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WORKING PAPER

Does sacking the coach help or hinder the team in the short term? Evidence from Belgian soccer.

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Abstract

The coaching carousel or turnover is an extreme but frequently occurring phenomenon in soccer. This study examines the effectiveness and efficiency of firing the coach in terms of team performance. In general, the purpose of coach turnover is to improve results in the short run. Therefore, the period of four games before and four games after the date of resignation is the focus of this paper. The hypotheses are set up within the concepts of the organizational learning theory. We analysed the effect of dismissing coaches by examining data from 8392 Belgian soccer games in the first, second and third national divisions; we found that many of the teams whose performance had declined over approximately two months had dismissed their coaches. Within four games under the management of a new coach, team performance improved. However, further analyses revealed that this increase was due to regression to the mean and cannot be attributed to the new coach. A control group comprising teams that had an equal performance dip but did not dismiss their coach showed a similar improvement. We conclude that coach turnover in Belgian soccer is neither an effective nor efficient means to improve performance in the short term.

Introduction

For more than 50 years, researchers have attempted to determine whether sports coaches do matter and have an impact on team performances. One way of addressing this question is to focus on the relationship between coach turnover and team performance. Although initial studies were in fact management research (Grusky, 1963; Gamson and Scotch, 1964; Eitzen and Yetman, 1972; Allen *et al*., 1979; Brown, 1982; Pfeffer and Davis-Blake, 1986), more recent research approached the issue from a sport management perspective (Theberge and Loy, 1976; Fabianic, 1984, 1994; Curtis *et al*., 1986; McTeer and White, 1995; Salomo and Teichmann, 2000; Bennet *et al*., 2003). Overall, most researchers agree that bad results are the major determinant of a turnover (Cannella and Rowe, 1995; Audas *et al*., 1999; Salomo and Teichmann, 2000; Bruinshoofd and ter Weel, 2003). Kesner and Sebora (1994) argued that three sociology inspired succession theories that are introduced by Gamson and Scotch (1964) have dominated succession research. First, the common-sense theory acknowledges the positive influence of manager turnover on organizational effectiveness. Performance improves following succession. Second, the vicious-circle theory accepts the reciprocal effect of a resignation. Turnover, frequently caused by poor performance, disrupts internal relationships in an organization. The resulting destabilizing force leads to a further decline in performance. The third explanation, the ritual scapegoating theory, assumes that a succession has no impact on performance. Sacking a manager is a convenient means of placating frustrated stakeholders.

Some studies found evidence to support the ritual scapegoating theory (Eitzen and Yetman, 1972; Cannella and Rowe, 1995), whereas other studies argued the common-sense theory was more appropriate (Pfeffer and Davis-Blake, 1986;

Fabianic, 1994; McTeer and White, 1995; Bennet *et al*., 2003). Few studies empirically supported the vicious-circle theory (Brown, 1982).

Several authors discussed the influence of regression to the mean (Salomo and Teichmann, 2000; Audas *et al*., 2002; Nevill *et al*., 2004; Rowe *et al*., 2005) or the slump-ending effect (Gamson and Scotch, 1964). In a stochastic environment, unusually low or high scores will be statistically followed by scores that tend to be closer to the mean. After controlling for regression to the mean, most studies (Curtis *et al*., 1986; Bruinshoofd and ter Weel, 2003) found no succession effect. However, Salomo and Teichmann (2000) and Audas *et al*. (2002) found a negative impact on team performance.

Comparisons of the performance of a resignation group and a control group—where no coach turnover had taken place—also revealed paradoxical results. Eitzen and Yetman (1972) and Brown (1982) found no differences in team performance between the resignation group and the control group, whereas Audas *et al*. (1997) found that English soccer clubs that dismissed their coaches performed worse immediately after the turnover than those that retained their coaches. The results of Bruinshoofd and ter Weel (2003) revealed that coach turnover did not lead to an improvement in team performance. Moreover, the control group more rapidly recovered to the mean performance compared with the resignation group.

