It’s all in the mix: Determinants and consequences of workforce blending in call centres

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Abstract
Supplementing the full-time permanent workforce with part-time staff is a widespread practice among firms. To better understand this dynamic, we evaluate how work organization choices influence the degree of part-time use by analysing North American survey data from call centre establishments. We also evaluate the effect of part-time use on the voluntary turnover behaviour of the full-time permanent workforce. For example, firms with greater reliance on a high involvement approach to work organization relied less on part-time use than those pursuing a low involvement approach. For firms that choose to rely heavily on part-time use, we find that this decision has consequences for their full-time permanent workforce, namely higher voluntary turnover among their full-time permanent staff. Interestingly, greater reliance on a high involvement approach appears to weaken the positive relationship between part-time use and voluntary turnover among the full-time employees.

Keywords
high involvement work organization, part-time employment, participation and workplace democracy, voluntary turnover

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Over the past two decades, the part-time workforce expanded rapidly in many advanced economies (Houseman and Osawa, 2003). While this growth and the factors explaining it are well documented (Kalleberg, 2000), relatively few studies evaluate whether part-time use is related to work organization choices. For example, organizations that choose to invest in human resource practices and empower their employees may be better suited to low reliance on part-timers as opposed to organizations that adopt a more standardized approach to managing their employees. Thus, work organization choices may be an important factor to consider when deciding how extensively to use part-time work arrangements. The growth in the part-time workforce is accompanied by an increasing likelihood that part-time employees are working alongside the full-time workforce in a practice known as workforce blending (Davis-Blake et al., 2003). Yet, extensive research on these arrangements (Hirsch, 2005; O’Reilly and Fagan, 1998; Uzzi and Barsness, 1998) also tends to overlook how supplementing the full-time workforce with other types of employment arrangements affects the behaviours of the full-time workforce.

We remedy these oversights by addressing three research questions. First, what influence do work organization strategies have on the degree of reliance on part-time staff? Second, how does the degree of part-time use affect voluntary turnover rates among the full-time workforce? Third, to what extent does the influence of part-time use on voluntary turnover among full-timers differ depending on how a firm organizes work? We argue that work organization choices may influence the degree of part-time use, and that variation in part-time use may affect voluntary turnover among the full-time workforce. We examine these questions with survey data from call centre establishments in North America. These questions are especially important in this context because our fieldwork revealed that call centres often choose part-time arrangements to supplement their full-time workforce, and managers in North America have considerable freedom in choosing how to organize work.

Call centres are useful for investigating differences in configurations of part-time use and work organization given scheduling pressures and fluctuations in call volume. Although there is some debate about the extent of variation in work organization across call centres (Glucksman, 2004; Taylor and Bain, 2007), some research has shown that work organization does vary across call centres depending on the type of work the call centre is engaged in, and the type of customer it serves (Batt, 1999; Holman, 2003; Houlihan, 2002).

Approaches to organizing work run the gamut from involving employees in meaningful ways in the production process, to exerting a high level of control over them (Frenkel, 1999; Frenkel et al., 1998). The low cost approach to work organization where work is highly standardized with widespread electronic surveillance represents one common approach found in call centres (Frenkel et al., 1998). The extensive management control associated with this approach may be well suited to heavy reliance on part-time use to ensure consistency across employees. Another way to organize work focuses on customizing customer service by emphasizing employee involvement. Choosing to rely heavily on part-timers might be less suitable against the backdrop of employee involvement because it could undermine, for example, team-based initiatives. It is also possible for call centres to adopt a high involvement management approach to improve customer service, while, at the same time, maintaining a highly controlled work environment...
(Kinnie et al., 2000). We capture this heterogeneity by examining two separate dimensions of work organization that are relevant to the call centre context: (i) the extent of employee involvement; and (ii) the level of standardization.

In this article, we consider the degree of part-time use in organizations informed by Uzzi and Barsness (1998), who showed that the degree of part-time use has a differential effect on the determinants of part-time use across establishments in the UK using the Workplace Industrial Relations Survey (WIRS). Consistent with Uzzi and Barsness’s (1998) approach, we categorize call centre establishments according to the extent they rely on part-time use. This categorization enables us to evaluate the theoretical propositions Lautsch (2002) outlines, suggesting that the motivation for firms to use non-standard employment contracts, whether it is to reduce labour costs or to increase flexibility, has an influence on how work is organized.

In comparison with organizations that are heavy part-time users, we expect organizations that rely less on part-timers to have different motivations for part-time use. In turn, these motivations may be related to decisions regarding how work is organized. We argue that low reliance on part-time use suggests an employer’s desire to increase flexibility whereas heavy part-time use represents a cost reduction strategy.

Our contributions are threefold. First, we examine whether organizations’ choices regarding work organization are related to part-time use, offering insights about the potential unintended consequences of part-time use. A mismatch could arise between the work organization approach and certain levels of part-time use. Our research design enables us to examine the complexities of part-time use, taking into consideration contextual factors such as work organization. Second, our survey data enables us to examine the influence of part-time use on a front-line service occupation at a non-managerial rank. Previous studies generally evaluate the effects of a multi-tier workforce segmentation strategy rather than a workforce blending strategy, using firm (establishment) level data compiled from various kinds and levels of jobs (Lepak and Snell, 2002). Third, we evaluate how part-time use affects the behaviours (e.g. voluntary turnover) of the full-time customer service workforce (Thorsteinson, 2003), in contrast to extant research that primarily concentrates on how using non-standard employment arrangements affects the attitudes of the full-time workforce (Broschak and Davis-Blake, 2006). Taken together, these contributions shed light on how the decision to supplement the full-time workforce with non-standard employment contracts is a complex one.

**Variation in work organization**

How firms organize work depends on whether they are competing on cost, quality, innovation, or customization (Appelbaum and Batt, 1994). Classic approaches to work organization in the service context include: (i) high involvement (Lawler, 1986) and (ii) mass production (Levitt, 1976). High involvement work organization features jobs that have greater discretion, foster collaboration, and offer greater job security which, in turn, can lead to improvements in organizational performance (Lawler, 1986; Pfeffer, 1998).

