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IZA DP No. 12970

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## ABSTRACT

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# Do Financial Constraints Affect the Composition of Workers in a Firm?\*

We study the relationship between financing constraints and the work- force composition of firms that employ both casual and non-casual workers. We use data on Australian firms from 2009-2014 and a more direct measure of firm financial constraint than previous studies. We show that the proportion of casual workers in firms grew over the time period being analysed. This was the case regardless of whether a firm was financially constrained or not. However, the magnitude of this change differed between financially constrained and unconstrained firms. We find that of firms whose workforces were growing, financially constrained firms hired relatively fewer casual workers than financially unconstrained firms did. This is consistent with firms using internal financing to cope with a lack of access to credit and equity.

**JEL Classification:** D22, L23, J29, J49

**Keywords:** financial constraints, firm behaviour, employment patterns, casual work, Australia

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# 1 Introduction

Recent studies have explored how financing constraints affect firm decision-making. Most of these studies have focused on decisions about fixed capital investment, and have found the effects significant and important. Fewer studies have investigated how financing constraints affect employment decisions. This paper provides new evidence on the effect of financial constraints on the mix of casual and other workers in small and medium-sized Australian firms.

Understanding the effect of financing constraints on firm employment decisions is crucial for two reasons. First, as small firms innovate and expand they often confront shortages in access to credit and equity. Firms may resort to self-financing which may affect how they hire and remunerate labour. For example, firms may pay current employees less or ask them to work harder in exchange for a promise of a share of future growth.

A second reason why this is an important question is that we know that employment suffers during financial crises, but often with a lag. Understanding how shocks in the macro economy are transmitted to the labour market requires understanding firm-level decision-making about employment. Our paper contributes to both of these larger literatures.

We classify firms as financially constrained based on their responses about access to financing in the Australian Bureau of Statistics' Business Characteristics Survey. This is a much more direct measure of financial constraint than has been used in previous studies which have generally tried to infer financial constraint from firm financial data.

Using this information, we analyse changes in the composition of employment for firms that are financially constrained and ones that are not. This paper focuses on how these two firm types change the mix of casuals and non-casuals in their workforce when their workforce is growing or shrinking.

We study Australian firms over the years immediately following the Global Financial Crisis. Our data cover small- and medium-sized firms; that is firms with less than 200 employees. We find that, for the firms studied, there was an interaction between financing constraints and employment decisions. Namely, firms that increased the size of their workforces gradually increased the share of their workforces that were employed on a casual basis. However, the magnitude of that increase was greater for financially unconstrained firms.

Casual workers in financially constrained firms were not disproportionately affected when firms reduced the size of their workforces. Firms that saw a shrinking workforce had relatively more casual workers over time, but the magnitude of this change did not differ based on whether a firm was financially constrained.

We make three contributions in this paper. First, we use a novel measure of financial constraint which has not previously been used in the literature. This measure is a more direct measure of firm financial constraint based on incapacity to access finance. Second, we provide the first evidence for Australia which, given its mix of European welfare programs and U.S.-style labour market institutions, is potentially insightful for a wide range of other countries. Finally, we add to the evidence about the nature and type of effects that firm financial constraints have on firm employment decisions.

This paper is organised as follows: Section 2 reviews the relevant literature. We describe the data in Section 3. In Section 4 we explain our definition of financially constrained firms and examine whether our definition corresponds to other elements of firm characteristics. Section 5 reports the results of regressions analysing the effect of financial constraint on changes in firms' employment mix and discusses the implications. We conclude in Section 6.

## 2 Background

The analysis in this paper complements the literature on financial constraints, which explores decisions of firms when they are unable to get access to financing. A large part of this literature proposes different approaches to identifying and measuring financial constraints. The analysis in this paper is also relevant to the literature on the determinants of firm employment dynamics. Each of these areas is discussed below.

### 2.1 What does it mean to be financially constrained?

Firms are assumed to have access to finance in many traditional models of firm behaviour. But in reality situations arise in which firms are unable to borrow money or issue debt. Firms in this position must rely at least in part on internal financing to fund activities. This reliance on internal funding sets a limit on what financially constrained firms can do.

