgrades. The results hold after accounting for re-rated countries' growth opportunities, endogeneity, and other factors that could affect private investment. The irreversible nature of investment may be the explanation for the temporary changes in the growth rates of physical capital investment associated with revisions in sovereign credit ratings.

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## 1. Introduction

Sovereign risk, a key indicator in international financial markets, has recently attracted considerable attention. As sovereign credit ratings reflect a country's perceived willingness and ability to repay its sovereign debt, they are used as a reference measure of country risk. Reinhart (2002) indicates that sovereign credit ratings play a crucial role in determining rated countries' access to international capital markets and the terms of that access, and are useful in predicting sovereign defaults. Gande and Parsley (2005) and Dittmar and Yuan (2008) argue that sovereign bonds serve as the benchmark for the valuation of corporate bonds or other financial instruments and that sovereign bond yield spreads reflect the default risk and other risks of borrowing countries. Thus, understanding the nature of sovereign credit rating changes is of fundamental importance. The recent sovereign rating downgrades of several European countries by major credit rating agencies have highlighted the importance of examining how sovereign credit problems affect re-rated countries' real macroeconomic conditions. When Fitch downgraded Spain's sovereign debt on May

28, 2010, because of sluggish economic growth outlook, this immediately pushed down the euro and world stock markets amid doubts about the prospects for weaker Southern European economies.<sup>1</sup>

Prior research on sovereign rating changes focuses mainly on their short-term announcement effects on financial markets (e.g., Cantor and Packer, 1996; Kaminsky and Schmukler, 2002; Gande and Parsley, 2005). To the best of our knowledge, there have been no studies to date to examine the impact of sovereign rating changes on private investment in the re-rated country. Yet this is critical if we are to understand how changes in sovereign credit ratings affect real macroeconomic outcomes, because physical capital investment is an important determinant of a country's long-run growth rate (Levine and Renelt, 1992; Sala-i-Martin et al., 2004; Ranci ere et al., 2008). Endogenous growth theory emphasizes the important role of physical investment in a country's growth process (Romer, 1986, 1987; Lucas, 1988).

A sovereign credit rating change may affect physical investment through its effect on the cost of capital. A flight-to-quality will induce investors to shift capital away from riskier investments to the safest possible investment vehicles (Bernanke et al., 1996; Hartmann et al., 2004; Pavlova and Rigobon, 2008). It usually occurs because of uncertainty in international financial markets.

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<sup>1</sup> See *Financial Times* (May 28, 2010).

Caballero and Krishnamurthy (2008) assert that severe flight-to-quality episodes are attributable to uncertainty about the environment, such as liquidation shocks, not just risk about asset payoffs. Reinhart and Rogoff (2004) argue that flows of capital from rich countries to poor countries are governed largely by sovereign countries' credit track records. When a sovereign rating is downgraded (and country risk is higher), investors might shift investments from high-risk countries with political disorder and volatile economic conditions to less risky markets in other countries. Therefore, we expect sovereign rating downgrades to be associated with an increase in net capital outflows, which raises the risk-free rate and the cost of capital (Henry, 2000a, 2003; Sandleris, 2008; Broner et al., 2010). An increase in a country's cost of capital will transform some investment projects with positive net present values (NPVs) before downgrades into negative NPV projects after downgrades, leading to a reduction in private capital investment following sovereign rating downgrades. The converse holds for sovereign rating upgrades.

Another way sovereign credit rating changes can affect the cost of capital and hence private investment is through risk premiums. First, if country risk cannot be entirely diversified away, there should be an extra premium assessed for country risk. For example, Bekaert and Harvey (1995) analyze factors that affect expected stock returns in integrated and segmented markets, and find that country risk is priced. Second, capital flows affect the liquidity of financial markets and hence risk premiums. Levine and Zervos (1998) document that capital flows affect stock market liquidity, and Amihud and Mendelson (1986) and Amihud et al. (1997) show that liquidity affects the equity premium. Beber et al. (2009) document similar evidence for the bond market. Thus, we expect that increases in country risk and net capital outflows associated with sovereign rating downgrades will raise risk premiums and the cost of capital, which in turn reduces real private investment, and vice versa.

