

## **Shareholder wealth effects of the four-day workweek**

### **ABSTRACT**

This study explores the shareholder wealth effects of the Belgian government's official agreement on the four-day workweek on the 15<sup>th</sup> of February 2022. The agreement –where Belgium became the first country deciding to officially adopt the four-day workweek as legislation – is unique in that it condenses the five-day workweek into four days but does not reduce the total number of hours worked. An event study of stock price reactions of Belgian listed firms to the announcement of the four-day workweek agreement shows evidence of positive abnormal stock returns. Consistent with investors predicting productivity increases following the introduction of the four-day workweek, the positive effect is stronger for firms with lower ex-ante human capital efficiency and a higher portion of highly-educated employees. The moderating influence of the productivity channel also holds in a sample of listed international firms with Belgian subsidiaries. In the latter sample, we furthermore find evidence suggesting that the positive stock market reaction can be attributed to employees accepting lower salaries in return for a four-day workweek. We find no evidence that the positive stock price reaction is associated with an anticipated reduction in non-staff operating costs. Our results are consistent with the notion that investors perceive the ubiquitous five-day workweek as resulting from an inherent status quo bias rather than from an optimal design choice, thereby generating meaningful implications for policy makers and companies.

*Keywords:* labor market regulation, four-day workweek, work-life balance, productivity, event study, shareholder value

## **1. Introduction**

In his essay “Economic Possibilities for our Grandchildren”, John Maynard Keynes (1930) predicted that one century later tremendous productivity growth would enable his grandchildren to limit themselves to a 15-hour workweek. As we approach 2030, it is clear this outcome will not materialize. Nevertheless, even though the traditional five-day 40-hour week is still ubiquitous among most firms, the statement does show that the design of the optimal working arrangements has been intriguing scholars for decades. Academic studies have examined a wide variety of working arrangement dimensions including vacation policies (e.g., Altonji and Usui, 2007), wage structures (e.g., Machin and Manning, 2004), remote working (e.g., Cañibano and Avgoustaki, 2022) and on the job learning (e.g., Westermann et al. 2015).

One working arrangement dimension that has gained substantial traction in the popular media in recent months is the concept of the four-day workweek. The underlying principle of this alternative workweek design entails condensing the current five-day week into four days. While several countries have shown interest in the four-day week as an official alternative workweek arrangement, Belgium recently became the first to decide to adopt it as legislation. More particularly, in the night of the 14<sup>th</sup> to the 15<sup>th</sup> of February 2022, the Belgian government agreed on the four-day workweek, following this up with an official announcement on the morning of the 15<sup>th</sup>. The four-day workweek arrangement implies that employees of Belgian companies can – through a formal, written application – request from their employers to be allowed to work the same total number of hours but in four days instead of five. Employers can only refuse this request by providing a thorough motivation on why this would not be feasible. Every six months, the employee can decide whether she wants to renew this arrangement or go back to a five-day week (Kelly, 2022).

Since its announcement, both praise and criticism have been heaped on the four-day workweek. In a press conference announcing the Labor Deal of which the four-day workweek is a core part, the Belgian Prime Minister, Alexander De Croo, argued: "We have experienced

two difficult years. With this agreement, we set a beacon for an economy that is more innovative, sustainable and digital. The aim is to be able to make people and businesses stronger." (Bateman, 2022). Political opposition members, meanwhile, dismissed it as a "window dressing scheme", and questioned whether it effectively offers employees a free choice in deciding on their working arrangements (Baert, 2022). The announcement also created quite an international stir. Using keywords "four-day week" or "four-day workweek" alongside "Belgium" in LexisNexis, we find 63 unique articles discussing the adoption in-between Tuesday February 15<sup>th</sup> and Friday February 18<sup>th</sup>. Major news outlets such as Forbes, Die Welt, BBC and The Guardian all covered the event.

The objective of our paper is to examine the impact of the announcement of the four-day workweek arrangement on the shareholder wealth of firms that would be affected by the legislation. If markets are semi-strong form efficient, abnormal stock returns at the announcement of the four-day workweek should reflect investors' perceptions of the net gains or losses resulting from the new legislation (Fama, 1970). We consider three main channels through which the announcement can affect expected cash flows, and therefore stock price reactions. The first channel pertains to the productivity of the firm. The four-day workweek introduction could affect the firm's productivity, and thereby its expected cash flows. However, the direction of the effect is unclear. On the one hand, when building on the role psychology plays in human resources (HR) (Troth and Guest, 2020), social exchange theory argues that individuals feel the need to reciprocate when they benefit from another person or entity's actions (Lambert, 2000; Peretz et al. 2018). In our research context, this implies that allowing employees increased temporal flexibility could lead them to repay the firm through increased effort, thereby enhancing corporate productivity and expected cash flows. Aside from potential productivity gains through increased effort, the three "weekend" days resulting from the legislation could allow for more psychological detachment from work, reducing stress and fatigue and, as a result, may increase productivity on the remaining four working days. On the

other hand, the condensation of the five-day workweek into four days could lead to a reduced potential for employee recovery in the evening (Sonnentag et al. 2010). This, in turn, may lead to heightened levels of fatigue that could harm productivity, thereby leading to lower expected cash flows. Second, the four-day workweek could affect stock price reactions through its effect on employee wages. The enhanced flexibility accompanying the regulation may be perceived as a clear advantage that can be offered to employees in improving their work-life balances (Kelliher et al. 2019; Wilson, 1980), thereby potentially reducing the wage demands to work for Belgian listed firms, resulting in higher expected cash flows. Third, the adoption of the four-day workweek could affect stock price reactions through its effect on firms' non-staff operating costs. The direction of the effect is unclear. On the one hand, investors may fear that the increased coordination costs accompanying the implementation of such an alternative work schedule may decrease firms' cashflows. As an illustration to this end, Laker and Roulet (2019) point out that the Wellcome Trust foundation had to abolish the four-day week in 2019 in its head office where 800 people were staffed as it was "too operationally complex to implement". On the other hand, the alternative workweek design could reduce sickness days and absenteeism, all of which are costly to the firm (Chung, 2022). This could be accompanied by other cost savings such as firms being able to use office space more efficiently (Choudhury et al. 2021) or having to pay less for commuting costs. In short, whether the sign of the stock price effect for the entire population of Belgian listed firms is positive or negative constitutes an empirical question according to the three channels. Of course, if investors were unaware of the announcement of the four-day workweek, expected it to have a high risk of being rejected by parliament before being formally implemented into law, or expected it to remain unimplemented in practice, we would observe a neutral stock price reaction.

The three channels each suggest specific moderators of the strength of the stock price reaction to the four-day workweek announcement. We focus on human capital efficiency as a first moderator to test the productivity channel (Sesil et al. 2002). The sign of its effect is a

priori unclear. On the one hand, firms with low ex ante human capital efficiency may find it more difficult to cope with additional flexibility demands engendered by the new workweek arrangements, leading to higher predicted cashflow losses associated with the transition, while more efficient firms are likely to better cope with this transition. On the other hand, the adoption of the four-day workweek may have larger incremental benefits for firms with a low ex ante human capital efficiency, since the five-day working week may not be optimal for these firms. As such, we may observe a more positive stock price response for firms with low human capital efficiency (Ivancevich, 1974; Vega and Gilbert, 1997). As a second moderator in the productivity channel, we focus on the education levels of the workforce. Arthur (2003) contends that well-educated people value flexible working arrangements as these employees can and do demand more work-family benefits from their employers. Following social exchange theory, knowledge workers may in turn repay the firm with increased effort after being granted a four-day week. We test the wage channel through firms' personnel costs, and hypothesize that the financial benefits from lower wage demands of new employees will be particularly pronounced in firms with a sizeable wage bill. Finally, we use the firm's profitability to test the importance of the non-staff operating costs channel. The adoption of the four-day workweek could be particularly beneficial for less profitable firms given its potential to reduce various costs such as infrastructure expenses, commuting expenses or absenteeism. On the other hand, a case can be made that this adoption is particularly beneficial for more profitable firms, given that these will be less likely to face difficulties in coping with possible additional coordination costs.

Our baseline sample consists of all listed firms headquartered in Belgium with the necessary stock price information around the event. As such, the sample for the univariate analysis of stock price reactions includes 141 firms. The sample for the cross-sectional analysis reduces to 63 firms due to more stringent data availability requirements to test our hypotheses. The Belgian National Bank (NBB) imposes that the annual accounts of all Belgian companies

employing staff contain a section on the company's social balance sheet.<sup>1</sup> These unique reporting requirements in Belgium allow us to extract data on the workforces' contract stipulations and characteristics. Given the likely impact of the workforce's characteristics on the success of the proposed legislation's implementation, Belgium provides the ideal context to analyze which factors influence the smooth transition to a four-day week.<sup>2</sup> Nevertheless, to provide a more complete view of this adoption decision, we also provide a supplementary analysis focusing on potential international spillovers, using a sample of 520 listed international firms controlling subsidiaries in Belgium.

We uncover that the announcement of the adoption of the four-day workweek triggered a significant average positive stock price reaction of 0.8% among Belgian listed firms. In terms of economic significance, as the total market capitalization of Belgian listed firms equals 322 billion euros on the 14<sup>th</sup> of February 2022, a 0.8% rise translates into a 2.5 billion euro increase. When dividing this across our 141 sample firms, this leads to an increase in value of on average 18 million euros per firm. Even though Rubery et al. (2016) stress the dangers of flexible employment policies, investors thus seem to perceive the imposed flexibility from having to accommodate the alternative workweek design as an opportunity rather than a burden. Our cross-sectional analyses show that the two dimensions of human capital reflecting the productivity channel, namely human capital efficiency and the education levels of the workforce, have a significant effect on the cumulative abnormal returns. These results are robust to excluding e-commerce companies – which received special attention in the Belgian Labor Deal – or using alternative market indices and are further corroborated in an international sample of listed firms who have at least one subsidiary operating in Belgium. In this

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<sup>1</sup> A Dutch-language template of this social balance sheet can be found on the following link: [https://www.nbb.be/doc/ba/socialbalance/models/sociale\\_balans\\_vol\\_20121201.pdf](https://www.nbb.be/doc/ba/socialbalance/models/sociale_balans_vol_20121201.pdf)

<sup>2</sup> The social balance sheet is based on non-consolidated data of the reporting entity. In our final cross-sectional sample of 63 firms, five Belgian listed firms also have Belgian subsidiaries. This may induce differences between the reported levels in the social balance sheet and the consolidated level representing all Belgian activities of the firm. However, when eliminating these five companies, our results remain similar, mitigating any concerns in this regard.

international sample, we also find evidence of a significant positive impact of the firms' personnel costs on the stock price reaction, consistent with our prediction under the wage channel. To conclude the empirical part of the paper, we briefly examine an international sample of listed firms that have voluntarily adopted the four-day workweek. Given the limited magnitude of this sample (7 firms), we refrain from resorting to a cross-sectional analysis to draw inferences. Nevertheless, we do examine their individual stock price responses and find a high variability in magnitude of their abnormal returns, ranging from -4.7% to +1.1% on the announcement day.