Since the late 1980s researchers have explored this interaction between access to financing and firm behaviour. The broadest (and most common) definition of financial constraints in the literature refers to firms facing a wedge between the cost of internal and external financing<sup>1</sup>.

Many papers on the effect of financial constraints on firm behaviour or outcomes focus on the relationship between financial constraints and firm investment decisions<sup>2</sup>. What has emerged is relatively widespread agreement that financially constrained firms invest less than unconstrained firms.

Fewer studies have considered the effects of financial constraints on other types of firm behaviour. They have found that financing constraints can hamper productivity (Ferrando and Ruggieri (2018)) and can have a negative effect on total employment (Nickell and Nicolitsas (1999), Smolny and Winker (1999).)

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<sup>1</sup>For example, Kaplan and Zingales (1997)

<sup>2</sup>See, for example, Kaplan and Zingales (1997), Cleary (1999) and Campello et al. (2010).

Michelacci and Quadrini (2009) concluded that firms are more likely to pay low wages when they are financially constrained and higher wages after they become unconstrained. Almeida et al. (2013) found that financial constraints are positively associated with firm-level innovative efficiency and found that being constrained can force firms to make better investment decisions.

These findings point to a statistically significant relationship between financing constraints and firm decision-making. This paper is motivated by the intuition that if financial pressures affect firm decisions about investment, employment levels and wages, they could also affect decisions about the types of workers that firms employ. Caggese and Cuñat (2008) found that financially constrained firms use fixed term workers more intensively, and more often use them to absorb employment volatility.

Their findings offer a useful comparison point for this paper. They study a sample of Italian firms and workers. Our evidence, from Australia, is important in determining whether we see similar effects at different time periods and under very different labour market institutions.

## **2.2 Measuring financial constraint**

Firm-level datasets do not typically contain information explicitly stating whether a firm is financially constrained. Instead, researchers must often determine whether a firm is financially constrained by looking at other information.

Approaches to doing this can differ significantly between studies and depending on what information is available. For example, Kaplan and Zingales (1997) assign firms a degree of financial constraint based on quantitative and qualitative information about financing from company annual reports. Cleary (1999) determines a financial constraint hierarchy using multiple discriminant analysis, classifying firms as either financially constrained or unconstrained based on

whether they are increasing or decreasing dividend payments. Other approaches to determining financial constraint involve solving a structured model numerically and using the results of the model to form portfolios with different financial constrained rankings (Whited and Wu (2006); Caggese and Cuñat (2008)).

Here, we identify financially constrained firms from their survey responses about access to funds. Since the survey data provide information that closely relates to the financial constraint definition (see below), more indirect financial modelling of financial constraints is not required.<sup>3</sup> The responses that we use are a much more direct measure of financial constraints faced by a firm.

### **2.3 Determinants of firm employment decisions**

This paper is also related to the literature exploring changes to firm employment composition. Papers typically model a simplified two-tier system including fixed term contracts and permanent contracts<sup>4</sup>. Fixed term contracts are treated as having a smaller firing cost, which drives a wedge in employment security and separation rates for the two types of workers.

Much of the literature on the employment composition of firms examines the economic effects of loosening employment protection laws, which liberalise the use of fixed-term contracts. For example, Dolado et al. (2002) considered the effects of an upsurge in temporary work following the Spanish labour market reforms in the 1990s. They found the changes resulted in higher worker and job turnover rates, and lower unemployment duration for fixed-term workers. Their results were more mixed for the unemployment rate. While lower firing costs associated with fixed-term contracts contributed to employment growth, this also resulted in lower investment in human capital, higher wage pressure

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<sup>3</sup>One shortcoming of our data is that they do not contain much detailed financial information. We are thus unable to compare our approach to that of other studies which use accounting and financial measures to generate a firm-level measure of financial constraint.

<sup>4</sup>For example, Saint-Paul (1993).

and a more unequal distribution of unemployment duration.

Similarly, Blanchard and Landier (2002) concluded that reforms allowing firms to hire workers on fixed-duration contracts can lead to perverse outcomes, with high turnover in fixed-duration jobs and higher unemployment.

