



Stockpiling cash when it takes time to build: Exploring price differentials in a commodity boom[☆]



Erwin Hansen^a, Rodrigo Wagner^{a,b,*}

^aSchool of Economics and Business, University of Chile, Santiago, Chile

^bCenter for International Development Harvard, Cambridge, MA, USA

ARTICLE INFO

Article history:

Received 26 February 2015

Accepted 18 January 2017

Available online 19 January 2017

JEL classification:

G31

G23

F23

F21

F32

Keywords:

Cash flow sensitivity of cash

Investment

Liquidity

Time-to-build

ABSTRACT

Some projects take time to build or are slow to yield cash flows. This may impact the dynamics of investment and liquidity management, although few studies test their financial implications. We exploit the peculiar advantages of copper mines as a laboratory to identify cash-flow sensitivities. In this context, investment decisions depend on the expectations of the long run price of the commodity, while the spread between the spot price and this long run expectations shifts current cash-flows. For this study we compiled a sample of copper firms between 2002 and 2012. We do not find significant effects of cash flow on current capital expenditures, but we do observe a systematic cash flow sensitivity of cash holdings, meaning that some of these transitory earnings are retained as liquidity. This cash stockpiling is stronger among financially constrained firms. In a context of time-to-build, our findings support financial theories emphasizing the salience of cash as buffer stock for liquidity in preparation for future investment opportunities.

© 2017 Elsevier B.V. All rights reserved.

1. Introduction

Some projects take a long time-to-build their capital or are slow to generate additional production. (e.g. [Majd and Pindyck, 1987](#); [Caballero, 1999](#); [Kalouptsi, 2014](#); [Greenwood and Hanson, 2015](#)). As examples, these projects in which investment takes a long time

are salient in industries like ship and aircraft building, as well as some types of construction, forestry and mining. They are also relevant because they tend to be associated to investment cycles.¹ From a methodological point of view, in this paper we argue that these industries with time-to-build could help in one crucial empirical challenge of the financial literature that looks for cash-flow sensitivities as a measure of financial constraints (e.g. [Fazzari et al. 1988](#); [Kaplan and Zingales 1997a](#); [Almeida et al. 2004](#)). The usual identification problem in this literature is that a positive shift in fundamentals could simultaneously generate incentives to invest

[☆] Authors acknowledge the valuable and patient comments made by Geert Bekaert, the Editor, and two anonymous referees; as well as the conversations with Ricardo Bebczuk, Matías Braun, Jaime Casassus, Eduardo Cavallo, Fritz Foley and with seminar participants in conferences at InterAmerican Development Bank's Research Department, U of Chile's School of Economics and Business, P. U. Javeriana (Colombia), U. Adolfo Ibañez, U of Chile's Center of Applied Economics (CEA), Central Bank of Chile. Joaquin Dagnino deserves special recognition for his superb work as Research Assistant. Carla Tokman provided excellent editorial and analytic help. Mario Campos from CODELCO (Chilean National Copper Corporation) helped with relevant industry information. The authors acknowledge financial support from the Inter American Development Bank's competitive call for proposals on Savings in Latin America (2013–2014). Hansen also acknowledges financial support from FONDECYT grant #11150693. A previous version of this paper has been circulated as "Multinationals stockpiling cash: Exploring a Commodity Boom". Usual disclaimers apply in the sense that only authors are responsible for the views, errors and ideas exposed in this paper.

* Corresponding author.

E-mail addresses: ehansen@fen.uchile.cl (E. Hansen), rodrigo_wagner@post.harvard.edu (R. Wagner).