To our knowledge, our paper is the first to document the stock price reactions to the permanent adoption of a four-day week. Our work complements the limited number of studies that examine the organizational characteristics affecting a smooth conversion towards the four-day workweek (Arbon et al. 2012; Hartman and Weaver, 1977). Furthermore, as our results are consistent with the notion that the ubiquitous five-day workweek is perceived by investors as resulting from an inherent status quo bias rather than from an optimal design choice, our findings could be of interest to companies contemplating a move toward a four-day workweek. Knowledge on how to smoothen the transition towards the four-day week may also be beneficial from a societal perspective as King and van den Bergh (2017) tout the four-day workweek as an important ally in the fight against climate change. Finally, as other countries (e.g., Iceland, Ireland, Scotland, Japan, Spain, and the UK) have highlighted their interest in the adoption of the four-day week, we hope that our findings are of interest to policy makers around the globe.

The remainder of this paper is structured as follows. Section 2 discusses the event history. Section 3 stipulates our contribution to the relevant literature, while the hypotheses are developed in section 4. The univariate and cross-sectional results are analyzed in sections 5 and 6, respectively. Section 7 provides relevant additional analyses, while section 8 concludes.

## **2. Event definition and history**

Inspired by the recent attention for alternative work scheduling, reinforced through the COVID-19 crisis (Butterick and Charlwood, 2021), the Belgian government negotiated the adoption of the four-day week when developing their new Labor Deal (“Arbeidsdeal”). Negotiations concluded in the night from Monday 14<sup>th</sup> to Tuesday 15<sup>th</sup> of February 2022 with various ministers (among which minister of labor Pierre-Yves Dermagne and vice prime-minister and minister of justice Vincent Van Quickenborne) announcing the deal around 1.30 a.m. on Twitter.

The main aim of the Labor Deal was to help the Belgian economy become “more sustainable, innovative and digital” according to prime minister Alexander De Croo, with the ultimate goal to attain an employment rate of 80% by 2030, compared with the current 71%. The adoption of the four-day workweek is the flagship of the Labor Deal, with Belgium becoming the first country deciding to officially and permanently incorporate the alternative workweek design in its legislation. Contrary to previous trials in Spain, Scotland and the UK, the Belgian four-day week will not follow the 100-80-100 format. A 100-80-100 model entails that employees work for 100% of their salary, only devoting 80% of their time, under the guarantee that 100% of productivity can be safeguarded. Instead, Belgian authorities decided to condense the five-day week into four days while keeping the number of working hours constant, meaning that the number of hours worked per day could go up to ten. The measure is moreover oriented at the private sector with civil servants not being able to benefit from the new workweek design. Employees can choose on a weekly basis which work schedule they want to follow to “help those who want spend more time with their children” according to minister of labor Pierre-Yves Dermagne.

Other components of the Labor Deal include: the right to ignore phone calls of the employer after working hours, at least three training days per year for each employee, the ability to move to another job during the notice period, reforms for e-commerce, better labor conditions



for meal couriers, diversity tracking in each sector alongside employment rate tracking in bottleneck professions. However, it was widely agreed that the four-day workweek was the most important element of the Labor Deal, and it was without doubt its most widely covered element. For instance, in his opinion piece, Professor of Labor Law at the University of Ghent, Alexander De Becker, dubbed the four-day workweek as “crown jewel of the Labor Deal” (De Becker, 2022).

The adoption of the four-day workweek was officially confirmed in a press conference by Belgian Prime Minister Alexander De Croo in the morning of the 15<sup>th</sup> of February and was quickly picked up in the international media. A search on LexisNexis using the keywords “four-day week” or “four day week” and “Belgium” returned 15 articles on this event that same day. In terms of pre-announcement leakage of information, a search using similar keywords yielded no articles on this topic on Monday the 14<sup>th</sup> nor Friday the 11<sup>th</sup> of February 2022. To investigate how this news affected individual firms, we also performed an extensive search of CEO responses to this announcement but found none. Nevertheless, we did find evidence that Belgian listed firms such as Colruyt are using granting a four-day week as a means to attract new employees by explicitly putting it in their job offers: “you will work full-time in a four-day week (instead of five days) so you can optimally coordinate between your work and private life”, substantiating the impact on the corporate realm of the alternative workweek arrangement.<sup>3</sup>

The Prime Minister’s announcement denoted the political agreement for the adoption of the four-day workweek. Afterwards, the social partners (i.e., employers’ organizations and unions) can still provide advice on the Labor Deal. Based on their comments, the government can still amend the deal before it is effectively voted into legislation by parliament. We consulted a policy expert as well as several media sources, which all suggested that the

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<sup>3</sup> See for instance, <https://jobs.colruytgroup.com/nl/vacatures/chauffeur-c-lot/>.

likelihood of the deal being significantly amended or outright rejected was very low. With regards to the social partners, the Labor Deal included elements that should appeal both to employers' organizations and the unions, making it unlikely to meet significant pushback. Additional analyses of the stock price reaction to the final approval of government of the four-day workweek design after having considered the suggestions of the social partners on the 17<sup>th</sup> of June 2022 support this notion.<sup>4</sup> With regards to the parliament, since parties of the Belgian government also have a majority in the Belgian parliament, it is widely agreed that the parliamentary vote (which is estimated to take place in autumn of 2022) will not constitute a major stumbling block either. To the extent that the stock market was not 100% certain yet that the proposed Labor Deal would effectively become law, any recorded stock price reaction on February 15<sup>th</sup> 2022 will likely be an under-estimation of the true stock price effects of the four-day workweek arrangement.

### **3. Shareholder value effects of human resource management**

This article adds to recent research on the intersection between HRM and corporate finance (Ataullah et al. 2022; Pham et al. 2022). Specifically, our work relates to a broader stream of event studies on the stock price effects of policy interventions in the labor market. As an example in this regard, Dessaint et al. (2017) show negative cumulative abnormal returns of approximately 2% around merger announcements following major employment protection legislation increases. Watson and Arunachalam (2018) focus on employment protection limiting the right of employers to lay off their workers using data from France between 1997 and 2003 and find that firms relying on employees with specialized skills to perform their jobs in particular responded positively to this legislative intervention. Furthermore, Cousins et al. (2020) investigate the adoption of the Modern Slavery Act in the UK in 2015 which was aimed

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<sup>4</sup> As the core of the Labor Deal remained unchanged, some changes relative to the agreement in February included increased control on working overtime to safeguard sufficient rest for employees during the four-day workweek.

at limiting the abuse of people that are “owned” by their employers and find a positive stock price response for firms that are known to have addressed slavery risk.

Our work also complements existing research on the shareholder wealth effects of firms’ human resource policies (e.g., Cook and Glass, 2009) and of those focusing on work-life balance in particular. Hannon and Milkovich (1996) find partial evidence of HR announcements having a positive impact on share prices with investors responding well to firms being a good workplace for mothers. Additionally, Arthur (2003) finds that 130 firm announcements of work-family HR initiatives in the Wall Street Journal also led to a significantly positive stock price response. In a similar vein, Arthur and Cook (2004) show positive stock price reactions in Fortune 500 companies adopting 231 work-family human resource policies between 1971 and 1996. More recently, Lattanzio (2020) finds that being included in the list of “100 Best Companies for Remote Jobs” leads to positive abnormal stock returns. Nevertheless, in both these strands, quantitative evidence on how a four-day workweek may affect shareholder wealth is lacking to date. Our paper addresses this question.

#### **4. Hypothesis development**

A priori, arguments can be made for both negative as well as positive stock price reactions to the adoption of the four-day week. Regarding the former, if firms are presumed to organize their workweek scheduling optimally, imposing additional flexibility through an interventionist policy is at best without impact and at worst harmful to shareholder value (Coase, 1960). Investors may fear that factors such as fatigue will lead to reduced productivity in a ten-hour workday and, as a result, diminish financial performance. Moreover, they might expect the adoption of the four-day week to reduce the cashflows of firms covered by the legislation by other means, for instance through increased coordination costs with respect to the initial optimum. However, both research on psychological detachment from the additional day off and the social exchange theory argue that the increased temporal flexibility from the four-day week

option should be translated into productivity gains, positively influencing the firms' bottom line. This is, moreover, corroborated by anecdotal evidence such as the Microsoft Japan case. Specifically, Microsoft Japan trialed the four-day workweek in August 2019 by giving its 2,300 employees five Fridays off in a row while keeping their salaries unchanged. They reported an increase in productivity by a staggering 40% by the end of the period alongside increased efficiency in their meetings and an overall happier workforce. Additional side benefits included lower costs, for instance through lower electricity use (down 23%) and less printing expenses (down 59%) (Paul, 2019). Finally, wage demands may also fall as the inherent demand for leisure is satisfied (Wilson, 1980). Therefore, if the current prevalence of the five-day week is mainly driven by an inherent status quo bias instead of being an optimal choice, investors may positively respond to the imposed flexibility. In short, the sign of the stock price reaction remains an empirical question *ex ante*.

For completeness, we note that there is also a possibility that the adoption of the four-day week led to no significant stock price reaction at all. For instance, if investors were unaware of the legislative adoption of the four-day week, they may not have responded to this event. Nevertheless, the vast attention both in the Belgian as well as the international media makes it unlikely that this was the case. Moreover, investors may also discredit the adoption of the four-day week entirely as not important enough to significantly affect the Belgian firms' cashflows. This would be in line with the argument of the Belgian political opposition dismissing the adoption as a mere window dressing scheme.

To conclude, the sign of the average stock price reaction to the adoption of the four-day week is *ex ante* unclear. Based on the arguments above, we also do not exclude a lack of an average stock price response to the event in a particular direction as a possible outcome. If investors do expect the adoption of the alternative workweek design to trigger a significant stock price reaction in one way or another, we expect this reaction to be influenced by moderators

related to productivity, employee wages, and non-staff operating costs. We now outline these three channels and their associated moderating variables.