Within the framework of coach turnover, several studies focused on variables such as game location, team quality, coaching experience or coaching ability. Implementing both team quality and home team advantage, Koning (2003) found that team performance did not always improve when a coach is fired within the season. Cannella and Rowe (1995) proved that coaching ability most strongly affects performance when a turnover occurs in a high rivalry context, whereas ability had no

effect on team performance under conditions of low rivalry. Coaching experience had no impact on team performance after a succession.

Although arguing that these three succession theories are all valuable, Giambatista *et al*. (2005) stated that the question had already been clarified and advocated that: "*It is time to move beyond the three traditional theories of leader succession*" (Giambatista *et al*., 2005, p. 982). Rowe *et al*. (2005) responded to this call by shifting their theoretical focus to the concepts of the organizational learning theory of Crossan *et al*. (1999). The underlying phenomenon of interest in organizational learning is strategic renewal. The organizational learning framework contains four related processes—intuiting, interpreting, integrating and institutionalizing—that take place at the individual, group and organizational levels. Organizational learning is a dynamic process that occurs over time. It takes time for leaders to accumulate organization-specific knowledge and to develop human capital. Leaders who force the organization to learn in less than the required time pilot the organization to worsening performance. The results of Rowe *et al*. (2005) in major-league hockey teams supported the theoretical framework; teams that had a within-season succession performed worse than teams that did not experience coach turnover.

The ambiguity of the findings creates an interesting challenge. Although some studies concentrated on between-season successions (Allen *et al*., 1979; Scully, 1995; Rowe *et al*., 2005), we accept the thesis that within-season successions are most appropriate for revealing the real effect of a coach resignation (Salomo and Teichmann, 2000). Within the organizational learning theory as the theoretical framework of this study, we hypothesize that there is no positive short term impact of sacking a coach because learning takes time. Moreover, we hypothesize that teams

that experience a performance decline but retain their coach recover better from a performance dip than do teams that fire their coach. Once systems, rules and procedures are institutionalized in organizations, it takes time to change them and the modification requires some consideration.

We could identify only one study (Audas *et al*., 1997) that compared the differences between several divisions of a sports league. They reported that, although upper divisions face more intense public scrutiny, coach turnover occurred more rapidly in lower soccer divisions. The authors could only partially explain this result by pointing out the specific relegation and promotion rules in English soccer. Organizational learning also occurs at the organizational level. We accept the thesis that clubs in higher divisions are more institutional relative to clubs in lower divisions. Institutional clubs recognize that the learning process among the different levels takes time. Therefore, we hypothesize that teams in higher divisions are more reluctant to dismiss their coaches when a performance dip occurs.

Methods

Belgian soccer competition (1998–2003)

Our data consist of male soccer teams that played in the highest national division, the second national division and the third national division A (for convenience we will continue to use the term "third national division") during the seasons from 1998–1999 to 2002–2003.

Measurement of performance

This study focuses on the question of whether coach turnover has any effect on team performances in the short term. We define the short run as a span of four

games prior to and following a change of coach. The performance measure is the average performance over four games, obtained by the points gained. A win is rewarded with three points and a draw with one point. No points are awarded when the team loses the game. The advantages of this method are twofold. First, we obtain a performance measure that can decline when performance stagnates. Second, abrupt performance declines or increases are smoothed out. In the appendix, a worked example of how the periods are constructed is presented.

Effectiveness of a coach resignation

Effectiveness of a resignation denotes that team performance under the authority of the new coach improves significantly compared with that under the previous coach. Therefore, we compare the mean team performance levels of the four games prior to and after the date of resignation. We also control the results for regression to the mean in order to discover the real effect of a coach succession.

Efficiency of a coach resignation—the construction of the control group

Our second objective was to judge the efficiency of a coach turnover. We see efficiency of a resignation as the cheapest way to obtain the possible effect of a turnaround. The lowest cost alternative in soccer is not to dismiss the coach. With efficiency, we question what would happen if the coach were not dismissed after a dip in performance.

Therefore, we construct a control group that consists of teams maintaining their coach and having, prior to turnover, the same performance pattern as the resignation group. Efficiency is measured by comparing the mean team performance levels of both groups after the real/virtual date of turnover.