Tensions do exist among elements within the high involvement approach (Appelbaum and Batt, 1994). For example, collaborative initiatives such as self-directed teams and
quality circles are both team-based initiatives, but each empowers employees in different ways, and to varying degrees (Batt, 2002; Batt and Moynihan, 2002; Lawler, 1992). Quality circles are derived from total quality management (TQM) theory (Deming, 2000) and are based on the notion that employees who are most familiar with the production process have the knowledge necessary to solve production problems, and to improve the production process (Batt and Colvin, 2011; Batt and Moynihan, 2002). Organizing these employees into quality circles encourages them to collaborate in an effort to facilitate better solutions (Batt and Colvin, 2011). Through these offline periodic meetings, employees can influence the managerial decision-making process, although the managers retain the decision-making power (Batt, 1999). In contrast, self-directed teams emerged from socio-technical systems (STS) theory, and involve pushing the decision-making power down to the employee level (Trist and Bamforth, 1951). Self-directed teams foster autonomy among employees, who are organized into online teams (Batt and Colvin, 2011). Given the different dynamics associated with teams within the high involvement conceptualization raises the question of how this plays out in practice. When these two distinct approaches are mixed into a system it may be difficult to determine whether, or to what extent, employees substantially exercise autonomy in the labour process.

Critics also question whether these initiatives are a way to extract more effort from the workforce by intensifying the work process through increased discretion and employee involvement (Godard, 2004; Legge, 1995; Ramsay et al., 2000). Further complicating these debates are the differences in definitions across studies, and piece-meal adoption of high performance work practices (Batt and Colvin, 2011; Godard, 2004; Ichniowski and Shaw, 1999).

Alternatives to the high involvement approach exist. One of the most popular options, the mass production approach, has its roots in Taylorism and, as such, jobs feature low discretion and a high level of management control exercised through script use, and extensive electronic monitoring (Batt, 1999). We refer to this model as high intensity work organization (Batt and Colvin, 2011). While this approach can maximize the volume of production, and reduce labour costs to a great extent, it has an obvious downside of creating repetitive jobs that demotivate workers, thereby increasing turnover (Deery et al., 2002).

From the strategic human resource management literature, we know that these work organization practices, namely high and low involvement, and high and low intensity, are not necessarily mutually exclusive (Batt et al., 2005). Especially in the customer service context with competition from international outsourcing options, a firm adopting a high involvement approach can also incorporate some cost reduction strategies, so it is misleading to view a high involvement work organization strategy as being the opposite of a high intensity work organization strategy. In the next section, we examine research undertaken in call centres regarding work organization.

Work organization in call centres

Early studies of work organization in call centres described them as ‘electronic panopticons’ and ‘dark satanic mills’, indicating that a high intensity approach to work organization would be commonplace (Fernie and Metcalf, 1998; Garson, 1988). Indeed, call
centre managers have technological tools such as performance metrics and electronic monitoring to control the work process (Taylor et al., 2002). However, these technological tools in combination with frequent customer interactions can result in high levels of burnout, absenteeism, and voluntary turnover (Batt, 2002; Deery et al., 2002).

Subsequent research efforts showed that call centres were far less homogeneous than previously thought (Batt and Moynihan, 2002; Frenkel, 1999; Houlihan, 2002; Korczynski, 2002; Taylor and Bain, 2001, 2002). Attempts to explain what drives this variation concentrate on the product markets they serve, the nature of the work, and customer segmentation. These insights improve our understanding about why employee outcomes are better in some call centres relative to others (Batt and Moynihan, 2002; Frenkel, 1999; Korczynski, 2002; Taylor and Bain, 2001, 2002). Researchers continue to debate what drives variation among call centres (Glucksman, 2004; Russell, 2009; Taylor and Bain, 2007).

The intersection of the high performance work literature with the call centre literature yields a research stream examining the degree to which high performance work practices are compatible with the call centre context, where electronic monitoring and standardization are widespread. Some argue that call centres are an unlikely setting for high involvement work organization. Proponents of this position argue that common high involvement features such as teams are unlikely to be present in call centres in a meaningful way, describing the teams that are present in call centres as ‘teams without teamwork’ (Russell, 2009; Van den Broek et al., 2004). That is, employers organize customer service representatives into what employers describe as teams, but the degree of integration and empowerment among what are referred to as team members is limited in these workplaces, where high managerial control is exercised through intensive use of technology (Russell, 2009; Van den Broek et al., 2004).

Meanwhile, other researchers have suggested that high involvement approaches to work organization are present in call centres (Batt, 2002; Batt and Colvin, 2011; Batt and Moynihan, 2002; Frenkel et al., 1998; Holman et al., 2005). While they acknowledge that a high involvement approach could, at first glance, appear to be in conflict with the standardized and routinized nature of these jobs, a high involvement approach can help offset the boredom of these highly individualized jobs (Deery et al., 2002). In centres serving high value customers, worker empowerment through a high involvement approach can enhance service quality because employees can customize their service to fulfill customer needs (Batt, 2002; Batt and Moynihan, 2002). Some studies in call centres have also found evidence of a hybrid approach combining elements of a mass production strategy with a high involvement approach (Batt, 1999; Frenkel et al., 1998).

Considering that elements of both work organization approaches can be present to some degree in call centres, it is important to examine how these configurations of control and empowerment relate to part-time use. In this article, we build on these efforts to advance the understanding of the relationship between work organization and part-time use, and the consequences of part-time use for the full-time workforce.

**Part-time use and work organization**

The compatibility of part-time use and how work is organized is a critical concern in call centres. Scholars debate whether a high involvement approach is compatible with
the use of non-standard work contracts (Hunter et al., 1993). Some argue that firms pursuing a high involvement approach should build internal flexibility into their workforce by, for example, cross-training full-time permanent employees as opposed to relying on non-standard employment arrangements to respond to changes in product demand (Atkinson, 1984). Alternatively, other scholars draw on the core-periphery hypothesis and suggest that a high involvement approach to work organization is compatible with non-standard use. Non-standard workers can be shed easily, thus protecting the job stability, compensation levels, and mobility opportunities of the core full-time workforce (Thompson, 1967). Empirical evidence is mixed regarding the relationship between a high involvement approach and the use of non-standard employment contracts (Cappelli and Neumark, 2001; Osterman, 1987).

Lautsch (2002) offers a way to reconcile these views. Using internal labour market theory, she proposes that the motivations for why firms are resorting to non-standard use, that is, whether it is to reduce labour costs or to achieve greater flexibility, influences how work is organized. Thus, in workplaces where flexibility is driving non-standard use, full-time and non-standard employees are likely to be closely integrated in the workplace, and low reliance on non-standard use is a more attractive option. Conversely, when cost pressures are driving non-standard use and non-standard use is likely to be widespread, Lautsch suggests that work should be organized in such a way as to reduce the disruption in the event that these part-time workers will need to be downsized.