#### *4.1 Productivity channel*

Ample empirical evidence exists of less productive firms facing more difficulties than their more productive counterparts in coping with additional legislation being imposed on them. For instance, Albrizio et al. (2014) examine environmental regulation in the OECD countries and find that the most productive firms experience productivity gains when faced with a tightening of environmental policy while their less productive peers experience a slowdown in their productivity. Also with respect to labor legislation, Duanmu et al. (2022) distinguish between subsidiaries of multinationals and their domestic counterparts in China and find that the former, which are reasoned to be more productive (see e.g., Doms and Bradford Jensen, 1999), are less affected by an exogenous shock increasing minimum wages. Similarly, with respect to the legislative adoption of the four-day workweek, the imposed flexible work arrangements can raise concerns among investors of incremental cashflow losses for firms with low productivity of human capital, while more efficient firms are likely to better cope with this transition. On the other hand, the main arguments in favor of introducing the four-day workweek are based on enhancing productivity. Even though there would be longer working days with a potentially harmful impact on productivity, proponents of the four-day week argue that the additional day off facilitates psychological detachment from work. This, in turn, increases work engagement, proactive behavior and ultimately productivity levels (Sonnentag, 2012). This has been supported by anecdotal evidence (e.g., the case of Microsoft Japan) as well as qualitative evidence (Ivancevich, 1974; Vega and Gilbert, 1997). Therefore, the adoption of the four-day week can also be considered as an opportunity for firms with a low human capital efficiency by investors.

Various case studies also provide no conclusive evidence on the impact on productivity of the condensed workweek. For example, Ono et al. (1991) examine flight attendants in daily

nonstop international flights as employees that are exposed to long working hours. They indeed find the length of the working hours to elevate the amount of fatigue complaints with complaint rates becoming abruptly higher after duties had been performed 7 through 10 hours since take-off. Conversely, Latack and Foster (1985) do not find fatigue to be an issue among information systems personnel operating in a three-day, thirty-eight hour work schedule. Similarly, Schroeder et al. (1998) do not find any differences in the test performance of air traffic controllers on the 10 hour shift from those on the 8 hour shift for any of their parameters. Given that a case can be made for both a positive as well as a negative stock price reaction *ex ante*, we define the following dual hypothesis.

Hypothesis 1a (H1a): Stock price reactions to the four-day workweek are positively affected by firms' human capital efficiency.

Hypothesis 1b (H1b): Stock price reactions to the four-day workweek are negatively affected by firms' human capital efficiency.

A second potential moderator through which the adoption of the four-day week can lead to productivity gains is by inducing reciprocity from knowledge workers. Social exchange theory posits that individuals feel the need to reciprocate when they benefit from another person or entity's actions (Lambert, 2000; Peretz et al. 2018). Therefore, allowing employees increased flexibility can lead them to repay the firm through increased effort. As both Arthur (2003) and Donnelly (2008) contend that well-educated people value work-life initiatives, as a result, they should be more likely to repay the firm under social exchange theory. This should lead to a positive stock price response, leading to our second hypothesis.

Hypothesis 2 (H2): Stock price reactions to the four-day workweek are positively affected by the education levels of the firms' workforce.

#### *4.2 Employee wage channel*

Wilson (1980) argues that an important factor in employee satisfaction is their demand for leisure. As the three-day weekend that accompanies the four-day week satisfies this desire for leisure, wage demands of employees to work in Belgian listed firms may decrease. Following this discussion, our next hypothesis focuses on a potential moderating influence of

personnel costs on the stock price reaction to the adoption of the four-day workweek in Belgium and is defined as follows:

Hypothesis 3 (H3): Stock price reactions to the four-day workweek are positively affected by firms' personnel costs.

#### *4.3 Operating costs channel*

As a final moderating channel, we focus on non-staff operating expenses. In social sciences, ample research examines the effects of condensed workweeks on employee wellbeing. Already in 1973, Nord and Costigan (1973) conducted a longitudinal study in a pharmacy and concluded that the introduction of the four-day week had an overall positive impact on its employees, for instance through reduced absenteeism. More recently, Laker and Roulet (2019) surveyed business leaders and workers in the UK and found that business leaders who implemented the four-day week reported increased employee satisfaction and reduced sickness leave among their workers. This was substantiated by the employees themselves as 77% of them reported a clear link between the four-day week and better quality of life. This positive impact on wellbeing has also been corroborated in various case studies. For instance, in 2018, Perpetual Guardian trialed a 32-hour four-day workweek in New Zealand with the positive effects of the condensed workweek being corroborated through employee stress levels being reduced from 45% to 38% and work-life balances significantly improving (Ashford et al. 2020). This increased wellbeing among employees should result in positive outcomes such as reduced absenteeism or sickness leave that are beneficial to firms' cash flows (Chung, 2022). The condensed workweek can also be argued to lead to various other costs savings for firms, including less commuting expenses, lower electricity use or optimized use of office spaces (Choudhury et al. 2021; Chung, 2010; Paul, 2019). These cost savings would be especially beneficial for less profitable firms. On the other hand, Chung (2022) highlights a structural issue with the four-day workweek that is especially relevant in the Belgian setting, namely the

longer working hours per day. Several studies show that longer working hours per day are detrimental to individual's physical and mental health (Caruso et al. 2006). Moreover, these longer working hours can result in other harmful side effects such as deteriorated relations between the workers and their partners and children (Crouter et al. 2001). Therefore, these longer working hours may increase costly absenteeism or turnover intentions. Furthermore, the alternative workweek arrangement may also induce increased coordination costs as illustrated by Laker and Roulet (2019). All these costs may nevertheless be better dealt with by firms that are more profitable than their peers, resulting in a positive stock price response of ex ante profitability. This leads us to our fourth and final hypothesis, which we define dually as follows:

Hypothesis 4a (H4a): Stock price reactions to the four-day workweek are positively affected by firms' profitability.

Hypothesis 4b (H4b): Stock price reactions to the four-day workweek are negatively affected by firms' profitability.

## **5. Average stock price reaction to the four-day workweek**

In this section, we discuss the sample and the methodology used for the univariate analysis of the stock price reactions to the adoption of the four-day week, followed by the results of this analysis.

### *5.1 Sample construction*

We extract information on all Belgian firms that are listed on the event date from the Bel-first database, established by Bureau Van Dijk. This leads to a preliminary sample of 154 firms. First, we exclude all firms for which the necessary information on their stock prices was missing during the event and estimation windows. As a result, we end up with 141 listed firms for our univariate analysis. The sample at our disposal in the baseline cross-sectional analysis is smaller due to additional data availability constraints for the measures used to test our hypotheses. Nevertheless, the 63 remaining firms still account for a total market capitalization of 242 billion euros, equaling approximately two-thirds of the total Belgian market capitalization.



## 5.2 Methodology

In our univariate analysis, we examine whether there was an average stock price reaction across all Belgian listed firms to the adoption of the four-day week. To this end, we calculate the firms' abnormal stock returns following the event, where the abnormal returns can be defined as the firms' stock returns with the event happening with respect to the counterfactual returns where the event did not take place. First, we calculate the abnormal returns at the level of the individual firms. Similar to Hendricks et al. (2020), we control for cross-sectional dependence in these abnormal returns across the sample firms given that they are all exposed to the same event on the same day. We use the test advocated by Brown and Warner (1985) that adjusts for this cross-sectional dependence to determine a possible stock price response. We first calculate the standard deviation from the mean daily abnormal returns over our estimation window. To calculate the abnormal returns, we use the standard market model. First, an Ordinary Least Squares (OLS) regression of the following specification is estimated.

$$R_{i,t} = \alpha_i + \beta_i * R_{m,t} + \varepsilon_{i,t} \quad (1)$$

$R_{i,t}$  are the firm's individual stock returns and the AEX index is used as market proxy ( $R_{m,t}$ ). The choice for the main Dutch stock index as market index is based on the Dutch economy most closely resembling the Belgian economy among a host of indicators (common currency, common language, geographic proximity, etc.) while being arguably unaffected by the four-day workweek policy adoption in Belgium. The appropriateness of this market index is also reflected in the high Pearson correlation between the average daily returns of our sample firms over the estimation period and the AEX index (0.67).<sup>5</sup> With respect to this estimation period, the OLS regressions are estimated in a sufficiently large estimation window, from 200

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<sup>5</sup> As a robustness check, we estimate our cross-sectional baseline model with the French CAC40 as market index and find that our results remain robust. These results are available on request.

days prior to the event until 20 days before the event. Additionally, the estimated coefficients are used to determine the abnormal returns using the following specification.

$$AR_{i,t} = R_{i,t} - (\alpha_{i,estimated} + \beta_{i,estimated} * R_{m,t}) \quad (2)$$

The mean daily abnormal returns can thus be calculated as follows:

$$AR_t = \sum_{i=1}^N \frac{AR_{i,t}}{N} \quad (3)$$

where  $N$  equals the total number of firms examined, being 141 in this case. Once we have obtained the mean daily abnormal returns and estimated the standard deviation from the average daily abnormal returns over our 180-day estimation window ( $SD(AR_t)$ ), we can calculate the test statistic for a  $t$ -test to determine the significance of the cumulative abnormal returns over a  $j$ -day event period as follows:

$$t_j = \frac{\sum_{t=t_1}^{t_2} AR_t}{SD(AR_t) * \sqrt{j}} \quad (4)$$

where the numerator equals the cumulative abnormal return for a given period  $\{t_1, t_2\}$ . Additionally, we use a binomial sign test to investigate whether the percentage of positive (negative) abnormal returns are significantly different from zero (Hendricks et al. 2020).

We also examine the abnormal returns adoption of the four-day workweek using a portfolio approach similar to that adopted in Cousins et al. (2020). This method also controls for firm-level clustering at the event date and is commonly used in the policy event study literature (see e.g., Lewis and Verwijmeren, 2014). To this end, we construct both a value weighted portfolio based on the market capitalization of the Belgian listed firms and an equal weighted portfolio of returns. The following regression is estimated from a period of 200 days prior to the event – consistent with the analysis above – until five days after the event:

$$R_{p,t} = \alpha_p + \beta_p * R_{m,t} + \gamma_p * D_t + \varepsilon_{i,t} \quad (5)$$

As in equation 1,  $R_{m,t}$  is the AEX index.  $R_{p,t}$  denotes the weighted return on the portfolio of sample firms.  $D_t$  is a dummy variable equal to one on the 15<sup>th</sup> of February 2022 and zero

otherwise. To broaden the event window, we discuss alternative specifications of  $D_t$  in the next section where the dummy is also set equal to one 1 day prior to the event as well as one day after the event, consistent with the most used windows in other event studies.  $\gamma_p$  is therefore our coefficient of interest and captures the abnormal return of the portfolio on the event day, or average abnormal returns when we define a multi-day window of  $D_t$ .

### 5.3 Results

The impact on shareholder value for the average firm in our sample is denoted in Table 1. Aside from limiting the event window to the day of the event  $\{0,0\}$  to capture the announcement effect, we examine various other windows consistent with other event studies (see e.g., Cousins et al. 2020). To this end, we also investigate  $\{-1,0\}$ ,  $\{0,1\}$  as well as  $\{-1,1\}$ . We find no significant abnormal returns in the  $\{-1,0\}$  window across all four estimated models.<sup>6</sup> We do, however, observe a significant overall positive stock price reaction in the last two rows of Table 1, both at the firm-level as well as at the portfolio level, driven by a positive response in the  $\{0,0\}$  window. These results substantiate a positive impact on shareholder wealth of the adoption of the four-day workweek in the night from the 14<sup>th</sup> to the 15<sup>th</sup> of February 2022.<sup>7</sup>

Additionally, we perform two searches in Factiva to ensure the robustness of these results. First, we investigate whether firm-specific announcements took place on the event date that may have triggered a confounding effect in the stock price reaction. We find nine firms for which this was the case (e.g., expansion investments or share buybacks). When excluding these firms for this test, we still find a similar, significantly positive stock price response in the  $\{0,0\}$  window. Second, in line with other event studies (Cousins et al. 2020; Lewis and Verwijmeren, 2014), we verify that no other important macro-economic news was released on the event date

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<sup>6</sup> We find no evidence of information leakage surrounding the adoption of the four-day week on day  $t-1$  in Factiva. A possible explanation for the negative stock price response on that date that is unrelated to the four-day week is a reaction to the press conference of ECB president Lagarde on the 14<sup>th</sup> of February refusing to rule out an interest rate hike in 2022 (Weber, 2022).

<sup>7</sup> Breusch-Godfrey tests with a lag of two show no evidence of autocorrelation. We therefore use the unadjusted ordinary OLS standard errors instead of the Newey-West standard errors.

based on a Factiva search. We find no evidence of this. For completeness, we also tested for a possible stock price response at the approval date of the Labor Deal on the 17<sup>th</sup> of June 2022, but found the effects on shareholder wealth to be of negligible magnitude. This is in line with the core of the Labor Deal being already known to investors since February and remaining largely unchanged. Results are reported in panel A of Table A.2. in the Appendix.

< Insert Table 1 about here. >

## **6. Cross-sectional differences of stock price reactions to the four-day workweek**

This section discusses the variables used for our cross-sectional analyses of stock price reactions to the adoption of the four-day week, followed by the results of the analyses. Detailed definitions of all variables alongside their respective data source are provided in the appendix Table A.1. All continuous variables are winsorized at the 2.5% level for the cross-sectional analyses.

### *6.1 Variables*

All four hypotheses in this paper pertain to the influence of human capital or profitability on stock price reactions to the adoption of the four-day workweek. We provide a brief description of the four main variables used to test our hypotheses. First, we consider a measure that investors may use to proxy human capital efficiency. To relate firms' production output to the amount of labor they require as input to achieve this, we define the variable *Value added per employee*. This is measured as the natural logarithm of the company's added value scaled by its number of employees. Second, to investigate a potential impact of the education levels of the workforce, *College degree* captures the percentage of the workforce that has obtained a college degree. Third, *Personnel costs* reflects the average wage per employee at the firm-level. Given the sizeable differences in the value of this variable across firms, we take the natural logarithm of this value. Finally, *ROA* is defined as the industry-

corrected (at the two-digit SIC level) return on assets, reflecting the firms' profitability relative to their peers.

As we need to control for the cross-sectional dependence of our sample firms to the event, we estimate a model similar to equation (5) at the firm-level over a window from 200 days prior to the event until 5 days after the event:

$$R_{i,t} = \alpha_i + \beta_i * R_{m,t} + \gamma_i * D_t + \varepsilon_{i,t} \quad (6)$$

where all variables have similar definitions as in equation (5).  $R_{i,t}$ , however, now shows the returns on the stocks of each individual firm  $i$ .  $\gamma_i$  therefore captures the average abnormal stock price effect of the adoption of the four-day workweek in Belgium for firm  $i$ . To reduce the impact of potential confounding influences, the event study literature argues that event windows should be as short as possible. To this end, and given that we are able to identify the event of interest with great accuracy, we use a one-day event window  $\{0,0\}$  in the cross-sectional analysis, meaning that  $D_t$  will only be equal to one on the 15<sup>th</sup> of February 2022 (Cousins et al. 2020; Larcker et al. 2011).<sup>8</sup> In terms of semantics, the abnormal returns on this day will be referred to as cumulative abnormal returns ( $CAR_i$ ) through the remainder of this paper. These cumulative abnormal returns are used as dependent variable to investigate our hypotheses. To this end, our baseline specification is defined as follows:

$$CAR_i = \alpha + \beta_1 * Value\ added\ per\ employee_i + \beta_2 * College\ degree_i + \beta_3 * Personnel\ costs_i + \beta_4 * ROA_i + \beta_5 * Employees_i + \beta_6 * Women_i + \beta_7 * Size_i + \beta_8 * LTD_i + \beta_9 * BTM_i + \varepsilon_i \quad (7)$$

where  $CAR$  equals the cumulative abnormal returns over the event window and *Value added per employee*, *College degree*, *Personnel costs* and *ROA* are our four independent variables to test the hypotheses on human capital efficiency (H1a & H1b), education levels (H2), personnel costs (H3) and profitability (H4a & H4b), respectively. All

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<sup>8</sup> In the final column of Table 3, we will set dummy  $D_t$  equal to one on both the 15<sup>th</sup> of February as well as the 17<sup>th</sup> of June. Additionally, we estimate equation (6) from 200 days prior to the event in February until 5 days after the event in June. As such,  $\gamma_i$  denotes the average abnormal stock price effect of these two events. To obtain the total cumulative abnormal return ( $CAR_i$ ), we multiply  $\gamma_i$  with the number of events (2) (Cousins et al. 2020).

independent and control variables are lagged by one year. Given the wide variety of measures reflecting human capital efficiency, we examine an alternative proxy in section 6.3. To this end, we use *Cashflow per employee* in line with Maksimovic and Phillips (2001).

In terms of the control variables, we add the firm's employment intensity (*Employees*), measured as the number of employees per million assets. Given that the Labor Deal also had a social dimension through enhanced tracking of diversity in the workforce, we include the percentage of female employees (*Women*) to ensure that increased salience of gender equality for investors is not driving our results. We also include the natural logarithm of total assets (*Size*) and the book-to-market ratio (*BTM*) as standard control variables to our model. Finally, to determine whether other human resources dimensions may influence the stock price reaction to the adoption of the four-day week, we define additional models where we respectively include variables reflecting the firms' workforce training as part of the Labor Deal focused on this particular area (*Training hours*), forced layoffs (*Layoffs*), employees' contract situations (*Indefinite term contracts*), HR performance as perceived by current and former employees (*Employee rating*) and the projected sectoral employment rate growth to investigate which may sectors stand to gain most from an alternative workweek arrangement (*Employment rate growth*).

Table 2, panel A, presents descriptive statistics for the variables in our cross-sectional analyses, while panel B reports the correlation matrix. First, we discuss the most salient numbers in panel A. On average, one third of our sample firms' workforce has obtained a college degree with some Belgian listed firms only employing college-educated people. In terms of our alternative proxy of human capital efficiency, the mean value of *Cashflow per employee* is 10 times its median value. To mitigate the influence of outliers, we transform this variable into a decile rank in the respective analysis. The average firm size equals 1.8 billion euros in total assets. Sample firms moreover tend to be profitable with an

average (median) ROA of 0.008 (0.021). It is further notable that two firms in our sample have a full female workforce. Our sample firms lay off on average 3.5% of the workforce per year, with a relatively high maximum of 26.3%. A possible explanation entails the impact of the COVID-19 crisis. As expected, the vast majority of the workforce also has an indefinite term contract, with more than half of the sample firms not using fixed term contracts. Across our sample firms, we also note sizeable variability in firms' Glassdoor ratings of HR performance (*Employee rating*) as well as the sectoral employment rate growth (*Employment rate growth*). Next, we direct our attention towards the correlation matrix in panel B. Among the independent variables, the largest correlation is, unsurprisingly, observed between *Personnel costs* and *College degree* (0.56, *p*-value of 0.00). Note that this is also the largest correlation across all variables used in our cross-sectional analyses. Overall, the correlations between these variables do not raise any concerns of multicollinearity.

< Insert Table 2 about here. >

## 6.2 Results

Column 1 in Table 3 provides the baseline regression results. Robust standard errors are reported between parentheses. First, we note that across all estimated models, the maximum variance inflation factor (VIF) is below the traditional threshold of five (3.33), suggesting no multicollinearity issues in our cross-sectional analyses. Consistent with H1b, the coefficient on *Value added per employee* is negatively significant at the 1% level. In terms of economic magnitude, a one standard deviation increase in this variable leads to a 0.42% lower stock price response. Corroborating H2, firms with a highly educated workforce (*College degree*) are positively affected by the adoption of alternative workweek schedule (*p*-value <0.05). This effect is also economically sizeable as a one standard deviation increase in educational levels leads to a 0.97% higher stock price response. We find no support for our hypothesis on employee wages (H3). Finally, with respect to our fourth hypothesis on profitability (H4a and

H4b), we observe a negative but insignificant coefficient on the *ROA* variable.<sup>9</sup> As our sample encompasses large companies, investors may perceive both more profitable as well as more loss making firms as capable of dealing adequately with the adoption of the four-day week. In terms of the control variables, none of them appear to exert a significant influence on the Belgian firms' stock price reaction. The fact that the coefficient of the variable *Women* is insignificant is consistent with Ko et al. (2013) who examine teleworking and argue that even though women are typically responsible for the majority of household tasks as well as child care, they are not more likely than men to reward organizations that offer flexible work scheduling with increased organizational commitment.

Additionally, we examine whether other human resources dimensions may influence the stock price reaction to the adoption of the four-day week. As a first supplementary analysis, we focus on the training firms provide to their employees in column 2. Part of the Labor Deal focuses on providing increased training opportunities to the workforce. This may have led to more salience among investors on how employee training could affect firm value. Human capital theory argues that investments in educating and training employees enhances their productivity (Becker, 1962). Recent empirical evidence suggests that investments in human capital indeed have a significant positive impact on employees' productivity (Georgiadis and Pitelis, 2016) as well as firms' financial performance (Riley et al. 2017). While productivity levels are captured through *Value added per employee*, we want to examine whether investments to increase future productivity may affect the abnormal stock returns from the adoption of the four-day week. The results show that, in terms of human capital efficiency, investors focus on productivity levels already in place when the alternative work schedule was introduced, as shown by the persistent negative effect of the coefficient on

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<sup>9</sup> These results remain robust when we use the ROA without applying the industry-correction.



*Value added per employee*, while potential future increases in productivity from additional training do not appear to significantly affect the stock price reaction.

Second, we focus on forced layoffs. On the one hand, ample layoffs at the firm-level can be interpreted by investors as a signal of a lot of flexibility in the firm's human resource policies. Therefore, coping with additional imposed flexibility from the four-day week is likely more convenient for firms already used to laying off employees. On the other hand, investors may also perceive these layoffs as a lack of stability and perhaps even as a signal of problems with the firm's overall business model. Imposed additional flexibility from an interventionist policy is likely to exacerbate these issues, leading to an expected negative stock price reaction. Nevertheless, we find evidence of neither contention with the coefficient of *Layoffs* being negative but insignificant in column 3 of Table 3.

Third, while layoffs can be considered as a form of flexibility in human resource policies, another dimension of staffing flexibility entails the types of contracts the employees have. As such, as our fourth additional analysis, we distinguish between contracts of indefinite duration and fixed term contracts in column 4. Obviously, firms with more fixed term contracts have more flexibility in terms of the number of employees they keep on. Therefore, if the four-day week would indeed lead to productivity gains and some employees may become redundant, firms with more temporary contracts might benefit even more from the adoption of the four-day week. Conversely, the long term nature of contracts of indefinite duration may reflect more commitment of the employees to the organization as opposed to firms where a lot of temporary workers are utilized. However, when looking at the results in column 4, neither of these arguments seem to be supported with the effect of the variable *Indefinite term contracts* being insignificant at the conventional levels.

Fourth, we focus on the Glassdoor ratings where current and former employees can evaluate their companies. These ratings are commonly used in the academic literature to provide an indication of the HR performance of the firm by focusing on employee satisfaction (e.g.,

Dube and Zhu, 2021). Investors may perceive the granting of the four-day week as an opportunity to increase employee motivation in firms with more disgruntled employees, leading to productivity gains. Nevertheless, column 5 does not support this assertion with the coefficient of the *Employee rating* being positive but insignificant.

Fifth, we investigate the sectoral employment rate growth predicted for the period between 2022-2030 in Belgium<sup>10</sup> in column 6 (*Employment rate growth*). Models based on the current workweek design of five working days project future employment to decrease in some sectors. Therefore, the alternative workweek arrangement of four days may be more suited to the needs of these sectors and help mitigate these negative growth forecasts. Thus, sectors with lower predicted growth may especially benefit from the four-day workweek. Alternatively, in sectors where employment is predicted to grow, employees have more outside options, increasing their bargaining power. This could reinforce the overall positive stock price response given the larger propensity for adoption of the alternative workweek schedule in these sectors. In short, the impact of the sectoral employment rate growth is thus ex ante unclear, with the empirical results in column 6 supporting neither line of reasoning.

Finally, we combine the events on the 15<sup>th</sup> of February and the 17<sup>th</sup> of June to determine whether the cross-sectional results remain robust to the final approval of government on the four-day workweek in column 7. We indeed find that the coefficients on *Value added per employee* and *College degree* remain negatively and positively significant, respectively, corroborating our baseline model.

< Insert Table 3 about here. >

To conclude this section, we perform a placebo test in line with Grewal et al. (2019) and Cousins et al. (2020) to ensure that we do not observe our cross-sectional results on non-event

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<sup>10</sup> These predictions are obtained from Steunpunt Werk, which is a policy-oriented research center from KU Leuven.

dates as well. As such, we repeat the following procedure 500 times: First, we randomly select an event date in the period one year prior to our actual event. Additionally, we calculate the cumulative abnormal return for each firm on the alternative event date using equation (6) and run our baseline regression model of which the coefficient estimates are stored. When examining the distributions of the coefficients from the non-event dates, we find that our original baseline regression coefficients are situated in the respective tails. This suggest that our significant baseline regression results indeed originate from the adoption of the four-day workweek in Belgium.

### 6.3 *Cashflow per employee*

To substantiate the robustness of our main results given the wide variety of available proxies on human capital efficiency, we investigate an alternative proxy in this section. To this end, we use *Cashflow per employee* in line with Maksimovic and Phillips (2001). Additionally, we transform this variable into a decile rank to mitigate the influence of outliers. In terms of the results, our efficiency measure remains negatively significant at the 5% level across all estimated models. In terms of economic magnitude, the difference in stock price response between the most efficient firms and least efficient firms is about 1 percentage point. Moreover, the levels of significance of the coefficients of *College degree* also remain similar to those in Table 3. As such, these findings tend to indicate that our results are generalizable across various measures of human capital efficiency.

< Insert Table 4 about here. >

## 7. Additional analyses

In February 2022, Belgium became the first country deciding to officially adopt the four-day workweek as legislation. In our main analysis, we exploit the detailed social balance sheet requirements in Belgium to extract unique variables on the workforces' characteristics. Nevertheless, to examine the international impact of this decision, we additionally examine the

stock price reaction of listed firms from abroad controlling subsidiaries in Belgium. However, we first provide some additional context of the adoption of the four-day workweek in an international context in the following subsection.

### *7.1 Countries' trials and recommendations of the four-day week*

Between 2015-2019, Iceland was the first country to experiment with the four-day workweek. Initiated by the Icelandic government and the Reykjavik city council, trials involved 2,500 workers shifting from a five-day 40-hour week to a 35- or 36-hour four-day week without loss in remuneration. Results showed increased well-being of employees across a host of indicators, ranging from reduced stress and burnout symptoms to better health and work-life balances (Villegas and Knowles, 2021). This success story attracted a lot of attention from policy makers in developed countries. As such, the last two years have seen the introduction of various Iceland-inspired trials. Table 5 provides an overview of these policy initiatives in the OECD countries. The first country to respond to the trials in Iceland by introducing their own recommendation was Japan. Although known for its strenuous work culture, the country's annual economic policy guidelines, released in June 2021, advocated the adoption of a four-day workweek. This shorter workweek, although optional, was meant to support employees wanting to further their education, look after family members or even meet new potential partners to fight Japan's aging and shrinking population (Westfall, 2021). The first official trial of the four-day week outside Iceland was proposed in March 2021 in Spain to be implemented from September 2021 onwards. The three-year project approximately includes 200 companies with the government also providing a €50 million budget to cover potential costs (Kassam, 2021). Similar initiatives followed suit with Scotland implementing a 100-80-100 trial in several corporations on the 3<sup>rd</sup> of September 2021, backed by a £10 million government fund, and Ireland piloting a six-month trial of the four-day workweek in 20 companies that came into effect in February 2022. Most recently, on the 18<sup>th</sup> of January 2022, the UK announced a six-month four-day workweek trial in 30 companies starting from June 2022 onwards. Following

the 100-80-100 model, the initiative will allow employees to work 32-hour weeks while keeping their compensation and benefits unchanged.

< Insert Table 5 about here. >

## *7.2 Listed firms with subsidiaries in Belgium*

In this section, we expand our main analysis by focusing on listed firms headquartered abroad with subsidiaries located in Belgium that employ at least 50 people there. As the adoption of the four-day week covers all firms operating in the Belgian private sector, these multinationals will have had to comply to the legislation in their Belgian subsidiaries. We use this 50-employee cut-off for two reasons. First, we want to ensure that firms in this international sample face a certain exposure to the legislation. Second, from 50 employees onwards, Belgian law requires labor union representation. Given the voluntary characteristic of the four-day week and the criticism of the political opposition in enforcing it, labor union representation may help to this end. To investigate whether the adoption had international spill-over effects in terms of stock price reactions, we first examine the average abnormal returns over the event windows consistent with our main analysis. To calculate the abnormal returns of all individual firms, we use an adapted version of equation (6) where the MSCI World is now used as market index. We end up with a sample of 520 listed firms that control subsidiaries in Belgium for our univariate analysis gathered from the Orbis global database established by Bureau Van Dijk. Even though the stock price reaction in Table 6 is, not entirely unexpected, smaller in this sample, we still find some suggestive evidence of a positive response when examining the results from the binomial sign test in column 5 of Table 6. As such, we observe a significantly positive stock price reaction, which appears to be driven by a positive response from  $t=0$  onwards. However, given the insignificant response in the other three analyses, we refrain from

making any claims in this regard.<sup>11</sup> For completeness, we also report the results from the approval of the four-day workweek on the 17<sup>th</sup> of June in Panel B of Table A.2. in the Appendix. Similar to the results for the sample of Belgian listed firms, none of the four tests shows a significantly positive stock price reaction at the {0,0} window.<sup>12</sup>

< Insert Table 6 about here. >

While we thus find some minor evidence of a positive stock price reaction in Table 6, we are mainly interested in whether the dimensions of human capital previously focused upon may have influenced the abnormal returns in this international setting. To this end, we resort to a cross-sectional analysis for which we are left with 217 observations due to more stringent data availability requirements. We again focus on human capital efficiency, education levels, personnel costs and profitability as possible moderators affecting stock returns. However, we hit some boundaries in terms of data availability in the international context. While the data for our measure of human capital efficiency (i.e., the value added per employee of which we take the natural logarithm), personnel costs (i.e., the natural logarithm of the personnel costs per employee) and profitability (i.e., industry-corrected return on assets) are available, this is not the case for data on the education level of the workforce. Therefore, we resort to constructing an alternative proxy. As argued by O’Gorman and Kautonen (2004), a high rate of university-

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<sup>11</sup> Companies such as Apple (9.61%) and Microsoft (8.27%) make up a large part of the value-weighted returns. Therefore, we perform an additional analysis where we eliminate all firms accounting individually for more than 5%, 1%, 0.5% and 0.25% of the market capitalization of the sample. The remaining subsamples still account for the majority of the observations. For instance, with the 0.25% cut-off, we lose 85 firms but still end up with a subsample that encompasses 83.65% of the original total sample. In terms of the results, we find that the average abnormal returns become -.0019, -.0011, -.0003 and .0005, respectively. We thus find that when the cut-offs become more comparable to the proportional weights (1/520=0.19%), the overall stock price reaction increases. These results are in line with our intuition that larger firms such as Apple and Microsoft are arguably less exposed to the adoption of the four-day week in Belgium. Results from the cross-sectional baseline model reported in Table 8 below are moreover robust in these alternative subsamples.

<sup>12</sup> The significantly negative response across all four estimated models over the {-1,1} window appears to be driven by the event date  $t-1$ . This can be explained by the Fed’s unanimous vote to raise the interest rate by 0.75 percentage points from the 16<sup>th</sup> of June 2022 onwards, the largest increase since 1994.  
<https://www.federalreserve.gov/newsevents/pressreleases/monetary20220615a1.htm?fbclid=IwAR3O8Y9vXjQK-2bVilU2LvDgXlIIVe9lWTnlizvMW7FDZpYqHQzKwnZjTyF4>

educated personnel is highly compatible with R&D expenses in the innovative processes of knowledge-based firms. Therefore, we define the variable *Research and development*, denoting the R&D expenses at the firm-level scaled by the number of employees, thus capturing the firm's R&D intensity. R&D intensity arguably proxies how knowledge intensive the activities of the firm are. Aside from examining the impact of the independent variables on human capital, we also would like to investigate whether the other factors that we investigated in section 6.2 might influence the stock returns. Once more, the lack of detailed social balance sheet data necessitates us to look for alternatives. As information on the training hours the workforce has received is unavailable for the international sample, we need to resort to an alternative proxy. To examine how engaged the firm is with its workforce, we use the overall social score obtained from Refinitiv as proxy. Similarly, with respect to the forced layoffs, while we do not have any information on how many employees are made redundant over the year, we can include the total change in employment (*Employment change*) with respect to the previous year as a layoff proxy. Finally, data on HR performance (*Employee rating*) and sectoral employment rate growth (*Employment rate growth*) remain readily available. As we are in an international setting, we also need to control for cross-country differences having a potential influence on the abnormal returns following the adoption. One could argue that the abnormal returns will either be more positive if the listed firm is headquartered in a country that has recently recommended or trialed the four-day week given the country's more favorable attitude to the alternative workweek schedule or more negative given the larger anticipation in those countries with respect to others where policy makers have not yet devoted attention to the alternative work arrangement. Based on the discussion in section 7.1, we include an indicator variable equal to one for firms headquartered in Iceland, Ireland, Japan Scotland, Spain or the UK, while it is set equal to zero otherwise.

First, we briefly discuss the main descriptive statistics in Table 7, panel A. When examining the *Value added per employee*, firms headquartered in Belgium tend to be a bit

more productive on average (5.143) than their international counterparts with subsidiaries in Belgium (4.606). Similarly, in terms of *Personnel costs*, we note that the Belgian listed firms pay higher wages on average (11.356) than those in the international sample (10.634). Further, firms in the global sample tend to be more employment intensive with an average (median) value of 3.086 (2.217) as opposed to the Belgian sample's average (median) of 1.040 (0.420). The average firm in the global sample tends to be profitable with a mean firm size of 33 billion euros. The majority of the sample firms (81.1%) are headquartered in firms whose regulators have not yet devoted attention to the four-day workweek. Table 7, panel B, lays to rest any concerns about possible multicollinearity between our variables.

< Insert Table 7 about here. >

Next, we focus on the cross-sectional analysis to determine which, if any, dimensions of human capital affected the multinationals' stock returns following the legislative adoption of the four-day week in Belgium. Consistent with the main results in Table 3, we find that our measure of human capital efficiency, *Value added per employee*, is also negatively significant in the international sample. Furthermore, also in line with the results in the Belgian sample, the educational level of the workforce, as proxied by *Research and development*, exerts a significantly positive impact on the stock price reactions of multinationals operating in Belgium. As such, H1b and H2 seem to be corroborated in an international setting as well. As in our main analysis in Table 3, we also observe a negative but insignificant coefficient on the variable *ROA*, leaving us without support for H4a & H4b. What is more in this sample, we now also find a significantly positive impact of the firms' personnel costs on the stock price response in line with H3. International investors thus tend to perceive the four-day workweek as an opportunity to lower the firms' wage bill. Regarding the other variables, we observe no significant impact on the stock price response of the control variables used in the Belgian sample, the indicator variable representing countries where policy makers have already devoted



attention to the four-day workweek nor of any of the other human resources dimensions potentially influencing the stock price reaction, *Social score* (column 2), *Employment change* (column 3), and *Employee rating* (column 4). One notable exception is the negatively significant coefficient of *Employment growth rate* in column 5. In the international setting, investors thus tend to perceive the adoption of the four-day workweek as an opportunity in sectors with lower projected employment levels in the future.<sup>13,14</sup>

< Insert Table 8 about here. >

### 7.3 Companies voluntarily adopting the four-day workweek

Finally, while Belgium recently became the first country to announce the four-day workweek as a policy initiative, we examine the listed firms who already voluntarily introduced a four-day week in this section in Table 9 to provide a holistic view. First, it is noticeable that the number of listed companies resorting to this kind of policy is still rather limited. Second, only Toshiba introduced the four-day week consistent with the Belgian design. Given this limited number of observations, we refrain from performing a cross-sectional analysis and solely focus on the overall announcement effect in each individual firm. We use Factiva to determine the event date when the adoption at the firm-level took place. When examining the cumulative abnormal returns over the  $\{0,0\}$  event window, it is noticeable that responses to these introductions are rather mixed, ranging from -4.7% to +1%.<sup>15</sup> As an overall tendency, the four-day week appears to be welcomed more in Japan than it is in other countries, with the

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<sup>13</sup> To avoid a possible omitted variable bias in the other specifications in Table 8, we re-estimate all models where we also include *Employment growth rate* as additional control variable. All findings remain robust and are available upon request.

<sup>14</sup> Argilés-Bosch et al. (2020) use the NACE 4-digit code 4791 to classify firms operating in E-commerce. To ensure that the reforms for E-commerce in the Belgian Labor Deal are not affecting our results, we investigate our two samples and find that in the sample of listed firms headquartered in Belgium and in the international sample, respectively, one and three firms operate in E-commerce following this definition, minimizing a potential influence of the E-commerce reforms.

<sup>15</sup> For each individual firm, we performed a search on the event day to ensure no other confounding announcements were made. We find that, for Mizuho Financial Group, Japan Credit Rating Agency, Ltd. announced a credit rating of AA- on the event day.

introduction in Unilever New Zealand even leading to a significantly negative stock price reaction. However, given the overall lack of significance across the examined listed firms, at first glance, the voluntary introduction of the four-day workweek appears to be neither persistently welcomed, nor persistently punished by investors.

< Insert Table 9 about here. >

## **8. Discussion and conclusion**

In this paper, we examine the shareholder wealth effects of the announcement of the adoption of the four-day workweek in Belgium. We detect a significantly positive stock price reaction of Belgian listed firms on the event date associated with the adoption of the alternative workweek design, which can be interpreted as investors perceiving the adoption of the four-day week as an opportunity to be exploited rather than a burden imposed on firms. This positive stock price reaction to the adoption of the four-day week is interesting for policy makers. If the investor response were to be negative, policy makers would be urged not to intervene in the labor market. However, the overall positive effect suggests that the five-day week may be perceived by investors as resulting from an inherent status quo bias rather than being an optimal workweek design.

Consistent with this shareholder notion, our cross-sectional analyses indicate that stock prices of firms with lower human capital efficiency were more positively affected by its introduction. Additionally, in line with social exchange theory, firms with knowledge workers that value alternative workweek arrangements experience a more positive stock price response as shown by the positive effect of the workforce's education levels. We further find no evidence of personnel costs, profitability, nor any other human resource dimensions influencing the stock price reactions in the Belgian sample. While evidence for an overall positive stock reaction is less convincing in international sample of firms operating in Belgium, similar cross-sectional results are observed. However, it has to be noted that while employee wages did not affect the

stock price response in the Belgian sample, it does have a positive impact in the international sample. As a final empirical analysis, we find no unambiguous positive or negative stock price response in an international sample of listed firms voluntarily adopting the four-day workweek. Nevertheless, given the limited number of firms that have voluntarily adopted the four-day workweek so far, we urge future research to revisit this question.

The positive stock price response we find may lead firms to rethink their traditional workweek design and shift towards a condensed workweek. Another main takeaway from our research for corporate managers entails that shareholders focus more on the inefficiency of human capital following the adoption of the four-day workweek, encouraging firms to address these issues. From a societal perspective, our results highlight the importance of education with firms incentivized to hire more well-educated people if the four-day workweek becomes more ubiquitous. Our study may also be useful for regulators in countries considering the adoption of the four-day workweek and may inform the broader discussion on the need for alternative work arrangements highlighted by the Covid-19 crisis.

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**Table 1. Abnormal returns of the adoption**

The table shows the abnormal returns for 141 Belgian listed firms following the adoption of the four day week. The event date is the 15<sup>th</sup> of February 2022. The AEX is used as market index. Column 2 shows the mean cumulative abnormal return. Column 4 denotes the percentage of positive cumulative abnormal returns. Column 6 shows the average abnormal stock return of the value-weighted portfolio. Column 8 shows the average abnormal stock return of the equal-weighted portfolio. T-statistics are reported in columns 3, 7 and 9. Z-statistics based on the binomial sign test are reported test in column 5.

Event window	mean	t-stat	positive	z-stat	value weighted portfolio	t-stat	equal weighted portfolio	t-stat
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1) Days (-1,1)	0.002	0.313	0.603	2.442***	.003	0.87	.001	0.41
2) Days (-1,0)	-0.001	-0.163	0.482	-0.421	.001	0.16	.000	0.02
3) Days (0)	0.008	2.413**	0.667	3.958***	.011	1.69*	.008	2.11**
4) Days (0,1)	0.010	2.252**	0.674	4.127***	.009	2.11**	.005	1.99**

**Table 2. Descriptive statistics Belgian sample**

The table shows the descriptive statistics of the variables used in the cross-sectional analysis, winsorized at the 2.5% level. ~Even though a decile rank is constructed for the analysis, we report the original values for maximum transparency. Similarly, # even though an industry-correction at the 2-digit SIC level is used for the analysis, we report the original values for maximum transparency. \* in Panel B denotes significance at the 5% level. Variables are defined in the appendix, Table A.1.

Panel A: summary statistics																
	Obs	Mean	St. Dev	Q1	Median	Q3	Max									
CAR	63	0.014	0.021	0.001	0.007	0.022	0.065									
Value added per employee	63	5.143	1.011	4.500	5.056	5.591	7.967									
Cashflow per employee~	59	669.840	2508.179	-24.222	41.665	254.895	12968.490									
College degree	63	0.318	0.226	0.160	0.265	0.455	1.000									
Personnel costs	63	11.356	0.551	11.015	11.345	11.660	12.857									
ROA <sup>#</sup>	63	0.008	0.113	-0.005	0.021	0.053	0.202									
Employees	63	1.040	1.331	0.054	0.420	1.961	5.066									
Women	63	0.387	0.239	0.182	0.355	0.537	1.000									
Size	63	12.692	2.196	10.988	12.959	14.357	16.595									
LTD	63	0.180	0.169	0.029	0.116	0.332	0.559									
BTM	63	0.678	0.681	0.385	0.617	0.909	2.914									
Layoffs	60	0.035	0.058	0.000	0.015	0.041	0.263									
Training hours	63	4.970	3.853	0.000	5.209	8.848	11.480									
Indefinite term contracts	63	0.978	0.039	0.970	1.000	1.000	1.000									
Employee ratings	63	3.713	0.600	3.500	3.800	3.900	5.000									
Employment rate growth	61	0.002	0.027	-0.013	0.001	0.014	0.047									
Panel B: Pearson correlations																
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) CAR	1.00															
(2) Value add per employee	-0.08	1.00														
(3) Cashflow per employee	-0.00	0.41*	1.00													
(4) College degree	0.29*	0.38*	0.46*	1.00												
(5) Personnel costs	0.09	0.29*	0.03	0.56*	1.00											
(6) ROA	-0.15	0.26*	0.09	-0.21	-0.04	1.00										
(7) Employees	0.00	-0.45*	-0.29*	-0.24	-0.31*	-0.22	1.00									
(8) Women	0.10	0.27*	0.09	0.09	-0.20	-0.17	-0.05	1.00								
(9) Size	0.01	0.08	0.26*	0.28*	0.39*	-0.17	-0.35*	-0.33*	1.00							
(10) LTD	-0.04	-0.03	-0.08	-0.01	0.11	-0.07	-0.10	-0.08	0.35*	1.00						
(11) BTM	0.08	-0.12	0.04	0.00	-0.04	-0.24	0.24	0.03	-0.15	-0.05	1.00					
(12) Layoffs	-0.04	-0.03	-0.08	-0.13	0.08	0.28*	-0.05	0.18	-0.12	-0.26*	-0.26*	1.00				
(13) Training hours	-0.01	-0.16	0.07	-0.09	-0.05	0.22	0.20	-0.31*	0.57*	0.12	-0.12	-0.29*	1.00			
(14) Indef. term contracts	-0.04	0.08	0.27*	0.13	0.07	-0.27*	0.01	-0.15	-0.03	0.12	0.15	-0.24	0.10	1.00		
(15) Employee ratings	-0.00	-0.09	0.19	-0.15	-0.05	0.03	-0.14	-0.07	0.18	0.25*	-0.12	-0.09	0.17	0.01	1.00	
(16) Employment growth	0.07	0.13	0.10	0.20	0.12	0.08	-0.17	0.02	-0.09	-0.06	-0.19	0.17	-0.33*	0.03	-0.24	1.00



**Table 3. Main results**

The table presents the regression results of OLS regressions analyzing the determinants of stock price reactions to the adoption of the four-day workweek. Robust standard errors clustered by two-digit SIC codes are reported between parentheses. \*,\*\* and \*\*\* represent significance at the 10%, 5% and 1% level respectively. Variables are defined in the appendix, Table A1.

VARIABLES	Parameter estimate (standard error)						Feb & June
	February						
	(1)	(2)	(3)	(4)	(5)	(6)	
Intercept	0.043 (0.053)	0.043 (0.051)	0.050 (0.074)	0.080 (0.086)	0.035 (0.056)	0.063 (0.060)	0.040 (0.094)
Value added per employee	-0.006*** (0.002)	-0.006*** (0.002)	-0.006** (0.002)	-0.006*** (0.002)	-0.005*** (0.002)	-0.006*** (0.002)	-0.009*** (0.003)
College degree	0.037** (0.018)	0.039* (0.019)	0.036* (0.019)	0.038** (0.016)	0.037** (0.017)	0.039* (0.021)	0.041* (0.021)
Personnel costs	-0.001 (0.005)	0.000 (0.004)	-0.001 (0.006)	-0.001 (0.005)	-0.001 (0.005)	-0.002 (0.005)	0.001 (0.010)
ROA	0.001 (0.027)	0.003 (0.027)	0.003 (0.034)	0.003 (0.023)	-0.001 (0.027)	-0.000 (0.025)	0.036 (0.059)
Employees	-0.001 (0.003)	-0.002 (0.002)	-0.001 (0.003)	-0.001 (0.003)	-0.001 (0.003)	-0.003 (0.002)	-0.002 (0.004)
Women	0.011 (0.012)	0.012 (0.012)	0.012 (0.015)	0.009 (0.013)	0.010 (0.012)	0.008 (0.012)	0.018 (0.021)
Size	-0.000 (0.001)	-0.002 (0.002)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.004 (0.014)	0.000 (0.003)
LTD	-0.001 (0.016)	0.000 (0.016)	0.003 (0.015)	-0.002 (0.017)	-0.000 (0.016)	-0.001 (0.001)	0.000 (0.032)
BTM	0.002 (0.006)	0.002 (0.006)	0.001 (0.006)	0.002 (0.006)	0.002 (0.005)	0.001 (0.006)	-0.007 (0.013)
Training hours		0.001 (0.001)					
Layoffs			-0.010 (0.056)				
Indefinite term contracts				-0.037 (0.103)			
Employee ratings					0.002 (0.003)		
Employment rate growth						-0.007 (0.100)	
R <sup>2</sup>	0.146	0.154	0.140	0.150	0.149	0.163	0.088
N	63	63	60	63	63	61	63
F-statistic	3.89***	6.53***	3.84***	5.46***	3.33***	3.85***	3.19***
Max VIF	1.88	3.33	2.10	1.93	1.89	2.06	1.88

**Table 4. Main results with cashflow per employee**

The table presents the regression results of OLS regressions analyzing the determinants of stock price reactions to the adoption of the four-day workweek. Robust standard errors clustered by two-digit SIC codes are reported between parentheses. \*,\*\* and \*\*\* represent significance at the 10%, 5% and 1% level respectively. Variables are defined in the appendix, Table A1.

	Parameter estimate (standard error)						
VARIABLES	February						Feb & June
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	0.018 (0.081)	0.014 (0.078)	0.024 (0.099)	0.034 (0.114)	0.017 (0.083)	0.043 (0.090)	-0.052 (0.171)
Cashflow per employee	-0.001*** (0.000)	-0.001*** (0.000)	-0.001** (0.000)	-0.001*** (0.000)	-0.001** (0.001)	-0.001*** (0.000)	-0.003*** (0.001)
College degree	0.042** (0.019)	0.043** (0.020)	0.041* (0.021)	0.042** (0.019)	0.043** (0.020)	0.040* (0.022)	0.048* (0.025)
Personnel costs	-0.001 (0.007)	-0.000 (0.007)	-0.001 (0.009)	-0.001 (0.008)	-0.002 (0.008)	-0.003 (0.008)	0.005 (0.016)
ROA	-0.026 (0.017)	-0.024 (0.019)	-0.025 (0.024)	-0.024* (0.013)	-0.026 (0.017)	-0.025 (0.017)	0.009 (0.051)
Employees	0.002 (0.003)	0.001 (0.003)	0.002 (0.003)	0.002 (0.003)	0.002 (0.003)	0.000 (0.003)	0.001 (0.004)
Women	0.008 (0.015)	0.009 (0.015)	0.008 (0.016)	0.008 (0.015)	0.008 (0.015)	0.004 (0.015)	0.025 (0.025)
Size	-0.000 (0.001)	-0.001 (0.002)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.001 (0.003)
LTD	-0.008 (0.015)	-0.008 (0.016)	-0.005 (0.015)	-0.009 (0.017)	-0.008 (0.015)	-0.003 (0.014)	-0.014 (0.031)
BTM	0.002 (0.006)	0.002 (0.006)	0.002 (0.006)	0.002 (0.006)	0.002 (0.005)	0.002 (0.006)	-0.007 (0.013)
Training hours		0.001 (0.001)					
Layoffs			-0.011 (0.054)				
Indefinite term contracts				-0.020 (0.111)			
Employee ratings					0.002 (0.004)		
Employment rate growth						0.028 (0.124)	
R <sup>2</sup>	0.164	0.167	0.157	0.165	0.166	0.156	0.117
N	59	59	57	59	59	57	59
F-statistic	3.37***	3.12***	3.29***	2.80**	3.17***	3.73***	3.69***
Max VIF	2.44	3.65	2.89	2.54	2.49	2.52	2.44

**Table 5. Four-day workweek initiatives in the OECD countries over the last two years**

The table shows the OECD countries adopting preliminary policy measures related to the four-day week in the last two years. The countries and dates are extracted from <https://buildremote.co/four-day-week/4-day-work-week-countries/>

Country	Year	Policy	Description
Japan	2021	Recommendation	The country's annual economic policy guidelines push employers to adopt four-day workweeks
Spain	2021	Trial	Three-year 32 hour workweek experiment
Scotland	2021	Trial	The ruling Scottish National Party launches four-day workweek trial without loss of pay for employees.
Ireland	2021	Trial	20 firms have signed up to a six-month pilot to trial a four-day workweek
United Kingdom	2022	Trial	Six month trial of four-day workweek for 30 companies

**Table 6. Abnormal returns of listed firms with subsidiaries in Belgium**

The table shows the abnormal returns for 520 listed firms with subsidiaries in Belgium that employ at least 50 people there following the adoption of the four-day week. The event date is the 15<sup>th</sup> of February 2022. The MSCI world index is used as market index. Column 2 shows the mean cumulative abnormal return. Column 4 denotes the percentage of positive cumulative abnormal returns. Column 6 shows the average abnormal stock return of the value-weighted portfolio. Column 8 shows the average abnormal stock return of the equal-weighted portfolio. T-statistics are reported in columns 3, 7 and 9. Z-statistics based on the binomial sign test are reported test in column 5.

Event window	mean	t-stat	positive	z-stat	value weighted portfolio	t-stat	equal weighted portfolio	t-stat
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1) Days (-1,1)	0.005	0.779	0.535	1.579	.001	0.30	.004	0.72
2) Days (-1,0)	0.001	0.238	0.483	-0.789	.002	0.62	.001	0.16
3) Days (0)	0.003	0.738	0.540	1.842*	-.002	-0.59	.005	0.59
4) Days (0,1)	0.007	1.238	0.558	2.631***	-.002	-0.68	.007	1.14

**Table 7. Descriptive statistics international sample**

The table shows the descriptive statistics of the variables used in the cross-sectional analysis focusing on all listed firms with subsidiaries located in Belgium that employ at least 50 people there. Continuous variables are winsorized at the 2.5% level. <sup>#</sup> Even though an industry-correction at the 2-digit SIC level is used for the analysis, we report the original values for maximum transparency. \* in Panel B denotes significance at the 5% level. Variables are defined in the appendix, Table A.1.

Panel A: summary statistics															
	Obs	Mean	St. Dev	Q1	Median	Q3	Max								
CAR	217	0.006	0.018	-0.004	0.005	0.015	0.054								
Value added per employee	217	4.606	0.690	4.196	4.627	5.035	6.950								
Research and development	217	0.010	0.020	0.000	0.003	0.010	0.128								
Personnel costs	217	10.634	1.268	10.664	11.062	11.333	12.312								
ROA <sup>#</sup>	217	0.028	0.054	-0.019	-0.000	0.022	0.219								
Employees	217	3.330	3.198	1.235	2.347	3.759	13.699								
Women	217	0.340	0.143	0.220	0.328	0.446	0.680								
Size	217	16.353	1.465	15.399	16.271	17.540	19.675								
LTD	217	0.253	0.119	0.179	0.243	0.320	0.607								
BTM	217	0.528	0.405	0.249	0.417	0.735	2.439								
Trial countries	217	0.189	0.392	0.000	0.000	0.000	1.000								
Employment change	217	-0.001	0.142	-0.059	-0.014	0.032	0.567								
Social score	217	0.762	0.147	0.679	0.792	0.877	0.941								
Employee ratings	217	3.777	0.324	3.600	3.800	4.000	4.400								
Employment rate growth	199	-0.001	0.023	-0.015	0.002	0.011	0.047								
Panel B: Pearson correlations															
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) CAR	1.00														
(2) Value add. per employee	-0.16*	1.00													
(3) Research and dev.	0.07	0.37*	1.00												
(4) Personnel costs	0.02	0.62*	0.02	1.00											
(5) ROA	-0.18*	0.35*	0.16*	0.09	1.00										
(6) Employees	0.03	-0.58*	-0.28*	-0.18*	0.03	1.00									
(7) Women	0.05	-0.14*	0.09	-0.08	-0.06	0.13*	1.00								
(8) Size	0.02	0.23*	0.34*	0.02	-0.05	-0.33*	0.02	1.00							
(9) LTD	0.07	-0.16*	-0.03	-0.25*	-0.20*	-0.12	0.24*	0.09	1.00						
(10) BTM	-0.03	0.14*	-0.15*	0.19*	-0.15*	-0.13	-0.30*	0.18*	-0.11	1.00					
(11) Trial countries	-0.04	-0.04	-0.05	-0.04	-0.01	0.11	0.09	-0.11	-0.05	-0.09	1.00				
(12) Employment change	-0.21*	0.05	0.15*	-0.15*	0.03	-0.08	-0.08	0.07	0.10	0.00	-0.03	1.00			
(13) Social score	-0.03	0.14*	0.30*	0.06	0.04	-0.03	0.03	0.53*	0.02	-0.00	-0.12	0.06	1.00		
(14) Employee rating	0.05	0.34*	0.30*	0.12	-0.19*	-0.32*	-0.08	0.35*	0.11	0.05	-0.07	-0.02	0.27*	1.00	
(15) Employment growth	-0.23*	-0.10	0.09	-0.08	-0.06	0.32*	0.19*	-0.19*	0.09	-0.12	0.13	0.06	-0.07	-0.03	1.00

**Table 8. Listed firms with subsidiaries in Belgium**

The table presents the regression results of OLS regressions analyzing the determinants of stock price reactions to the adoption of the four-day workweek. Robust standard errors clustered by two-digit SIC codes are reported between parentheses. \*,\*\* and \*\*\* represent significance at the 10%, 5% and 1% level respectively. Variables are defined in the appendix, Table A1.

Parameter estimate (standard error)						
VARIABLES	February					Feb & June
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.013 (0.021)	0.009 (0.020)	0.016 (0.023)	-0.005 (0.023)	-0.001 (0.019)	0.063 (0.039)
Value added per employee	-0.011** (0.005)	-0.011** (0.005)	-0.011* (0.005)	-0.012** (0.005)	-0.008* (0.004)	-0.022** (0.009)
Research and development	0.184*** (0.053)	0.196*** (0.056)	0.201*** (0.054)	0.174*** (0.052)	0.184*** (0.041)	0.303** (0.124)
Personnel costs	0.004*** (0.001)	0.004*** (0.001)	0.003** (0.002)	0.004*** (0.002)	0.003** (0.001)	0.006** (0.003)
ROA	-0.029 (0.034)	-0.030 (0.033)	-0.022 (0.034)	-0.029 (0.034)	-0.040 (0.030)	-0.055 (0.055)
Employees	-0.001 (0.000)	-0.000 (0.001)	-0.001 (0.001)	-0.000 (0.000)	0.000 (0.000)	-0.001* (0.001)
Women	-0.002 (0.013)	-0.003 (0.012)	-0.005 (0.012)	-0.002 (0.012)	-0.003 (0.012)	0.003 (0.023)
Size	0.000 (0.001)	0.001 (0.001)	0.000 (0.001)	-0.000 (0.001)	0.000 (0.001)	-0.001 (0.002)
LTD	0.007 (0.012)	0.008 (0.011)	0.009 (0.012)	0.011 (0.011)	0.016 (0.012)	0.013 (0.019)
BTM	-0.001 (0.004)	-0.001 (0.004)	-0.001 (0.004)	-0.001 (0.004)	-0.001 (0.004)	-0.001 (0.005)
Trial countries	-0.001 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.001 (0.002)	0.000 (0.002)	-0.002 (0.005)
Social score		-0.012 (0.011)				
Employment change			-0.027 (0.020)			
Employee ratings				0.006 (0.005)		
Employment rate growth					-0.187*** (0.065)	
R <sup>2</sup>	0.101	0.106	0.137	0.110	0.158	0.144
N	217	217	215	217	199	217
F-statistic	3.55***	3.46***	4.41***	4.63***	7.78***	2.03*
Max VIF	3.95	3.96	3.98	3.98	4.11	3.95

**Table 9. Listed companies voluntarily introducing the four-day workweek**

The table shows the companies voluntarily introducing the four-day week and the mean cumulative abnormal return of the announcement. The S&P 500, S&P TSX, FTSE 100 and Nikkei 225 are used as market indices for US, Canadian, UK, and Japanese companies, respectively. Companies are extracted from <https://buildremote.co/four-day-week/4-day-work-week-companies/>

Company	Date	Policy	CAR [0,0]
<b>Condensed workweek with same total hours</b>			
Toshiba	04/05/2020	Toshiba announced a four-day workweek from June, maintaining total working hours	0.9%
<b>Shorter workweek with reduction in working hours</b>			
Shake Shack	15/03/2019	Shake Shack moved towards a four-day, 32 hour week, requiring the same amount of work gets done	-3.3%
Microsoft Japan	23/07/2019	Workers in Microsoft Japan received five Fridays off in a row during August	0.2%
Shopify	16/06/2020	Carl Rivera, VP of Product, tweeted that Fridays were off for rest and recovery during summer.	-1.2%
Mizuho Financial Group	07/10/2020	45,000 employees are given the option to work three or four days a week, receiving respectively 60 and 80% of their original salary	0.7%
Unilever New Zealand	01/12/2020	Unilever introduced a 12-month trial at its New Zealand offices where employees would work four days (80%) while getting paid five (100%)	-4.7%***
Panasonic	11/01/2022	Panasonic allows employees to scale down to a four-day week	1.1%

## Appendix

**Table A.1. Variable definitions**

Variable	Definition	Source
Value added per employee	Natural logarithm of the company's added value scaled by its number of employees	Bel-first & Orbis
Cashflow per employee	Decile rank of the cashflow per employee	Bel-first
College degree	Percentage of the total workforce that have a college degree	Bel-first
Personnel costs	Natural logarithm of the personnel costs per employee	Bel-first & Orbis
ROA	Industry-corrected (at the 2-digit SIC level) return on assets	Bel-first & Orbis
Size	Natural logarithm of total assets	Bel-first & Orbis
LTD	Long term debt scaled by total assets	Bel-first & Orbis
Employees	Employees per total assets in million euros	Bel-first & Orbis
Women	Percentage of the total workforce that is female	Bel-first & Eikon
BTM	Book-to-market value	Bel-first & Orbis
Layoffs	Layoffs as percentage of the total workforce	Bel-first
Training hours	Natural logarithm of the annual hours of employee training	Bel-first
Indefinite term contracts	Percentage of the total workforce that has an indefinite term contract	Bel-first
Employee ratings	Company review ratings from current and former employees on a five-point scale	Glassdoor
Employment rate growth	Projected percentage growth rate in employment between 2022-2030 at the 2-digit NACE level in Belgium	Steunpunt Werk (KU Leuven)
Research and development	Employees scaled by R&D expenses	Orbis
Trial countries	Dummy equal to 1 if the headquarter country has recommended or trialed the four-day week.	Orbis
Employment change	Percentage change in the number of employees	Orbis
Social score	Refinitiv's social score	Eikon

**Table A.2. Abnormal returns of the approval**

Panel A denotes the abnormal returns for the sample of Belgian listed firms, while panel B denotes the abnormal returns for the listed firms with subsidiaries in Belgium. The event date is the 17<sup>th</sup> of June 2022. The AEX is used as market index. Column 2 shows the mean cumulative abnormal return. Column 4 denotes the percentage of positive cumulative abnormal returns. Column 6 shows the average abnormal stock return of the value-weighted portfolio. Column 8 shows the average abnormal stock return of the equal-weighted portfolio. T-statistics are reported in columns 3, 7 and 9. Z-statistics of the binomial sign test are reported in column 5.

Panel A: Belgian listed firms								
Event window	mean	t-stat	positive	z-stat	value weighted portfolio	t-stat	equal weighted portfolio	t-stat
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1) Days (-1,1)	0.001	0.078	0.556	1.291	.004	0.91	.000	0.12
2) Days (-1,0)	0.001	0.193	0.563	1.463	.006	1.03	.001	0.22
3) Days (0)	0.004	0.728	0.570	1.635	.011	1.48	.004	0.78
4) Days (0,1)	0.003	0.417	0.541	0.947	.006	1.13	.002	0.48
Panel B: Listed firms with subsidiaries in Belgium								
Event window	mean	t-stat	positive	z-stat	value weighted portfolio	t-stat	equal weighted portfolio	t-stat
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1) Days (-1,1)	-0.020	-2.324***	0.285	-9.823***	-.005	-2.00**	-.013	-1.90*
2) Days (-1,0)	-0.015	-2.065***	0.302	-9.03***	-.004	-1.20	-.012	-1.48
3) Days (0)	0.001	0.146	0.598	4.473	.004	0.94	.009	0.76
4) Days (0,1)	-0.005	-0.678	0.490	-0.439	-.002	-0.56	-.002	-0.29