However, outside the context of fixed-term contract liberalisation, few studies have investigated the interaction between business cycle effects and managerial decisions on hiring and firing fixed-term or casual workers. This small literature is reviewed in section 5 of Bakhtiari et al. (2019). One important paper related to our study is Caggese and Cuñat (2008), which investigated this point with reference to financial constraints. They propose two possible effects of financial constraints on the composition of employment. The first is that firms experiencing financial constraint value internally generated earnings highly and therefore demand more productive permanent workers. The second is a demand for fixed term workers who are more flexible and therefore able to absorb liquidity shocks. They found that the latter effect dominates and as a result financially constrained firms increase their use of fixed term workers by relatively more than unconstrained firms.

### 3 Data

The analysis in this paper uses the Australian Bureau of Statistics' (ABS) Business Longitudinal Database (BLD). The BLD contains confidentialised unit record data for Australian businesses. It is based on matched annual administrative data from the Australian Taxation Office (ATO) and survey data collected by the Australian Bureau of Statistics through its Business Characteristics Survey (BCS). Each panel was sampled once a year for five years<sup>5</sup>. Two panels

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<sup>5</sup>More information is available at: Australian Bureau of Statistics. 2016. 8168.0.55.001 – Microdata: Business Characteristics, Australia, 2009-10 to 2013-14 <http://www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures/0679921D4D1F3566CA257ACA00100CAC?>

were used for this analysis:

- BLD13, the panel covering the period 2008-09 to 2012-13
- BLD14, the panel covering the period 2009-10 to 2013-14

The ABS obtains information about key characteristics of small- and medium-sized Australian firms through the BCS.<sup>6</sup> This includes information about employment levels by employment type, firms' ability to access external funds and issues affecting business performance. The database is also a rich source of information on industry, type of legal organisation and changes to business performance.

A range of firms are represented in the sample. On average across the panel, about 6 per cent of firms had no employees, about 30 per cent had one or two, 35 per cent of firms had between two and 100, and 27 per cent had between 100 and 200.

The sample design involves the use of panels that represent the Australian business population at the point in time that each panel is initiated into the BLD. The sample for each BLD panel is stratified by industry division and business size. Industry is based on ANZSIC 1993 division, and business size is based on a derived employment size indicator - Derived Size Benchmark (DSB). DSB is a derived item using ATO data which models employment and formed a part of stratification for all ABS business surveys at the time of the panels' selection.

The scope of the BLD is actively trading businesses in the Australian economy. An actively trading business is one which is registered for an ABN and remits Goods and Services Tax. The BLD includes both non-employing and employing businesses in the Australian economy except for some categories of

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<sup>6</sup>Firms are defined as small- or medium-sized if they have less than 200 employees. This is the Australian definition, different than the OECD definition based upon 250 employees.

businesses including: large businesses (i.e. with 200 or more employees) or complex businesses (those which comprise multiple Australian Business Numbers); all units classified to Financial corporations, and General Government. Non-employed businesses were kept in the sample since in some cases these businesses became employing businesses over time <sup>7</sup>.

Finally, it is important to note a couple of key limitations of the data. First, BLD data may be partially missing for an individual business and no imputation is applied for missing data. Second, firm deaths occur in the sample: some firms cease operation or undergo structural change. However, no action is taken to adjust for entry of new firms nor do we try to identify which ‘new’ firms are merely re-configurations of ‘exiting’ firms. As such the sample is not entirely representative of Australian firms over the life of the panel. As indicated above, the data are limited to small- and medium-sized businesses with fewer than 200 employees. Readers should interpret our results with this in mind.

One obvious potential critique of our use of self-reported financial constraint data is that they may not accurately reflect underlying firm financial conditions. Respondent subjectivity could bias responses and we have no way to test these subjective responses against objective financial data as our data do not contain accounting or financial information that could be used to construct alternative measures of financial constraints. If firm managers are overly pessimistic or optimistic about the firm’s financial situation, their responses might over- or under-state financial constraints.<sup>8</sup> However, as we show below the percentage of firms who report being financially constrained is similar to other studies and

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<sup>7</sup>More information and the full list of excluded businesses is available at: Australian Bureau of Statistics. 8168.0.55.002 - Technical Manual: Business Longitudinal Database, CURF, Australia, 2004-05 to 2009-10 <https://www.abs.gov.au/ausstats/abs@.nsf/Products/8168.0.55.002-2004-05+to+2009-10~Main+Features~About+the+Business+Longitudinal+Database?OpenDocument>

<sup>8</sup>We note that progress is being made in Australia in making more business data available to researchers and addressing this question and studying larger firms are important future research objectives.

seems reasonable. Also, the reports of firm financial constraints are correlated with other firm characteristics in the way one would expect.

## 4 Classification results

In this paper we classify a firm as being financially constrained if the data show that, in a given year, the firm:

- attempted to obtain debt or equity financing and was unable to obtain either; or
- did not attempt to obtain debt or equity financing but cited a lack of access to additional funds as a factor significantly hampering its business activities or performance; or
- did not attempt to obtain debt or equity financing but cited a lack of access to additional funds as a factor significantly hampering innovation.

The first criterion captures firms which strictly fall within the definition of financial constraints adopted for this paper. The second and third attempt to capture firms which are likely to be financially constrained but may not have attempted to seek debt or equity financing. This could happen for many reasons. For example, a firm may have viewed the likelihood of obtaining financing as low, or may have previously been denied financing. The second criterion is broader than the first and may incorrectly identify some financially unconstrained firms as being financially constrained. But this risk is low and outweighed by the need for a proxy by which to identify financially constrained firms which did not attempt to obtain external financing.

However, it should be noted that the results in this paper are sensitive to this variable's design. In particular, the results in Table 5 were repeated using only the first criterion, and the coefficient of the financial constraint indicator

in those regressions was no longer statistically significant. However, it is our view that using all three of the conditions listed above gives a more complete and correct picture of financial constraint.

Another important limitation to bear in mind is that the concept of financial constraint is not strictly binary. This study considers financial constraint as a firm’s inability to obtain debt or equity financing, but realistically, a firm could be constrained from obtaining even a small amount of financing, making them very financially constrained. Alternatively, they could be able to obtain a limited amount of financing but less than they want, making them somewhat financially constrained. Seen this way, there could be a spectrum of financial constraint, with the degree of financial constraint being related to the wedge between the financing that a firm needs and what it can attain. In our paper, in classifying firms, we are agnostic on the degree of financial constraint as we have no way of measuring the size of this wedge.

Table 1 summarises the outcomes of the financial constraint classification. Overall, about 17 per cent of firms in the sample were identified as financially constrained<sup>9</sup>.

Table 1: Per cent financial constraint classification by year

<b>Year</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
Per cent constrained	15.4	16.4	19.4	17.7	17.1	13.5

The percentage of firms identified as constrained is comparable with other studies. For example, of the Kaplan and Zingales sample, 14.7 per cent were identified as being constrained.

The accuracy of our classification scheme is further explored in Table 2,

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<sup>9</sup>The number of financially constrained firms went up in Australia in the aftermath of the Global Financial Crisis. We have data going back to 2006-07 from which we can calculate the proportion of financially constrained firms. However, the employment composition variables which are key to our analysis are flawed in this earlier period so we only consider data from 2009 onward. This is consistent with tightening of credit markets after the crisis began.

which shows the relationship between the financial constraint measure and other variables that indicate operational and financial performance. The table suggests that firms identified as being financially constrained in the sample were more likely to:

- have experienced a reduction in profitability, productivity or number of employees
- have cut expenditure on structured training for its employees
- have cut the social contributions they make
- have experienced a decline in sales
- be firms that received financial assistance from the government
- have abandoned business activity<sup>10</sup>

All of these are consistent with the subjective measure of firm financial constraints being related to firm fundamentals in ways that would be expected.

Average cash flow in financially constrained firms in the sample is also significantly lower (on average 30 per cent lower) than for unconstrained firms. As already discussed, other financial information is unavailable in the BLD.

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<sup>10</sup>The BCS refers in particular to abandonment of business activities concerned with the development or introduction of new or significantly improved goods, services, processes or methods planned for implementation in the future in a particular year.

Table 2: Percentage of constrained and unconstrained firms by other measures of firm performance

	<b>Not constrained</b>	<b>Constrained</b>	<b>Overall</b>
Compared to the previous years, firms with declining:			
Profitability	37.7%	47.1%	39.3%
Productivity	19.0%	25.6%	20.1%
Number of employees	12.3%	21.1%	13.8%
Expenditure on training	2.9%	6.2%	3.5%
Social contributions	4.9%	9.5%	5.7%
Total sales	48.3%	51.8%	49.0%
Firms receiving financial assistance (grants, subsidies, etc)	11.5%	13.1%	11.8%
Firms which abandoned development	4.4%	11.9%	5.6%

Table 3 shows results from logistic regressions of the probability that a firm is identified as being financially constrained. This was done as an additional check that the variable we constructed was a reliable measure of financial constraint. The logistic regressions show similar results to Table 2. The likelihood of a firm being classified as constrained is higher for firms that have cited declining profitability, declining social contributions, etc. Firms facing greater competition were also more likely to be classified as constrained. Similarly, the extent to which financial measures were cited as a business focus for firms had a positive relationship with the likelihood of being classified as financially constrained. Overall, the results in Table 3 support the measure of financial constraint which we use in this paper.

Table 3: Logistic regression results

	Dependent variable: financial constraints indicator		
	(1)	(2)	(3)
Constant	-2.243*** ((0.158))	-2.264*** ((0.16))	-2.732*** ((0.193))
Year 2009-10	0.014*** ((0.128))	0.023*** ((0.129))	0.053*** ((0.132))
Year 2010-11	0.229*** ((0.129))	0.243*** ((0.13))	0.279*** ((0.131))
Year 2011-12	0.095*** ((0.131))	0.083*** ((0.132))	0.112*** ((0.135))
Year 2012-13	0.000*** ((0.132))	0.010*** ((0.134))	0.036*** ((0.136))
Year 2013-14	-0.269*** ((0.165))	-0.286*** ((0.165))	-0.266*** ((0.165))
Log total number of employees	-0.054*** ((0.022))	-0.055*** ((0.022))	-0.052*** ((0.022))
Financial measures a business focus (small extent)	0.579*** ((0.135))	0.540*** ((0.136))	0.455*** ((0.137))
Financial measures a business focus (moderate extent)	0.654*** ((0.125))	0.613*** ((0.126))	0.506*** ((0.126))
Financial measures a business focus (major extent)	0.865*** ((0.123))	0.787*** ((0.124))	0.655*** ((0.126))
Profit declined	0.300*** ((0.073))	0.277*** ((0.074))	0.252*** ((0.073))
Social contributions declined	0.538*** ((0.123))	0.493*** ((0.129))	0.479*** ((0.129))
Abandoned development		0.959*** ((0.116))	0.909*** ((0.116))
Degree of competition - minimal			0.452*** ((0.159))
Degree of competition - moderate			0.729*** ((0.147))
Degree of competition - strong/tough			0.641*** ((0.128))
Pseudo-R2	0.0254	0.0361	0.0430
Prob > chi2	0.00	0.00	0.00
Number of observations	15,251	15,172	15,172

Numbers in table are coefficient estimates. Standard errors are reported in parentheses. \*, \*\*, \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively. The dependent variable is the financial constraint indicator, which takes the value of 1 if the firm is financially constrained and 0 otherwise. Independent variables are: financial measures a business focus in the survey, firms are asked to what extent financial measures affected overall business performance and dummies were created for these responses (options were: not at all; small extent; moderate extent; major extent) ; profitability declined indicator of whether a firm stated in the survey that, compared to the previous year, profitability had declined ; social contributions declined indicator of whether a firm stated in the survey that, compared to the previous year, profitability had declined; abandoned development indicator of whether a firm has abandoned any kind of development (options include goods or services, operational processes, marketing methods, etc); degree of competition in the survey, the firms were asked about the degree of competition their firm faced, based on the number of competitors (options were: captive market/no effective competition; minimal; moderate; strong/tough).

## 5 Financial constraints and employment composition

In this paper we consider casual workers. There is a distinction in Australia between casual workers and either part-time workers or fixed-term workers. In Australia, casual employees generally have no guaranteed hours of work, may work irregular hours, do not receive sick leave or vacation leave and employment can be ended without notice or penalty by either the worker or the firm. There is usually no specified end date to casual employment. Casual workers are entitled to a higher hourly wage rate (often called a ‘casual loading’) that is paid in lieu of other benefits. Casual workers are entitled to 2 days unpaid carer’s leave and 2 days unpaid compassionate leave per occasion as well as unpaid community service leave. The Business Characteristics Survey questionnaire refers to casual workers as those who receive a higher rate of pay to compensate for lack of permanency and leave entitlements. In the survey, casual employees could be people who worked 35 hours or more per week.

Fixed term workers have contracts with specified end dates. They can be either full-time or part-time and they receive the same benefits and wages as permanent staff. In our data we can distinguish between casual and non-casual workers and between part-time and full-time workers, but not between fixed-term and permanent. The distinction in Australia is not crisp with many “permanent” staff on “fixed-term” arrangements that are periodically rolled over.

Our paper analyses casual workers relative to all other types of workers. So we are comparing employment of workers who can be terminated at a moment’s notice with very little cost to all other employees where termination must either wait for a pre-specified date or where it is likely to be costly.

The percentage of casual workers in Australian firms is currently at around

20 per cent of the workforce, the same level as it was in 1998, Wooden and Richardson (2016).<sup>11</sup> But in the interim the percentage of casual workers has fallen, particularly following the GFC's onset in 2008. Table 4 shows that our analysis covers a time period when, overall, firms were increasing the share of their workforce employed on a casual basis. This increase comes off the back of drops in the percentage of casual workers in firms immediately following the GFC, so it can be interpreted as a period of recovery to to pre-GFC levels<sup>12</sup>.

Note that the level of casual workers that we show in Table 4 is lower than the population estimates described in the preceding paragraph. In the data, there were some firms where the number of casual workers is reported as missing. We re-coded these to zero for the purpose of our analysis. If instead, we drop those firms we get a percentage of casual workers from 19 to 22 per cent across the years of our data, and smaller year-on-year changes in the number of casuals, in line with the population estimates. If we re-do the analysis presented below in Table 5 on this smaller sample (dropping firms with missing number of casual employees), the results are quite similar to what we report.<sup>13</sup> Given this, our preference is to use the larger sample.

In this paper we explore the relationship between the percentage of casual workers in a firm and financial constraint. Financially constrained firms tend to have a higher percentage of casual workers, as can be seen in Table 4<sup>14</sup>.

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<sup>11</sup>See the discussion at: <https://theconversation.com/factcheck-has-the-level-of-casual-employment-in-australia-stayed-steady-for-the-past-18-years-56212>. 20 per cent is for all employed persons; the number goes up to about 25 per cent when restricted to employees. See also Australian Bureau of Statistics (ABS) (2013) for population estimates from the Australian Bureau of Statistics.

<sup>12</sup>We separately analysed a BLD panel covering 2006-07 to 2010-11. Our analysis confirmed that prior to the GFC, about 20 per cent of workers were employed on a casual basis overall. However, we had to exclude those years (pre-2009) from our analysis due to data deficiencies as described in footnote 4.

<sup>13</sup>These results are available from the authors upon request.

<sup>14</sup>We also estimated a fractional response model where we control for year, industry, and type of legal organisation. The relationship between the percentage of casual workers and being financially constrained remains statistically significant and positive. Readers interested in obtaining these results may contact the authors directly.

Table 4: Casual workers as a percentage of all workers in financially constrained and unconstrained firms

<b>% casual employees</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
Unconstrained firms	13.3%	13.5%	14.7%	14.7%	16.1%	19.1%
Constrained firms	16.8%	18.8%	16.1%	17.4%	17.9%	17.6%
Overall	13.9%	14.4%	15.0%	15.2%	16.4%	18.9%

Note: Casual employees are defined as those who typically receive a higher rate of pay to compensate for a lack of permanency and leave entitlements. They can be employed on either a full time or part time basis.

We focus on the change in the percentage of casual workers over time to determine whether a relationship exists between financial constraint and changes to a firm’s employment mix of casual and non-casual workers. The regressions that follow use the changes in this percentage<sup>15</sup> from time t-1 to t as the dependent variable. In the regressions, we regressed the level change in the percentage of casual workers in a firm with respect to financial constraint indicators and other variables.

We use fixed effects regression (Table 5) to control for time-invariant, unobservable factors. Factors such as quality of management, firm culture or efficiency of production could affect firm composition. These factors cannot be controlled for using the available data. Given that our panel length is relatively short, many of these factors are reasonably invariant within firms. Fixed effects regressions can thus overcome potential endogeneity from these unobserved factors.

One concern with fixed effects estimation is that it uses variation within firms to identify the coefficients. In our case this presents no problem as there was a reasonable amount of variation in the financial constraint variable within each firm; financial constraint status changed over time for about 60 per cent of firms in the sample.

<sup>15</sup>For example, if 5 per cent of a firm’s employees at time t-1 are casuals, and 8 per cent are casuals at time t, then the percentage point change would be +3 per cent. This amount

Table 5: Fixed effects regressions of financial constraint and the change in the proportion of casual workers

Dependent variable: change in per cent of casual workers in firm				
Variables	(1)	(2)	(3)	(4)
Constant	0.090 *** ((0.014)	0.102 *** ((0.023)	0.093 *** ((0.020)	0.077 *** ((0.031)
Financially constrained	-0.030 ** ((0.014)	-0.023 ((0.019)	-0.003 ((0.033)	-0.057 *** ((0.023)
Log total number of employees	-0.037 *** ((0.004)	-0.037 *** ((0.000)	-0.033 *** ((0.007)	-0.044 *** ((0.000)
2010-11	0.006 ((0.013)	-0.001 ((0.024)	-0.020 ((0.019)	0.050 ** ((0.026)
2011-12	-0.014 ((0.012)	-0.046 ** ((0.021)	-0.010 ((0.571)	0.035 * ((0.025)
2012-13	-0.001 ((0.013)	-0.010 ((0.020)	-0.041 ** ((0.024)	0.069 *** ((0.024)
2013-14	-0.007 ((0.019)	-0.024 ((0.033)	-0.062 ** ((0.031)	0.078 *** ((0.030)
R-squared	0.0393	0.0399	0.0485	0.0531
Prob > F	0.0000	0.0000	0.0000	0.0000
Number of observations	12,209	5,299	2,391	3,979

Standard errors are reported in parentheses. \*, \*\*, \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively. The dependent variable is the level change in the percentage of casual employees in a firm over a one year period (t-1 to t). Independent variables are: financial constraint indicator (indicator of whether a firm is financially constrained); Logged total number of employees; Year dummies. Regressions (2) to (4) represent different subsets of the sample of firms depending on whether their workforce decreased, stayed the same or increased over the panel respectively.

Regression (1) of Table 5 shows that the total effect of the constant, time variables, and financial constraint variable is positive in the regressions. So for both constrained and unconstrained firms, the proportion of casual workers in firms was increasing. This is consistent with Table 4. But the coefficient of the financial constraint indicator is statistically significant and negative. This suggests that in the years following the GFC, financially constrained firms saw a smaller percentage increase in casual workers than unconstrained firms.

Since the dependent variable is the change in a percentage, it is not immediately clear whether changes in the numerator or denominator drive the overall result<sup>16</sup>. This is why in the regression results presented in columns (2) to (4) of

is the dependent variable in the regressions.

<sup>16</sup>That is, the percentage of casual workers in a firm could simply be growing because total

Table 5, we split the sample into firms whose workforce was shrinking, remaining unchanged or growing.

The regression results show that the financial constraint indicator is not significant for firms that were shrinking their workforces or keeping them unchanged (regressions (2) and (3) respectively). The overall effect was still positive (the proportion of casual workers in the firm increased over time) but there was no statistically significant difference in the magnitude of this change between constrained and unconstrained firms.

But there was a statistically significant difference for firms whose workforces were growing (regression (4)). While those firms again experienced an increase in the proportion of casual workers over time, the increase was less for financially constrained firms. That is, of firms that were in a hiring position, financially constrained firms hired relatively fewer casual workers compared to unconstrained firms. This shows that firms whose workforces were growing primarily drove the result in regression (1) of Table 5.

We undertook a couple of robustness checks. First, we re-estimated the above models excluding any firms that had fewer than 5 employees in any year. The substantive results are unchanged. Second, we re-defined the financial constraint variable using only the first response from Section 4 above. This basically restricts the definition of financial constraint to firms who attempted to obtain debt or equity financing. As already mentioned, the results become statistically insignificant if we do this.

Our conclusion from that exercise is that it is important to include firms who faced financial constraint but who did not seek debt or equity finance. As discussed above, firms with dim prospects of obtaining finance through these sources may not have even attempted them. But they are still financially constrained and they should be included as such in the analysis.

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number of employees was shrinking.

This result reflects the aggregate behaviour of all firms in the sample. These firms span different industries in 14 of the 19 broad industry divisions of the Australian and New Zealand Standard Industrial Classification. This result would likely differ by industry, particularly as some industries such as Retail Trade or Accommodation and Food Services use casual employees more intensively.

There does appear to be some evidence for differential effects by industry. However, our sample sizes are such that it is hard to produce convincing analysis. Splitting the sample into different industry groups shows that industries such as retail trade see a much bigger difference in the effect of financial constraints on employment composition. Conversely, for some industries, the effect of financial constraint is statistically insignificant. More data would be required to estimate the difference in effects of financial constraints by industry.

Further work using more detailed data may help shed some light on why this difference between financially constrained and unconstrained firms exists. One possible explanation could be in line with the reasoning in Caggese and Cuñat (2008). They suggested that some firms experiencing financial constraint value internally generated earnings highly and therefore demand more productive permanent workers. However, in their paper Caggese and Cuñat find that firms' demand for flexible, casual workers dominated their demand for more productive permanent workers.

One additional difference between our analysis and theirs is the time period being analysed. Further work on this topic would be useful to discern whether there is a statistically significant difference between constrained and unconstrained firms' hiring decisions under more stable economic conditions. It may indeed be that this finding is exclusive to firms which may be recovering from an economic downturn.

## 6 Conclusion

Previous studies have shown that a variety of firm decisions are affected by financial constraints. This paper contributes to that literature by exploring how employment decisions of firms are affected by the presence of financial constraints.

Our study employs a novel definition of financial constraint based upon firms' own reports of inability to access financing. Previous studies have used indirect measures of financial constraints inferred from balance sheet data. The survey responses that we use provide a much more direct measure of whether or not a firm is impacted by financial constraints.

Using six years of Australian firm-level data, we investigate how the percentage of casual workers in financially constrained firms differs from unconstrained firms when the size of firms' workforces changed. It finds that for firms that increased the size of their workforces, the share of casual workers in the firm increased for both constrained and unconstrained firms. However, those that were financially constrained saw a smaller percentage increase in casual workers than unconstrained firms.

When facing financial constraints, one way that firms can cope is by 'internal financing'. This can take the form of deferred salary increases for staff or using staff more intensively. Our results on firm use of casual workers seem to fit with these explanations. Expanding firms that are not financially constrained hire more casual workers whereas financially constrained firms don't. This is consistent with firms using their own workers more intensively as they grow rather than expanding employment.

Note that our results are quite different from those of Caggese and Cuñat (2008). There could be many reasons for these differences including the time period studied and the very large differences in the Australian and Italian labour

markets. This highlights the importance of country-specific evidence around the relationship between firm financial constraints and employment decisions.

Overall, our results support the prediction that firms' employment decisions are affected by the presence of financial constraints. While further work is required to explain the exact firm behaviours generating these results, they are useful insofar as they shed new light on how financing constraints affect employment activities of firms in Australia.

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