While cost or flexibility considerations could influence the decision to use non-standard workers, it is also helpful to view the relationship between part-time use and work organization through the psychological contract lens. How work is organized communicates expectations and obligations that are part of the employment relationship, referred to as the psychological contract (Rousseau, 1995). This perspective involves the employment relationship being viewed as an implicit exchange between organizations and the employees who work for them (Argyris, 1960).

High involvement work organization signals employees about the nature of their exchange with their employer through a certain level of investment in job security, training and compensation (Tsui et al., 1997; Zatzick and Iverson, 2006). Thus, the full-time workforce in the high involvement context could view heavy reliance on part-time employees as violating their psychological contract because it could indicate a weakening commitment on the employers’ behalf to job security and support for the full-time regular workforce (George, 2003), which in turn could undermine a high involvement approach. In an individual level study examining the effect of using non-standard employees on the attitudes of the full-time workforce, George (2003) found that the extent and duration of externalization (e.g. use of non-standard workers) were negatively related to full-time employees’ levels of trust, organizational commitment, and psychological contract with organizations.

Based on theory, and extrapolating from empirical evidence, we expect that firms adopting high involvement work organization will use part-timers to a lesser extent than firms pursuing a low involvement approach. This managerial choice can signal employees that part-timers are being hired to support full-timers in a supplemental manner, and should not be viewed as altering the psychological contract between the employer and the full-time workforce.
Thus, we hypothesize:

*H1a*: Greater use of a high involvement approach to work organization is negatively associated with heavy part-time use.

*H1b*: Greater use of a high involvement approach to work organization is positively associated with low levels of part-time use.

The psychological contract perspective can also explain the relationship between a high intensity approach to work organization and part-time use. A high intensity approach to work organization is likely to result in employees having lower expectations regarding pay, benefits and advancement opportunities. As a result, the hiring of part-time staff is less likely to be viewed as undermining the psychological contract with the full-time staff because the full-time workforce is less attached to the organization in the first place. Because part-time use in this context is more likely to be motivated by cost reduction, we expect that a high intensity approach to work organization will be related to heavy reliance on part-time use as opposed to light or no part-time use.

*H1c*: Greater use of a high intensity approach to work organization has a stronger association with heavy part-time use than with low levels of part-time use.

**Relationship between part-time use and voluntary turnover**

On a daily basis in the workplace, part-timers interact with the full-time permanent workforce. Yet, few studies focus on the consequences of workforce blending for the full-time workforce. Among those that do examine workforce blending, they concentrate on whether the extent of reliance on non-standard employment arrangements affects the *attitudes* as opposed to the *behaviours* of the full-time workforce. For example, Davis-Blake et al. (2003) found that supplementing the full-time permanent workforce with temporary workers increased full-time turnover intentions, but using contractors did not have the same effect. They explained the positive relationship between temporary work use and full-time turnover intentions as an outcome of temporary workers being administratively closer to the full-time workforce than contractors, making their presence more salient to full-timers (Davis-Blake et al., 2003). Extrapolating from these findings, part-timers are in close proximity to full-time staff, and so, we expect a greater reliance on part-time use to be positively related with actual turnover among the full-time permanent workforce.

In a follow-up study undertaken in a financial services firm, Broschak and Davis-Blake (2006) examined the composition of workgroups, that is, the proportion of non-standard in relation to full-time permanent employees. They found that workgroups with higher proportions of non-standard employees reported higher levels of turnover intentions among workgroup members, and reported stronger negative effects on work group relations, supervisor–subordinate relations and work-related helping behaviours. They also found that the effects of heterogeneity in employment contracts were larger for
individuals in lower level jobs. They explained these findings using Blalock’s theory on minority-group relations that suggests that greater heterogeneity in work groups can have negative psychological and social consequences for majority members of the workgroup (Blalock, 1967). These efforts to examine the interplay between non-standard and full-time permanent employees suggest that the proportion of the workforce that is non-standard can negatively influence the attitudes of the full-time workforce (Broschak and Davis-Blake, 2006; Davis-Blake et al., 2003; George, 2003).

Building on this line of reasoning, we suggest that the proportion of part-timers in the workforce could influence the turnover behaviours of the full-time workforce, with heavy reliance having a stronger effect on voluntary turnover than marginal part-time use. There are several explanations for why extensive reliance on part-time staff could influence voluntary turnover among the full-time permanent staff. First, part-time staff are, according to partial inclusion theory, less integrated in the workplace than the full-time workforce. Partial inclusion theory proposes that part-time employees spend less time in the workplace and prioritize their non-work roles outside of the workplace (Katz and Kahn, 1978).

This line of reasoning also dovetails with the psychological contract perspective. Full-time permanent employees have expectations about support from their co-workers. If their co-workers are increasingly part-time staff, they may view that as a breach of the psychological contract because part-time use is increasing their workload and supervisory responsibilities (George, 2003). Part-time staff also receive less training and are screened less carefully in the hiring process (Walsh, 2007). The difficulty for the full-time permanent workforce in workplaces with extensive reliance on part-time use is that part-time employees can miss important information and increase the workload for the full-time permanent workforce, whom the part-time staff rely on for assistance (Walsh, 2007). Moreover, increasing reliance on part-timers could signal that the employer is trying to reduce labour costs by replacing full-time staff with part-timers, thus reneging on its obligations to the full-time workforce regarding job security.

Extrapolating from these studies and from theory, we expect that extensive reliance on part-time use will be positively related to voluntary turnover. Moreover, we expect heavy part-time use to have a stronger effect on voluntary turnover among full-time staff than does light part-time use.

\[ H2a: \text{Heavy part-time use will be positively related to voluntary turnover.} \]

\[ H2b: \text{Heavy part-time use will have a stronger effect than light part-time use on voluntary turnover.} \]

Work organization could also influence the relationship between part-time use and voluntary turnover. The adoption of a high involvement approach to work organization tends to increase the employer’s motivation to more closely integrate part-time and full-time employees. In the high involvement environment, the employer has more incentive to preserve their psychological contract with the full-time regular workforce. Thus, it is in the employer’s interest to avoid giving the full-time workforce the impression that the part-time workforce is replacing them. The full-time workforce could decide to quit if they believe that their psychological contract is being violated. One
way to avoid this problem is by integrating part-time employees with the full-time workforce. This integration can help ensure the sustainability of a high involvement approach and is critical to team-based initiatives, common features of a high involvement work organization. Through this integration, employers can signal the full-time regular workforce that the use of non-standard work arrangements is for flexibility as opposed to cost reduction purposes. For these reasons, in work environments featuring heavy part-time use and a high involvement approach, the part-time workforce is more likely to be closely integrated with the full-time workforce to avoid the impression that the part-time workforce is a substitute for the full-time workforce. Therefore, we expect that the positive effect of heavy part-time use on full-time voluntary turnover will be mitigated by a high involvement approach:

H3: Greater reliance on a high involvement approach will mitigate the positive relationship between heavy part-time use and full-time voluntary turnover.

Meanwhile, the high intensity approach is unlikely to influence the positive relationship between heavy part-time use and the voluntary turnover rates of the full-time workforce because the work organization choices in the high intensity context account for high levels of employee churn.

Data and method

Call centre establishments in North America were the population for this study. The establishment level of analysis is considered more reliable than corporate level surveys because managers are more familiar with the establishments they work in (Gerhart et al., 2000). We surveyed US call centre managers in 2003 (response rate = 68%) and Canadian call centre managers between February 2005 and July 2006 (response rate = 77%).

Both the Canadian data and the US data were collected using a telephone survey administered by the Survey Research Institute at Cornell University. This data collection effort was part of a large scale project, the Global Call Centre Project (Batt et al., 2009). In order to participate in the study, centres needed to employ at least ten employees, and each eligible call centre selected an individual (e.g. contact centre manager, site director) most familiar with daily operations to complete the survey. We asked about working conditions for typical employees who represent their core front-line service employees – i.e. customer service representatives (Osterman, 1994). For multivariate analyses, our sample consists of 792 establishments (US: 444; Canada: 348).²

We engaged in site visits and pilot tested the survey to ensure the validity and reliability of our measures. In both Canada and the US these site visits involved interviews and focus groups with managers, supervisors, and customer service representatives. In both countries, we visited 20 call centres between 2004 and 2006 that varied on several dimensions, including the nature of work, ownership status, type of customer segment served, industry, and union status. We also interviewed representatives from unions, employer associations and economic development agencies. These site visits gave us a first-hand sense of variation in work practices across call centres and about how call centres organize work.
Method

Dependent variables

Our analysis includes two dependent variables: (i) degree of part-time use and (ii) annual full-time voluntary turnover rate. We identify part-timers who are on a permanent contract. This approach helps us control for the considerable differences within the part-time employment category (Tilly, 1996).

We measure part-time use with three categories: no part-time use, light part-time use (less than 10 percent), and heavy part-time use (greater than 10 percent) because varying degrees of part-time use can have differential determinants and consequences (Uzzi and Barsness, 1998). For example, Uzzi and Barsness (1998) in a study of the determinants of fixed term contractor and part-time use by UK public and private sector firms showed that the determinants of part-time use can change depending on the degree of part-time use.

We used the 10 percent threshold to distinguish between firms that are light part-time users and those that are heavy part-time users because national statistics in the US and Canada indicate that part-time employment represents 13 percent (Canada) and 18 percent (US) of total employment (Organisation for Economic Co-operation and Development, 2004). Given that our narrowly defined part-time measure includes only part-timers on permanent contracts, the 10 percent threshold reflects an organization’s considerable reliance on part-time employment. We present the summary statistics for each category in Table 1.

The second dependent variable, annual voluntary turnover for the full-time workforce, indicates the percentage of workers who quit voluntarily in the past year. With respect to voluntary turnover, managers were asked to limit their answer to their full-time core employees, that is, customer service representatives. We asked managers the following question: ‘We want to ask you about the turnover of permanent core full-time employees. In the last year, what percent of your permanent core employees quit.’ The average full-time voluntary turnover rate among firms in our sample was 13.6 percent.

Independent variables

We created our high involvement work organization index by measuring the use of self-directed teams, quality improvement teams, and the extent of employee discretion (Batt and Colvin, 2011). 

Self-directed teams is the percentage of workers in online semi-autonomous teams. 
Problem-solving groups is the percentage of workers involved in offline groups with supervisors or managers to discuss various work related issues.

The discretion scale (MacDuffie, 1995) is the average of six items measuring the extent (from none (1) to complete (5)) to which employees have task and interaction discretion over the daily tasks they perform, what they say to customers and the speed at which they work (α = .77). The discretion scale comes from the organizational behaviour field and has been used in the call centre context (Holman et al., 2002; Wood et al., 2006). Because each variable is measured on a different scale, we created a standardized variable for each one and summed them all to generate the high involvement work organization index. The greater the score is, the higher the degree of involvement.
We measured high intensity work organization with an index based on the extent of electronic monitoring, the extent of script use and the average number of calls customer service representatives handle per day. **Electronic monitoring** is the percentage of core employees’ daily work activities that are monitored continuously. This measure is relevant because we noticed in our site visits quite a range in the degree of real-time electronic monitoring in use in call centres. The **extent of reliance on scripted interactions** reflects how much core employees rely on scripted texts when interacting with customers, measured on a five-point Likert scale (Batt and Colvin, 2011). The high intensity work organization index is also based on standardized variables. A higher score on this scale indicates a more intensive work organization.

Previous call centre studies used these measures and validated them (Batt, 2002; Wood et al., 2006). In addition, our site visits and pilot tests confirmed their relevance in this context. It is noteworthy that the terms designating high intensity and high involvement work organization are not mutually exclusive both conceptually and empirically as we recognize that call centres can have dimensions of work practices that are both high in involvement and work intensity within the same workplace (Kinnie et al., 2000; Taylor and Bain, 2002). Finally, in order to examine the role these choices have regarding work organization in the relationship between part-time use and turnover rates, we created an interaction between: (i) high intensity work organization and (ii) part-time use.

**Control variables**

We control for national, organizational, workforce, and market characteristics that previous research has shown to be related to our dependent variables. We include a country variable indicating whether the data are from Canada or the US to acknowledge institutional differences such as variation in labour and employment law (Colvin, 2006; van Jaarsveld et al., 2009). We control for **in-house status, union presence** and **customer segmentation** – whether or not the firm handles mass market customers because previous research has shown that they influence our dependent variables (Batt, 2002; Houseman, 2001; Uzzi and Barsness, 1998). In addition, we consider the influence of industry sector. For example, the retail industry is known for being the most cost sensitive, with long operating hours (Batt et al., 2005), and its workforce is highly mobile relative to call centres in other industries. Finally, we control for **labour market characteristics** such as

**Table 1. Distribution of categorical dependent variables: Degree of part-time use.**

<table>
<thead>
<tr>
<th>Category</th>
<th>Range</th>
<th>Number of observations in range</th>
<th>Mean of observations in range</th>
<th>Median of observations in range</th>
</tr>
</thead>
<tbody>
<tr>
<td>No use</td>
<td>0%</td>
<td>297 (37.5%)</td>
<td>.00%</td>
<td>0%</td>
</tr>
<tr>
<td>Low use</td>
<td>&lt;10%</td>
<td>212 (26.8%)</td>
<td>4.60%</td>
<td>4.35%</td>
</tr>
<tr>
<td>Heavy use</td>
<td>≥10%</td>
<td>283 (35.7%)</td>
<td>41.97%</td>
<td>28.57%</td>
</tr>
</tbody>
</table>

Note: N = 792. The values in parentheses are standard deviations.
unemployment rates, *demographic workforce characteristics* such as the education level of the workforce, and the percentage of female employees in the core customer service representative workforce (Houseman, 2001; Lautsch, 2002).

**Analytical strategy**

In the first part of our analysis, we use Multinomial Logit analysis to estimate the relationship between the type of work organization and degree of part-time use. This method involves simultaneously estimating binary logits for all possible comparisons among outcome categories: \( \log(P(\text{degree} = \text{light use})/P(\text{degree} = \text{no use})) \) and \( \log(P(\text{degree} = \text{heavy use})/P(\text{degree} = \text{no use})) \). This method is appropriate because our dependent variable, degree of part-time use, has multiple categories (Long, 1997) and because our focus is on the choice of one category over others in terms of the degree of part-time use. In other words, we use the Multinomial Logit model to estimate a discrete choice (Long, 1997). In the second part of our analysis, we estimate full-time voluntary turnover using Tobit regression because Ordinary Least Squares regression produces biased estimates when used with censored data (Long, 1997).

**Results**

**Descriptive statistics**

In Table 2, we present means and bivariate correlations for the variables. From the correlation matrix, we find initial support for Hypothesis 1a, predicting a negative relationship between the high involvement approach and heavy part-time use. We also find initial support for Hypotheses 2a regarding the positive relationship between heavy part-time use and turnover rates. We investigate these relationships further in our multivariate analysis.

**Multivariate analysis: Part-time use and work organization**

We report our findings from our multivariate analysis in Table 3, assessing whether the type of work organization a firm adopts is related to the degree of part-time use. We predict the degree of part-time use with work organization strategies, human resources practices, and organizational, workforce and labour market characteristics (Table 3, Column 1-4). The coefficients in this analysis should be interpreted as the log of the ratio of the probability of choosing one option over the reference of no part-time use (Long, 1997).

When reporting Multinomial Logit results, we include the *relative risk ratio* (RRR) in Table 3, indicating the risk ratio of belonging to a group employing a specific level of part-timers relative to the referent group of no part-time use given a 1-unit change in the independent variable. In Table 3, we present: (i) the Multinomial Logit results, (ii) the Ordered Logit results with the degrees of part-time use being ordered, and (iii) the Tobit results using a continuous part-time variable. The Multinomial Logit approach is consistent with our theoretical assumptions and enables us to assess different
<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<th>13</th>
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<th>15</th>
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<tbody>
<tr>
<td>1. Full-time voluntary turnover</td>
<td>13.60</td>
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<td>-.07*</td>
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<td>14. % female</td>
<td>67.40</td>
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<td>-.01</td>
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<td>.15*</td>
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<td>.16*</td>
<td>-.03</td>
<td>.13*</td>
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<td>15. Country (US = 1)</td>
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<td>-.24*</td>
<td>-.21*</td>
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<td>.34*</td>
<td>-.03</td>
<td>-.12*</td>
<td>-.17*</td>
<td>.12*</td>
<td>-.10*</td>
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Note: \( N = 750 \). * \( p < .05 \).
relationships between our dependent variables and varying levels of part-time use. To justify our decision to use the Multinomial Logit approach, we also present the Ordered Logit and Tobit results in Table 3 to illustrate that the patterns when examining specific levels of part-time use using these analytical alternatives are fairly consistent.

### Table 3. Determinants of the degree of part-time use.

<table>
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<tr>
<th></th>
<th>Multinomial logit (Base: no part-time use)</th>
<th>Ordered logit</th>
<th>Tobit</th>
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<tr>
<td></td>
<td>Coef. RRR</td>
<td>Coef</td>
<td>Coef</td>
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<td>Low part-time use</td>
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<td>High part-time use</td>
<td>% part-time use</td>
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<td>Degree of intensity</td>
<td>.209 1.233</td>
<td>.866 2.376</td>
<td>.694 1.25</td>
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<td></td>
<td>(.181)</td>
<td>(.171)</td>
<td>(.127)</td>
</tr>
<tr>
<td>Degree of involvement</td>
<td>−.825 .438</td>
<td>−.709 .492</td>
<td>−.515 −.099</td>
</tr>
<tr>
<td></td>
<td>(.172)</td>
<td>(.167)</td>
<td>(.123)</td>
</tr>
<tr>
<td>Union</td>
<td>−.369 .691</td>
<td>−.312 .732</td>
<td>−.184 −.018</td>
</tr>
<tr>
<td></td>
<td>(.301)</td>
<td>(.287)</td>
<td>(.217)</td>
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<td>In-house</td>
<td>−.738 .478</td>
<td>−.754 .471</td>
<td>−.447 −.075</td>
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<tr>
<td></td>
<td>(.266)</td>
<td>(.255)</td>
<td>(.180)</td>
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<td>Mass market</td>
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<td>.825 2.283</td>
<td>.575 .093</td>
</tr>
<tr>
<td></td>
<td>(.206)</td>
<td>(.204)</td>
<td>(.147)</td>
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<tr>
<td>Retail</td>
<td>−.245 .783</td>
<td>.442 1.556</td>
<td>.453 .114</td>
</tr>
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<td></td>
<td>(.264)</td>
<td>(.239)</td>
<td>(.180)</td>
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<tr>
<td>Unemployment rate</td>
<td>−.143 .867</td>
<td>−.147 .863</td>
<td>−.094 −.010</td>
</tr>
<tr>
<td></td>
<td>(.058)</td>
<td>(.055)</td>
<td>(.040)</td>
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<td>Education</td>
<td>−.528 .590</td>
<td>−.618 .539</td>
<td>−.479 −.073</td>
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<td></td>
<td>(.268)</td>
<td>(.280)</td>
<td>(.205)</td>
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<td>Training</td>
<td>−.009 .991</td>
<td>−.016 .984</td>
<td>−.013 −.003</td>
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<td></td>
<td>(.006)</td>
<td>(.006)</td>
<td>(.004)</td>
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<tr>
<td>% female</td>
<td>−.099 .905</td>
<td>1.112 3.041</td>
<td>.937 .145</td>
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<td>(.448)</td>
<td>(.474)</td>
<td>(.342)</td>
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<td>−1.307 .271</td>
<td>−.920 −.105</td>
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<td>(.223)</td>
<td>(.221)</td>
<td>(.158)</td>
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**Model summary**

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<td><strong>Pseudo R²:</strong></td>
<td>.233</td>
<td>.14</td>
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Note. Standard errors are in parentheses.
We find support for Hypothesis 1a predicting that greater use of a high involvement work approach is negatively associated with high part-time use. Regarding the high involvement approach, the log of the ratios of two probabilities (P(heavy use)/P(no use)) is −.709 (Table 3, Column 3-4, Row 2, \( p < .01 \)). In other words, a 1-unit increase in a high involvement approach measure reduces the relative risk of being in the high part-time use group over being in the no part-time use group by .5 times, all other things being equal (RRR = .492, Table 3, Column 3-4, Row 2). Thus, if a firm increased their high involvement approach, they would be expected to avoid the use of part-timers rather than using them extensively.

We found no support for Hypothesis 1b predicting that greater use of the high involvement strategy would be related to low levels of part-time employment. In our analysis, a 1-unit increase in high involvement work organization reduces the relative risk of engaging in light part-time use by .44 times compared to no use (coefficient (P(low use)/P(no use)) is −.825 and RRR = .438 (Table 3, Column 1-2, Row 2, \( p < .01 \))). In general, establishments adopting high involvement work organization tend to prefer to use full-time employees exclusively as opposed to supplementing them with any level of part-time use. We do find support for Hypothesis 1c, expecting that a high intensity approach is associated with greater reliance on high part-time use (Table 3, Model 2, Column 3-4, \( p < .01 \)). A 1-unit increase in the high intensity strategy will increase the log of the ratio of two probabilities (P(heavy use)/P(no use)) by .866 (Table 3, Model 2, Column 3-4, \( p < .01 \)). In general, a high intensity approach to work organization is associated with extensive part-time use as opposed to solely relying on a full-time regular workforce. Interestingly, a high intensity approach does not appear to differentiate between the probability of no part-time use and low part-time use. This finding supports our reasoning that the cost-driven motivation for a high intensity approach has a much stronger relationship with heavy part-time use. Meanwhile, the relationship between a high intensity approach and lower part-time use is statistically insignificant, and this result reflects that the interest of low part-time users lies in representing the employers’ interest in enhancing flexibility rather than cost reduction.

Among our control variables, we found that in-house firms are less likely to rely on part-time staff than outsourced firms. Also noteworthy, centres that serve mass market customers, meanwhile, are more likely to be light or heavy part-time users than are centres serving business clientele. We interpret this seemingly contradictory finding as suggesting that business clientele are more likely to prefer a full-time regular workforce without supplementing it with any part-time staff. Meanwhile, centres serving mass market customers are more likely to focus on cost reduction and, as such, any level of part-time use is preferable to solely relying on full-time staff. Centres with a higher share of women are more likely to be heavy part-time users, whereas centres with a better educated or better trained workforce are less likely to hire part-timers. In addition, we found that local unemployment rates and the country variables that reflect local labour market conditions and national institutional differences affect firms’ choices regarding the different degrees of part-time use.

We present two alternative models using Ordered Logit and Tobit analysis in Table 3 to justify our focus on examining the degree of part-time work. We found that both alternative models resembled the results from the Multinomial Logit analysis.
Multivariate analysis: Relationship between part-time use and voluntary turnover

In Table 4, we present our analysis predicting annual full-time voluntary turnover with work organization strategies (e.g. high involvement and high intensity), the degree of part-time use, and our control variables (Table 4, Model 3).

In Hypothesis 2a, we predicted that high part-time use would be positively related to full-time voluntary turnover. Our results for the full multivariate model still support this hypothesis (Table 4, Model 3, Row 2) and are consistent with the simpler models (Table 4, Models 1 and 2).

In Hypothesis 2b, we predicted that high part-time use would have a stronger effect on voluntary turnover than would low part-time use. Our results support this hypothesis. High part-time use had a stronger effect than low part-time use on voluntary turnover, with the influence of low part-time use on voluntary turnover disappearing once we added control variables to the model (Table 4, Model 3). Meanwhile, heavy part-time use maintained its influence in the full model (Table 4, Model 3, Row 2). In sum, these findings indicate that heavy reliance on part-time use is associated with higher voluntary turnover among full-timers in call centres than no part-time use.

In Model 3 (Table 4), it is noteworthy that full-time voluntary turnover is significantly related to the high involvement work approach. We found that the more a firm pursues a high involvement approach to work organization, the lower voluntary turnover is for the full-time regular workforce. One explanation for this finding comes from social exchange theory. Firms that invest more into work organization are reaping the benefits of lower voluntary turnover because employees recognize that firms are investing in them and respond accordingly by remaining with the firm.

Among the control variables, voluntary turnover is lower in centres that are union-ized, in-house, employ more women, employ a higher educated workforce, and are in locations with high unemployment rates. Meanwhile, higher voluntary turnover is found in centres primarily serving mass market customers.

We also presented our analysis using a continuous measure of part-time use – the percentage of part-time workers among customer service representatives who are on permanent contract (Models 3a and 4a). This analysis supports our results (Table 4, Model 3a) – greater part-time use is associated with higher turnover among the full-time regular workforce.

In order to examine more closely the impact of the dynamics of the relationship between part-time use and work organization choice on full-time voluntary turnover, we added an interaction term between work organization and part-time use to our models analysing the pooled dataset. We present the results in Table 4 (Model 4).

First, our evidence supports Hypothesis 3, predicting that a high involvement strategy will weaken the positive relationship between part-time use and voluntary turnover. We find a significant interaction effect between high involvement work organization and heavy part-time use in predicting voluntary turnover (Table 4, Model 4, p < .01).

We probed this interaction using the simple slopes technique (Aiken and West, 1991). The significant and negative coefficient associated with the interaction term (Table 4, Model 4a, β = −.107) indicates that the positive relationship between part-time use and
Table 4. An analysis of full-time voluntary turnover using Tobit analysis.

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3a</th>
<th>Model 4a</th>
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<td>.060***</td>
<td>.040**</td>
<td>.043**</td>
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<td>−.001**</td>
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Model summary

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Note: In Models 3 and 4, the measure of part-time use is categorical on the first column whereas the measure of part-time use is continuous in Model 3a and 4a.

***p < .01; **p < .05; *p < .1.
full-time quit rates tends to be mitigated for those call centre establishments that adopt a high involvement approach to a greater degree. In Figure 1, we present a pictorial representation of the interaction, clearly demonstrating the role of high involvement work organization in moderating the relationship between part-time use and voluntary turnover among the full-time workforce. In call centres where a high involvement approach is absent or less pervasive, greater reliance on part-time use explains high voluntary turnover among full-time employees. In other words, in workplaces that adopt a high involvement approach to work organization, part-timers are more likely to be integrated into the workplace and are thus less likely to increase voluntary turnover rates among their full-time counterparts. We interpret this finding as suggesting that a high involvement strategy signals that the firm uses long-term investment inducement practices and thus mutual interest exchange still takes place, mitigating the detrimental effect that part-time use has on voluntary turnover among the full-time workforce.

This finding is consistent with George (2003)’s finding that organizational investment in the workforce lessens the negative effects of a workforce blending strategy on workers’ organizational attachment. Similar findings are also observed when we used the continuous part-time variable and its interaction with the variable of high involvement approach (Model 4a, Row 14, p < .05). Although we did not pose a formal hypothesis about the interaction between high intensity and part-time use, from our analysis it appears that a firm’s choice to pursue a high intensity approach to work organization does not change the positive relationship between part-time use and voluntary turnover at a statistically significant level.

**Figure 1.** The moderating effect of high involvement on the relationship between part-time use and full-time quit rate.
Discussion and conclusion

We consider whether firms’ work organization choices are related to the degree of part-time use, and whether the degree of part-time use is related to voluntary turnover levels among the full-time workforce. First, we find that the degree of part-time use varies depending on the type of work organization a firm chooses. For example, high involvement work organization is negatively associated with heavy part-time use. Interpreting this result from the psychological contract perspective suggests that in a high involvement context, full-time regular employees may be less willing to exert effort on behalf of their employer if part-time use is widespread. In these circumstances, the full-time workforce may view heavy reliance on part-time use as indicating that the employer is reneging on elements of the psychological contract.

One difficulty that part-time use creates for high involvement work organization is that sustaining team-based initiatives necessitates stable relationships between coworkers and a certain level of commitment. By definition, part-timers are motivated to limit their hours, whereas these high involvement initiatives require employees to be present. In addition, as researchers have found, employers usually invest in less training for part-timers and often exclude part-timers from sharing necessary work related information (Connelly and Gallagher, 2004; Walsh, 2007). Part-timers who are less skilled and are only present for a portion of the workweek may miss interactions with team members, thus threatening the effectiveness of existing team-based initiatives. As a result, widespread part-time use may be inconsistent with high involvement work organization.

Turning to high and low intensity approaches to work organization, we find that a high intensity approach is more likely to be associated with heavy part-time use. Call centres adopting a high intensity approach to work organization, all other things being equal, have a high propensity to use part-timers because they prefer a low cost workforce flexibility option. In addition, they minimize the downsides associated with part-time use through a highly standardized work process and tight electronic monitoring system.

Lautsch (2002) draws on internal labour market theory to offer some insights about how firms organize work in relation to their use of non-standard employment contracts. She argues that in workplaces where flexibility is the main motivation for contingent work use, work is organized in such a manner that contingent workers are closely integrated with the full-time staff. Our findings build on this line of reasoning because they show that in workplaces where the organization of work necessitates a high level of integration between full-time and part-time workers, such as the case where high involvement work organization is being pursued, we are likely to find marginal levels of reliance on part-timers to achieve greater flexibility. By matching the degree of reliance on non-standard employment with work organization, firms are able to preserve the psychological contract they have with their full-time workforce.

In workplaces where the use of non-standard employment contracts is being motivated by a desire to control costs, Lautsch (2002) suggests that managers should assign non-standard workers to occupations with limited need for firm specific skills, and design work in such a manner that it can easily dismiss employees with minimal disruption to operations. Extending this line of reasoning to our evidence, we suggest
that the level of work standardization (e.g. script use), higher volume of production and widespread electronic monitoring – which are features of a high intensity approach to work organization – are well-suited to widespread part-time use as a staffing strategy. From the psychological contract perspective, the lack of job security and low investment in the workforce in the form of training and promotional opportunities because they are short-term hires contributes to the creation of a workforce, both regular full-time and non-standard, with short-term expectations regarding their employment relationship. Work organization choices can accommodate this type of high turnover workforce.

The pressure to control costs is especially intense for outsourced workplaces because they have to offer a competitive advantage to the in-house alternative and are under pressure from offshore options in India and the Philippines. Our findings also shed light on part-time use in outsourced workplaces. Outsourced firms are heavier part-time users than in-house firms. Choosing to outsource customer service work is often motivated by a need to reduce labour expenditures (van Jaarsveld and Yanadori, 2011), and thus outsourced centres tend to maintain their competitiveness by increasing the size of their less expensive part-time workforce.

In the second part of our analysis, we show that the degree of part-time use affects voluntary turnover among the full-time workforce. Heavy part-time users experience higher voluntary turnover relative to their counterparts who do not use part-timers. However, minimal part-time use does not affect voluntary turnover among the full-time workforce. These findings, together, show that the impact of part-time use on full-time voluntary turnover varies depending on the degree of part-time use, as we expected. We interpret these findings as suggesting that the full-time workforce may view heavy part-time use as potentially undermining their psychological contract with their employer. This threat may be articulated through full-time voluntary turnover, whereas light part-time use is viewed as being motivated by flexibility and so is perceived as less threatening to full-timers than heavy part-time use.

Researchers have shown that high involvement work organization is associated with significantly lower voluntary turnover than is low involvement work organization (Colvin, 2006). We examined whether high involvement work organization would mitigate the positive effect of part-time use on voluntary turnover, based on our expectation that high involvement work organization is predicated on offering job security to the workforce in exchange for their commitment, and such an exchange relationship would reduce workforce concerns that part-time use might breach their psychological contract.

Our findings support this interpretation, implying that greater reliance on high involvement work organization tends to moderate the relationship between part-time use and voluntary turnover. In other words, call centres adopting a greater degree of high involvement work organization might not experience the increase in full-time voluntary turnover that is associated with their use of part-time employment. Meanwhile, the positive relationship between part-time use and full-time voluntary turnover remains the same in call centres that rely less on high involvement. In workplaces where a high involvement work organization is present, it signals the full-time regular workforce that part-time use is being used for flexibility reasons, and their use should not be
viewed as evidence of the organization altering its psychological contract with its full-time regular workforce. The use of high involvement work organization would signal the full-time workforce that part-time use should not be viewed as a threat by the full-time regular workforce, thus relaxing the positive relationship between part-time use and full-timers’ voluntary turnover.

Turning to the high intensity approach, we find that such an approach does not affect the positive relationship between part-time use and voluntary turnover at a statistically significant level, all other things being equal. We interpret this finding as confirming that these workplaces are designed to accommodate employee churn. In this work environment, full-time employees have lower expectations for job security to begin with, and they interpret employer’s greater dependence on part-time employment as an employer’s effort to enhance their capacity to adjust the size of their workforce. Taken together, we find that decisions about part-time use are, in some circumstances, related to work organization decisions. We also find that the decision to supplement the full-time workforce with part-timers can have important implications for the voluntary turnover of the full-time workforce even in highly labour intensive work environments. However, the same decision is interpreted differently by the full-time workforce when firms adopt a high involvement approach to work organization.

At a general level, our findings suggest that firms need to align their choice of work organization with their employment policies. Heavy reliance on part-time use may not be costly for employers choosing high intensity work organization because the downside of the low cost workforce flexibility option can be minimized with a highly standardized work process and tight electronic monitoring systems. However, heavy reliance on part-time use will not fit the choice of high involvement work organization as it could undermine the psychological contract between the employer and workers and lose core workers’ commitment to the organization. By matching the degree of reliance on part-time workers with work organization, firms are able to preserve the psychological contract they have with their core full-time workforce. In addition, we show that part-time use can have unintended consequences with respect to full-time voluntary turnover rates that are very costly for employers, especially in the service environment. Employee turnover has been shown to be related to customer turnover (Heskett et al., 1997). The practical implications of our study suggest that the use of non-standard work arrangements is not a silver bullet, and should be used cautiously with consideration regarding whether their use will support the work organization objectives and how the full-time permanent workforce will react.

Our findings build on and extend the work of van Jaarsveld et al. (2009), which examined the influence of institutional differences on variations in non-standard use with data from the US, Canada, and the UK. The present study differs in that it focuses on the workplace level to evaluate whether the degree of part-time use is related to work organization choices, and whether the choices organizations make regarding part-time use has consequences for the full-time workforce. We also build on two other studies that focus on work organization in call centres, including: (i) Batt and Colvin (2011), who investigated relationships between employment systems, performance, and total turnover using longitudinal data from US call centres; and (ii) Holman et al. (2009), who analysed the relationship between institutional differences and variation in job design using data from 16 countries. Holman et al. (2009) focus primarily on the alignment between a firm’s strategic objectives and work design.
Indeed, as with any study, we acknowledge several limitations. First, we analysed data collected from one respondent in the organization. High performance work practice research has been criticized because these studies tend to rely on one managerial respondent, which brings into question the reliability of the data. We tried to minimize this problem by collecting establishment level data from a very informed respondent. Respondents also had time to consult their records or other colleagues in the event that they could not answer certain questions. Our single-source self-reported data also raises the possibility of common method bias. Most survey questions were factual in nature and thus are less vulnerable to bias. If common method bias had been a problem, we would have expected much stronger associations between the variables of interest than we found.

Second, our dataset is cross-sectional, bringing into question the direction of the relationships in our analysis. Reverse causation could be a problem. An alternative interpretation of our findings is that the decision to use part-time employees could shape work organization decisions. While this is a possibility, we argue that decisions about work organization, and the ramifications they have for the full-time workforce, will be related to different logics for part-time use. We examine the degree of part-time use as a proxy for the purpose motivating firms to use part-timers, the problem being that if there is a mismatch between work organization and the degree of part-time use, firms run the risk of alienating their full-time workforce. The question of causality is an important one that could be addressed in future research with longitudinal data.

Third, we focused on part-time use, whereas broadening the range of non-standard employment classifications could offer some alternative insights. Fourth, we focus on call centres where the need for workforce flexibility is high given scheduling constraints, extensive electronic monitoring and intense competitive pressures given outsourcing and offshoring options. On the one hand, this singular focus on call centres helps reduce extraneous sources of variation; on the other hand, extending our research to other workplaces would enhance the generalizability of our findings. We are also comparing work organization in call centres with other call centres. It would be useful to extend this comparison to other types of workplaces to ensure that we do not have a range restriction problem. Finally, we undertook this study in North America where managers have a lot of choice regarding work organization and fewer institutional constraints on the decision to use non-standard work arrangements. Replicating this study in coordinated market economies (e.g. Germany) or developing economies (e.g. India) could yield divergent findings.

Despite these limitations, this study helps clarify the relationship between work organization and part-time use, and the consequences of part-time use for the full-time workforce. Previous studies have tried to understand the relationship between non-standard use and the high involvement approach. We build on these efforts by examining closely determinants of varying degrees of part-time use. We find that variation in the degree of part-time use depends on work organization, providing a more finely grained analysis of these relationships. As reflected in the voluntary turnover analysis, full-time employees can perceive the hiring of varying degrees of part-time staff in different ways. This study represents an initial step toward understanding this relationship.
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Notes

1 The two authors contributed equally to this article and are listed in alphabetical order.
2 We used a pairwise t-test to examine whether significant differences existed in our key variables between our final sample and the cases that were removed. We found no significant differences.
3 McFadden’s pseudo-$R^2$ presented in our Stata output is obtained by computing $1 - LL(\text{full model})/LL(\text{constant only model})$. As many researchers have pointed out, Pseudo-$R^2$ is not the best measure of fit. Instead, we calculated the $R^2$ between the predicted and observed values ($\rho^2$) which is probably closer to what an OLS regression generates. We presented $\rho^2$ in our output.

References


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