We examine how sovereign credit rating changes affect re-rated countries' private investment growth. In a sample of sovereign rating changes provided by Standard & Poor's (S&P) for 48 countries during 1983–2009, we find that countries experience significant declines in their private investment growth following downgrades in sovereign ratings. However, the declines are temporary and occur only in the downgrade year and in the following year. After that, private investment growth exhibits no significant changes. We also find symmetric responses to sovereign rating upgrades. That is, after an upgrade there are significant and temporary increases in private investment growth in that year and in the following year. There are no significant changes in private investment growth in the second and third years after the upgrade. We show that sovereign rating changes affect the re-rated country's private investment through their effects on the cost of capital. The temporary effects of sovereign rating changes on real private investment are robust after accounting for re-rated countries' growth opportunities and the potential endogeneity problem. The results also hold after controlling for other potential effects, such as world business cycles, domestic economic fundamentals, financial liberalization, financial crises, different rating agencies, degree of rating changes, crossing of the investment-grade threshold, rating outlooks, and credit watches.

One possible explanation for the temporary changes in the growth rates of private investment associated with revisions in sovereign ratings is based on the theory of irreversible choice under uncertainty (Bernanke, 1983; Caballero, 1991; Pindyck, 1991; Abel and Eberly, 1994; Kogan, 2001; Bloom et al., 2007; Chirinko and Schaller, 2009). This theory indicates that the irreversible nature of investment and the potential value of waiting make investment behavior especially sensitive to various forms of risk. Sovereign rating downgrades increase a country's risk and add to

uncertainty, and agents choose to wait for the arrival of new information and not invest. Thus we observe a temporary reduction in private investment growth following sovereign rating downgrades. Conversely, when there is a sovereign rating upgrade, agents will accelerate investment projects with reduction of sovereign risk and uncertainty. We provide supporting evidence by showing that sovereign rating downgrades reinforce the negative impact of country uncertainty on private investment growth in the downgrade year and in the following year. We also document a decline in the negative effect of country uncertainty on private investment growth in the short period immediately after sovereign rating upgrades.

Section 2 of the paper describes data and methodology. We report the main results in Section 3 and provide additional analyses in Section 4. The findings are summarized in the final section.

## 2. Data description and methodology

### 2.1. Sample

We collect data on S&P long-term foreign currency sovereign ratings from its website. The sample covers changes in sovereign credit ratings during 1983–2009. If a country experiences several rating changes in the same year, we include only the earliest rating change in order to reduce potential problems associated with overlapping data. We exclude rating changes for countries that experience both upgrades and downgrades in the same year, as our focus is on the effects of pure upgrades or downgrades on private investment. We collect data on private investment and related macroeconomic variables from the World Bank's World Development Indicators (WDI) and Global Development Finance (GDF), IHS Global Insight, Economic and Financial Affairs AMECO, the International Monetary Fund's International Financial Statistics (IFS), Datastream, the United Nations Statistics Division, Barro and Lee (2010), and Reinhart and Rogoff (2011a).

Our final sample consists of 116 rating upgrades and 62 rating downgrades for 48 countries. Table 1 presents the sample distribution. The vast majority of rating changes are to neighboring levels of upgrades and downgrades; about 96.6% of upgrades and 96.8% of downgrades involve changes of only one notch. Only 8 upgrades and 4 downgrades cross the investment-grade threshold, which is defined by an S&P rating of BBB–.

### 2.2. Measuring the impact of sovereign rating changes on private investment

We start with a benchmark panel regression, and we then modify it to account for potentially important omitted variables. The regression model is estimated for rating changes in both directions: rating upgrades and downgrades. The regression is:

$$\ln vGrowth_{i,t} = \alpha_i + \eta_t + \beta_1 RC_{i,t} + \beta_2 AfterRC1_{i,t} + \beta_3 AfterRC2_{i,t} + \beta_4 AfterRC3_{i,t} + \varepsilon_{i,t} \quad (1)$$

$\ln vGrowth_{i,t}$  is the growth rate of real private investment of country  $i$  in year  $t$ . Real private investment is nominal private investment (in local currency) divided by the domestic GDP deflator.<sup>2</sup> Following Barro (1990), Henry (2000b), and Alesina et al. (2002), we use the first-difference specification as the growth rate of private investment. The independent variables include  $RC$ ,  $AfterRC1$ ,  $AfterRC2$ , and  $AfterRC3$ , which are a binary variable with a value of one in the year of rating change; in the first year after the change; in the

<sup>2</sup> To check the robustness of our results, we also use purchasing power parity (PPP) of Penn World Table adjusted growth rate of private investment as an alternative dependent variable, and yield similar results.

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