¹ For time to build in manufacturing industries see [Koeva-Brooks \(2000\)](#), [Mayer and Sonenblum \(1955\)](#); for mining see for example [Slade \(2013\)](#); for shipbuilding see [Greenwood and Hanson \(2015\)](#) and [Kalouptsi \(2014\)](#). The literature that explores time-to-build tends to focus on the real side of the problem, for example characterizing investment cycles and lumpiness of decisions (e.g. [Caballero, 1999](#); [Kalouptsi, 2014](#); [Greenwood and Hanson, 2015](#)). The literature tends to pay little attention to the financial decisions, which is a relevant gap since these projects could be among the most sensitive to financial constraints and impact investment cycles. One notable exception that explores the financial side is the current working paper by [Drobetz et al. \(2015\)](#), who explore cash flow sensitivity in bulk shipping. Unlike their study, we have source of identification to separate the incentives to invest from cash flow of the company. Also, they emphasize the fact that shipping is an asset heavy industry. Our point focuses more on the fact that they take time to be built.

today, but also generates more liquidity due to current cash flows. For that reason Kaplan and Zingales (1997b) argue that the standard OLS regression explaining investment would estimate a positive and significant coefficient for cash-flows regardless of financial constraints. We argue that this frequent empirical problem of an omitted variable bias could be mitigated in industries with time-to-build, because the incentives to invest depend on long run fundamentals, while current cash-flows could be shifted by a transitory component that does not affect the fundamentals that define investment.

In this paper we precisely take advantage of these features studying copper mining; an industry with time-to-build and for which we can have separate proxies for long and short run profitability. In particular, investment in copper mines is determined by the expectations of the long run copper price, while short run deviations between the spot price and this long run expectation do not generate incentives to invest, because by the time this investment matures, the transitory component of price would vanish in expectation. This cash windfall created by the spread is the core of our identification strategy.

To perform our study we built a panel of both listed and unlisted copper firms around the world between 2002 and 2012. This was a period of a price boom, with surges in the long run price but also meaningful deviations between the spot price and this long run expectation. This spread is our instrument for cash-flows.

Using instrumental variables we examined two types of tests for financial constraints in this sample of copper firms. As suggested before, the first symptom is the well known cash-flow sensitivity of investment (CFSI) as in Fazzari et al. (1988). The logic is that constrained firms tend to invest more when they have more cash-flows, something that may not happen to financially unconstrained firms, which can invest when needed, not only when they have liquidity. In our setting of time-to-build this usual sensitivity of investment may be less likely to be detected, because the funding of investment today was decided looking at financial conditions of some years ago and because of the constraints to the speed of investment.

The second and stronger symptom we explore is about future financial constraints. We look at cash-stockpiling as a signal that forward looking firms are preparing themselves for future investments. The story goes as follows: the firm is expecting future constraints to finance a project, and therefore it accumulates a larger fraction of their current cash-flow as cash holdings in the balance sheet. This increases future liquidity that would be useful for future investment. To link this to the previous literature Almeida et al. (2004) call this phenomenon the *cash-flow sensitivity of cash* (CFSC), where the second mention of the word cash is for cash-holdings rather than cash-flows. In sum, we will be focusing on how much firms stockpile cash out of an additional dollar of transitory earnings.

Our setting seems particularly relevant for testing this theory of cash stockpiling, because this theory is built on the essential assumption that there are future investment opportunities which cannot be executed today. Without such a technological delay in investment opportunities Almeida et al. (2004)'s model would not predict that firms stockpile cash. Our setting of time-to-build in the copper industry is in fact an extreme case of delayed investment opportunities, in which projects take a long time to plan and execute. Moreover, our results are consistent with the theory's prediction. We find that financially constrained firms tend to stockpile a relevant fraction of the cash coming from transitory earnings. In other words there is a positive and statistically significant CFSC.

In contrast to CFSC, the cash flow sensitivity of investment (CFSI) is almost always statistically insignificant. We are not claiming that cash-flows have exactly a zero effect on the investment of constrained firms. Instead, we argue that in the case CFSI is not

zero, it is still difficult to obtain precise estimates of the CFSI because of heterogeneous delays between the financial decisions and actual investment, which is a central characteristic of the industry. Our main message is that with time-to-build CFSC might be a preferred measure of financial constraints compared to CFSI.²

Our central results survive a large battery of robustness tests. For example we show that this behavior holds both for listed and unlisted companies. We also try different definitions for financial constraints (i.e. size, credit rating) and for long run copper prices. We added various time varying controls to test for measurement problems or explanations that could challenge our identification. Our results remained robust.