To construct the control group, we focus on the features of the performance levels of the resignation group before the date of turnover. However, we have to construct a control group that has the same characteristics as the resignation group over a sufficiently long time. We applied the method of Bruinshoofd and ter Weel (2003) and analysed performance patterns beginning from five periods before a change of coach, which represent a period of approximately two months. Figure 1 presents the mean team performance levels before a coach turnover for the three national divisions. Over the five subsequent periods, team performance sharply declines in all three divisions. Performance before the date of turnover is at a low level. The second and third national divisions have higher performance levels compared with the first national division. To build our control group, we converted the general features of the three national divisions into measurable criteria as follows.

- The level of mean team performance five periods prior to resignation (T–5) may not exceed 1.25 points for the first national division, 1.40 points for the second national division and 1.30 points for the third national division.
- During the five periods prior to resignation, the mean team performance level must decline by 30% or more.
- The mean team performance level in the period just before coach turnover (T–1) must obtain a score of at least 0.5 points.

****Figure 1 near here****

Identifying resignations and dips

Because we adopt a four-game average as a performance measure, we can only construct our first mean performance level after four games. Our time scope to

categorize the performance dips for the control group requires five periods, and so we only can identify dips starting from game eight. Therefore, we only include resignations and dips starting from game eight. Applying the same argument to the end of the season, we need four periods after the real/virtual date of resignation so that we may include only resignations and dips before game 31 for teams that played 34 games in a season. Moreover, we include only resignations if the successor remained for at least four games. Teams appointing an interim coach for a few games or teams having more than one change of coach during the season are excluded from the analysis. For teams with no coach turnover, only the first dip that is identified starting from game eight is included in the control group.

Statistics

Repeated measures analysis of variance (ANOVA) was conducted to evaluate the effects on mean team performance levels over time. Post-hoc analysis of detected differences was examined using the Scheffé F-test. The independent sample t-test was used to detect differences in mean performance levels between both groups. All analyses were performed using SPSS 12.0. Statistical significance was set at $p < 0.05$.

Results are reported as mean (M) team performances of four games ± standard deviation (s

Results

Resignation and control group

Table 1 summarizes the numbers of resignations and performance dips by division that are included in the resignation and control group. 72 resignations and 50

performance dips conform to our criteria and are used for further analyses. All divisions have similar numbers of included performance dips and turnovers. Overall, the coach turnovers that are analyzed in our data are involuntary resignations. In five cases the coach left voluntary (one in the first, two in the second and two in the third national division).

Competition tables are drafted so that home and away games alternate as much as possible. However, sequences of one home and three away games and vice versa are not unusually. This study focuses on the short term effect of a coach turnover. A possible unbalance between the number of home and away games played might influence the results. Suppose the dips in the control group are due to teams encountering sequences of consecutive away games and their possible recovery after the dip due to home games, the interpretation of the results would be wrong. Therefore, we analysed if both groups have similar numbers of home and away games before and after the real/virtual date of resignation. Four games before the real/virtual date of resignation, 74% of the teams in the control group and 78% of the teams in the resignation group played 2 home and 2 away games. Four games after the real/virtual date of resignation, 70% of the teams in the control group and 68% of the teams in the resignation group played 2 home and 2 away games. Within the resignation group, no significant difference was found at time period T-1 $\{F(2, 69) = 0.18, p > .05\}$ and T+4 $\{F(2, 69) = 0.81, p > .05\}$ between the performance levels of teams completing sequences of 3+1, 2+2 or 1+3 home and away games. Within the control group, no significant difference was found at time period T-1 $\{F(2, 47) = 0.02, p > .05\}$ and T+4 $\{\chi^2(2, N = 50) = 2.23, p > .05\}$ between the performance levels of teams completing sequences of 3+1, 2+2 or 1+3 home and away games.

****Table 1 near here****

Validity of the control group

From the worked example in the appendix, it is clear that there is an overlap between some periods. We only presented means and standard deviations of time periods that do not overlap in table 2. Repeated measures ANOVA, with periods T-5 and T-1 as within-subject factor and group as between-subjects factor, is conducted to assess the validity of our control group in model 1 of table 3. Neither a significant group effect nor a significant time × group interaction effect was found, indicating no significant difference between both groups. These results affirm both groups have comparable performance levels 8 games prior to the change of manager. Implicit in this methodology is the assumption that the last eight games before a change are crucial in dismissing a coach. However, decisions to resign a coach might be taken as a result of poor performance over a much longer period. Conversely, the control group might include teams that have been successful over the long term, but have recently experienced a short term dip. It could be that firing the manager of those teams was never in any doubt because the long term success overrides the short term problems. Therefore, we controlled if both groups have comparable performances over a much longer period. The independent sample t-test reveals no significant difference {t (118) = 1.75, p > .05} between the mean performance levels from game 1 to the real/virtual date of resignation of the resignation (M = 1.04, s = 0.47) and control group (M = 1.16, s = 0.28). Moreover, no significant difference {t (120) = -.32, p > .05} was found for the mean points gained during the previous season between the resignation (M = 1.44, s = 0.43) and control group (M = 1.42, s = 0.41). Therefore, we conclude that the resignation and control group have similar mean

performance levels before the real/virtual date of turnover. The data affirm the validity of our control group.

****Table 2 near here****

****Table 3 near here****

Effectiveness and efficiency of a resignation

The purpose of this study is to assess the effectiveness and efficiency of coach turnovers in the short term. T–1 contains the four games just before the real/virtual date of turnover and T+4 contains the four games just after the date of turnover. From model 2 (table 3) we learn that there is a significant time effect for the resignation group ($F = 9.92$, $p < 0.01$) and for the control group ($F = 164.66$, $p < 0.001$). Moreover, there is a significant group effect ($F = 4.78$; $p < 0.05$) and significant time × group interactions ($F = 17.45$; $p < 0.001$). The control group achieves a mean team performance level after four games of 1.53 compared with 1.09 for the resignation group.

Regression to the mean

In model 3 (table 3), we filtered the original data for the effect of regression to the mean. We calculated the mean performance levels caused by regression. A strong regression effect means that unusually low or high scores will be followed by scores that tend to be closer to the mean. If the performance recovery after a dip or turnover is due to regression, we would notice that the scores after the date of

turnover tend toward the mean. To calculate the regression scores we use the regression line (see also the appendix):

$$Y = r * x + (1-r) * \bar{x}.$$

The correlation coefficient was obtained by calculating the correlations between the means of any four following games within a team and season. Data for all the teams with a change of coach within the season were omitted. Correlations were calculated for 154 cases and an overall mean correlation was obtained. The mean correlation coefficient between a four-game average and another four-game average is 0.20, s = 0.06. The overall mean performance score for the control group is 1.30, s = 0.24 and for the resignation group 1.12, s = 0.39. Inserting these values in the regression line yields:

For the control group: $Y = 0.20 * x + (1 – 0.20) *1.30$

For the resignation group: $Y = 0.20 * x + (1 – 0.20) *1.12$

Model 3 presents the original and the regression scores for period T+4. The regression scores are obtained by inserting the initial mean scores of T–1 into the regression line. As mentioned in the previous section, periods T–1 and T+4 do not overlap and refer to the four games immediately prior to and following coach turnover. If regression affects the original data, we expect no significant differences between the mean scores of the two periods. If coach turnover has a real effect on team performance, we expect a significant difference between the original and the regression data. From model 3, we learn that there is a significant group effect (F =

22.48, $p < 0.001$) and significant time × group interactions ($F = 7.61$, $p < 0.01$). There is also a significant time effect for the control group ($F = 26.38$; $p < 0.001$). There is no significant difference between the original mean performance levels of the resignation group ($M = 1.09$, $s = 0.68$) and the mean performance levels caused by regression ($M = 1.04$, $s = 0.12$). The original mean team performance levels of the control group ($M = 1.53$; $s = 0.50$) are significantly higher compared with the mean performance levels caused by regression ($M = 1.17$, $s = 0.03$).

Differences in national divisions

Means and standard deviations for the three national divisions are presented in table 4. The third national division is characterized by the highest mean performance levels, followed by the second and first national division. Model 1 (table 5), which contains the periods before a turnover, reveals no significant division effect before turnover in both the resignation and the control group. There is also a non-significant interaction effect between group and division. For model 2, which contains the four games just before and after coach turnover, no significant division effects for both the resignation and the control group were found.

****Table 4 near here****

****Table 5 near here****

Discussion

The aim of this study was to examine the effectiveness and efficiency of a coach turnover in the short term. During five consecutive periods prior to a coach

turnover, team performance sharply declined, after which many clubs dismissed their coach. Mean team performances increased after the turnover. Our first analysis suggests that the shock effect of a turnover has a positive impact on team performance. However, accepting the positive impact of dismissing a coach without controlling for regression to the mean might result in misleading interpretations of the data. We calculated the regression effect and compared these data with the original. The analysis reveals no evidence to attribute the performance recovery following a change of coach to his/her successor and rejects the hypothesis of the effectiveness of coach turnover. The data suggest no impact of coach turnover in the short term. The results give support to the concepts of the organizational learning theory. Supporting the assumption that teams need learning time to improve performance, we would expect that the turnover effect is negative or non-existent. A period of approximately one month might be too short for new coaches to reconstruct the team according to the way they want to play the game.

Our second research question concerns the efficiency of a turnover. What would happen if the club did not dismiss its coach? Our control group significantly improved relative to the results before the virtual turnover. This positive effect is maintained after controlling for regression to the mean. Statistical analysis reveals that both groups have comparable performance patterns before turnover and confirms the validity of our control group. We can therefore conclude that sacking the coach is not the most efficient way of dealing with a performance dip in the short run. A possible explanation is that coaches of teams that experience performance dips but who are not dismissed can continue to act because they are familiar with the organization-specific knowledge. Their actions have a greater chance of affecting team performance in a positive way. The assumptions are in line with the principles

of the organizational learning theory. Our results are in line with the conclusions of Bruinshoofd and ter Weel (2003) that a coach turnover is not the most effective and efficient way of dealing with performance dips.

We also hypothesized that clubs in higher divisions fire their coach less rapidly when a performance dip occurs. The data show that before turnover the mean team performance levels of teams in the first national division are the lowest, followed by clubs in the second and third national divisions. However, no significant division effects are found and so the hypothesis is not confirmed.

A limitation of our study is that we did not consider the effect of home team advantage and team quality. However, this disadvantage implies both the resignation and the control group. We had no insight into coaching experience or coaching ability. The study also does not control for player motivation to perform, nor did we control for the stage of the season when coach turnover occurred. Both variables may have an effect on performance and on the learning process. Further research should incorporate these possible determinants.

The results give promising prospects to the application of the organizational learning theory in the study of coach turnover. However, in the absence of qualitative data to support the organizational learning theory, we should exercise caution in the interpretation of our data. Triangulation of both qualitative and quantitative data is necessary to fully understand the process of coach turnover and to affirm the concepts of the organizational learning theory in this area.

References

Allen, M. P., Panian, S. K. and Lotz, R. E. (1979). Managerial succession and organizational performance: A recalcitrant problem revisited. *Administrative Science Quarterly*, **24**, 167-180.

Audas, R., Dobson, S. and Goddard, J. (1997). Team performance and managerial change in the English Football League. *Economic Affairs*, **17(3)**, 30-36.

Audas, R., Dobson, S. and Goddard, J. (1999). Organizational performance and managerial turnover. *Managerial and Decision Economics*, **20**, 305-318.

Audas, R., Dobson, S. and Goddard, J. (2002). The impact of managerial change on team performance in professional sports. *Journal of Economics and Business*, **54**, 633-650.

Bennet, G., Phillips, J., Drane, D. and Sagas, M. (2003). The coaching carousel: Turnover effects on winning in professional sport. *International Journal of Sport Management*, **4**, 194-204.

Brown, M. C. (1982). Administrative succession and organizational performance: The succession effect. *Administrative Science Quarterly*, **27**, 1-16.

Bruinshoofd, A. and ter Weel, B. (2003). Manager to go? Performance dips reconsidered with evidence from Dutch football. *European Journal of Operational Research*, **148**, 233-246.

Cannella, A. A. and Rowe, W. G. (1995). Leader capabilities, succession, and competitive context: A study of professional Baseball Teams. *Leadership Quarterly*, **6**, 69-88.

Crossan, M. M., Lane, H. W. and White, R. E. (1999). An organizational learning framework: From intuition to institution. *Academy of Management Review*, **24**, 522-537.

Curtis, J. E., Loy, L. W. and Hillen, J. M. (1986). Managerial succession and team effectiveness: a case study of Japanese professional baseball. *International Review for the Sociology of Sport*, **21**, 339-351.

Eitzen, D. S. and Yetman, N. R. (1972). Managerial change, longevity, and organizational effectiveness. *Administrative Science Quarterly*, **17**, 110-116.

Fabianic, D. (1984). Organizational effectiveness and managerial succession: An update of an old problem. *Journal of Sport Behavior*, **7**, 139-152.

Fabianic, D. (1994). Managerial change and organizational effectiveness in Major League Baseball: findings for the... *Journal of Sport Behavior*, **17**, 135-148.

Gamson, W. A. and Scotch, N. A. (1964). Scapegoating in baseball. *The American Journal of Sociology*, **70**, 69-72.

Giambatista, R. C., Rowe, W. G. and Riaz, S. (2005). Nothing succeeds like succession: A critical review of leader succession literature since 1994. *The leadership Quarterly*, **16**, 963-991.

Grusky, O. (1963). Managerial succession and organizational effectiveness. *The American Journal of Sociology*, **69**, 21-31.

Kesner, I. F. and Sebora, T. C. (1994). Executive succession: Past, present & future. *Journal of Management*, **20**, 327-372.

Koning, R. H. (2003). An econometric evaluation of the effect of firing a coach on team performance. *Applied Economics*, **35**, 555-564.

McTeer, W. and White, P. G. (1995). Manager/coach mid-season replacement and team performance in professional team sport. *Journal of Sport Behavior*, **18**, 58-69.

Nevill, A., Holder, R., Atkinson, G. and Copas, J. (2004). The dangers of reporting spurious regression to the mean. *Journal of Sports Sciences*, **22**, 800-802.

Pfeffer, J. and Davis-Blake, A. (1986). Administrative succession and organizational performance: How administrator experience mediates the succession effect. *Academy of Management Journal*, **29**, 72-83.

Rowe, W. G., Cannella, A. A., Rankin, D. and Gorman, D. (2005). Leader succession and organizational performance: Integrating the common-sense, ritual scapegoating, and vicious-circle succession theories. *Leadership Quarterly*, **16**, 197-219.

Salomo, S. and Teichmann, K. (2000). The relationship of performance and managerial succession in the German Premier Football League. *European Journal for Sport Management* (Special Issue), 99-119.

Scully, G. W. (1995). Does firing the manager improve club performance? In *The market structure of sports,* pp.156-191. Chicago: The University of Chicago Press.

Theberghe, N. and Loy, J. (1976). Replacement process in sport organizations: the case of professional baseball. *International Review of Sport Sociology*, **11**, 73-93.

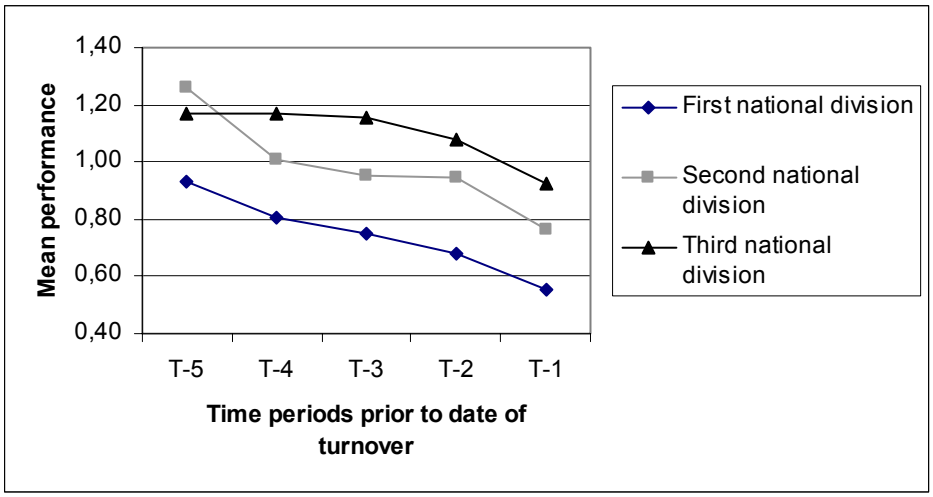

Figure 1. Mean team performance levels of the five time periods prior to turnover for the three national divisions.

Table 1. Number of teams, games, included resignations, and included performance dips by year and division

Level	First national division				Second national division				Third national division			
Season	Teams	Games	Dips	Resignations	Teams	Games	Dips	Resignations	Teams	Games	Dips	Resignations
1998-1999	18	34	1	4	18	34	3	8	16	30	1	5
1999-2000	18	34	1	5	18	34	3	5	16	30	4	1
2000-2001	18	34	2	8	18	34	4	5	16	30	3	3
2001-2002	18	34	5	3	18	34	5	7	16	30	4	1
2002-2003	17	32	5	2	18	34	4	9	15	28	5	6
Total			14	22			19	34			17	16

Table 2. Means and standard deviations for the resignation and control group at different time periods.

Condition	Resignation group		Control group	
Time period	N	Mean ± s	N	Mean ± s
T-5	72	1.14 ± 0.68	50	1.16 ± 0.15
T-1	72	0.74 ± 0.60	50	0.64 ± 0.13
T+4	72	1.09 ± 0.68	50	1.53 ± 0.50
T+4 due to regression	72	1.04 ± 0.12	50	1.17± 0.03

Table 3. Repeated measures ANOVA for three models.

Condition	Resignation group	Control group	Overall		
Model	F time	F time	F time	F group	F time x group
Model 1 (T-5 and T-1)	13.71***	1067.34***	64.09***	0.35	1.03
Model 2 (T-1 and T+4)	9.92**	164.66***	81.02***	4.78*	17.45***
Model 3 (T+4 and T+4 due to regression)	0.41	26.38***	13.42***	22.48***	7.61**

* $p<0.05$ ** $p<0.01$ *** $p<0.001$

Table 4. Means and standard deviations for three national divisions at different time periods.

Condition	Resignation group						Control group					
	First national division		Second national division		Third national division		First national division		Second national division		Third national division	
Period	N	Mean ± s	N	Mean ± s	N	Mean ± s	N	Mean ± s	N	Mean ± s	N	Mean ± s
T-5	22	0.93 ± 0.70	34	1.26 ± 0.69	16	1.17 ± 0.58	14	1.16 ± 0.16	19	1.11 ± 0.17	17	1.21 ± 0.10
T-1	22	0.56 ± 0.54	34	0.76 ± 0.59	16	0.92 ± 0.68	14	0.64 ± 0.13	19	0.61 ± 0.13	17	0.66 ± 0.12
T+4	22	0.91 ± 0.62	34	1.21 ± 0.69	16	1.09 ± 0.74	14	1.54 ± 0.49	19	1.61 ± 0.46	17	1.43 ± 0.56

Table 5. Repeated measures ANOVA for two models by division.

Condition	Resignation group	Control group	Overall
Division	F division	F division	F group x division
Model 1 (T-5 and T-1)	2.54	1.80	1.84
Model 2 (T-1 and T+4)	2.26	0.23	1.41

* $p<0.05$ ** $p<0.01$ *** $p<0.001$