Beyond our central finding of cash-holdings as a financial buffer under conditions of time-to-build, our work is connected to at least three areas of the literature. A first connection of our work is to other papers in the literature that instrument cash-flows using various natural experiments (e.g. Blanchard, Lopez-de Silanes and Shleifer, 1994; Tufano, 1996; Lamont, 1997; Rauh, 2006).³ Some of these papers use exogenous shocks to prices to mitigate the endogeneity of cash flows to long run investment fundamentals. The difference with our study is that we are the first to exploit the *difference* between spot and long run expected prices to mitigate that endogeneity.⁴ Our story is meaningful only given conditions of time-to-build, which make current prices less relevant for investment decisions.

A second link of our paper relates to the literature measuring investment opportunities. In two extensive summaries of the literature both Hubbard (1998) and Caballero (1999) argue that in investment regressions there is usually little significance or magnitude for the coefficient on Tobin's Q, while there tend to be positive effects for measures such as cash-flows. Erickson and Whited (2000, 2012) argue that this could be due to measurement error in Tobin's Q, which inflates cash-flow sensitivities and dilutes the coefficient for Q. We do not use Tobin's Q but instead replace it with expectations of the long run price of the commodity, as a shifter for investment possibilities. When we test both proxies of

² Various papers that tested both CFSI and CFSC found that *both* CFSI and CFSC are significant; but they do not focus on industries with time to build. Using alternative econometric approaches and empirical specifications D'Espallier et al. (2008), Dasgupta et al. (2011) and Gatchev et al. (2010) report positive and statistically significant estimates for *both* cash flow sensitivity estimates. A similar result is also found by Almeida et al. (2004) for CFSC and Almeida and Campello (2007) for CFSI independently but using a similar sample of manufacturing firms in the US.

³ Within this cash-flow-sensitivity literature we aim at contributing to the much less prolific set of papers that are identified with a strategy beyond lags and other covariates. Blanchard et al. (1994) explores eleven event studies in which companies were awarded a cash windfall after a judicial procedure. Lamont (1997) explores internal capital markets of conglomerates (multi-segment firms) that include an oil company, looking at the oil price drop in 1986. Rauh (2006) exploits the cash flow shocks induced by unpredicted returns of the corporate pension plans for employees. Out of financial economics various studies have used movements in the main export commodity of a country as a shifter for its exchange rate (e.g. Chen, Rogoff and Rossi, 2010; Chen and Rogoff, 2003; Cashin, Céspedes and Sahay, 2004).

⁴ André and Jankensgård (2015) also uses a relatively smaller sample of firms to study how commodity price changes impact funding, specifically in the gas and oil industry. They find that financially constrained firms reduce their investment sensitivity to earnings when commodity prices jumped. We have significant differences with their approach. First, we study both sensitivity of investment and cash holdings to changes in earnings. Second, they claim to identify a shift in liquidity, not only because of earnings but also because the assets of the company became more valuable after the commodity boom, which allowed taking extra debt. Unfortunately that shock to liquidity is by construction correlated with the expectation of future investment opportunities (the demand for funding). We avoid that challenge by focusing on transitory rather than permanent changes, explicitly using an IV approach to identify the liquidity shock. We are also close to Hovakimian (2009) who looks for the determinants of investment cash-flow sensitivity of cash. Again, our innovation vis-à-vis these papers is the aim for causality and especial concern for cash holding rather than investment. Carter et al. (2006) also uses a relatively small panel, but in the airline industry, to explore how hedging impacts a company's value after oil price changes.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات