A TOTAL SMOKING BAN: AN EXPLORATORY ANALYSIS OF AVERAGE MONTHLY SICK-LEAVE USE AMONG PUBLIC SERVICE EMPLOYEES BEFORE AND AFTER THE INTRODUCTION OF A NO-SMOKING POLICY

CENTRE FOR NEWFOUNDLAND STUDIES

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A Total Smoking Ban: An Exploratory Analysis of Average Monthly Sick-Leave Use among Public Service Employees Before and After the Introduction of a No-smoking Policy

BY

© Ken F. Fowler

A thesis submitted to the School of Graduate Studies
in partial fulfilment of the requirements
for the degree of
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Department of Psychology
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ABSTRACT

In a time-series design, sick-leave records of three-hundred and nine General Service employees from four Newfoundland government head offices were analyzed over a four-year period to determine if any change in average monthly sick-leave use resulted from the introduction of a no-smoking policy. Using three dependent measures, the total-time index (TTI), frequency index (FI) and short-term index (STI), pre and post measures were assessed for possible changes through the use of ARIMA (p,d,q) procedures and ANOVA procedures where applicable. No significant change in absenteeism regardless of dependent measure, time of policy introduction, or department was found. Differences among dependent measures, the future of absenteeism research and the suitability of sick-leave use as an indicator of employee well-being are discussed.

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INTRODUCTION

It has been suggested that companies and governments in North America spend billions of dollars each year in employee absenteeism; according to some, employee absenteeism in the U.S. has been estimated to cost $40 billion a year (Markowich & Silver, 1989). In Canada, absenteeism is perceived as a growing and costly problem for Canadian governments and companies. According to a Statistics Canada labour force survey, the work days missed among full-time paid workers for illness or disability and personal or family responsibilities rose by almost a full day, from 8.6 days per worker in 1987 to 9.4 days in 1990 (Akyeampong, 1992). In particular, between 1987 and 1990, time lost due to illness or disability increased by a third of a day to 6.7 days, while time lost on account of personal or family responsibilities rose by an extra half day (Akyeampong, 1992).

During a period when budgetary restraints limit the earnings and development of industry, administrators have been looking toward such employee behaviour as short and long term sick-leave use, and worker's compensation as a method of reducing expenditures and increasing productivity. Generally, such concerns have been met with various sick-leave policy options and occupational health and safety strategies to limit the financial liability associated with brief and prolonged episodes of employee absenteeism.

Methods of Reducing Absenteeism

Absence-Control Policies. There are several ways in which employers attempt to reduce or control employee absenteeism. One approach seeks to modify the existing sick-leave policy in order to make it less appealing for employees to take sick-leave (sometimes referred to as positive absence-control programs). For instance, some policies contain components which offer a reward or positive motivation for good attendance such as letters of commendation, employee-payments of a percentage of unused sick leave time, or some other predetermined amount of money (Markowich et al., 1989). Other absence-control policies are more punitive in nature whereby aversive consequences, such as dismissals or probationary periods, are imposed on employees with poor attendance records. Recently, it seems that many companies and governments are opting for absence-control policies that combine features of both disciplinary and positive-reward absence-control programs which are often referred to as mixed-consequence systems (Markowich et al., 1989). The "paid leave policy" is an example of such a mixed-consequence system. The paid leave system operates by combining all types of leave (i.e., sick, annual, and family responsibility leave) into one package called "paid leave." While a reward system exist where employees may "cash in" unused paid leave after a specified time period, employees are negatively affected if they are legitimately or

illegitimately sick because, by doing so, they reduce the number of possible days for vacation and family responsibility leave. Such policies have been favourably received by private and public organizations (Markowich et al., 1989; Fowler, 1993).

Researchers have observed components of sick-leave policies such as absence-control strategies to be significantly related to absenteeism rates. For instance, in a study of a public utilities company, Dalton & Mesch (1991) found that a sick-leave policy exempting employees who had accrued more than 90 days of sick leave from pay reductions while absent served as the strongest predictor of sick-leave use. Mathieu & Kohler (1992), in their investigation of absenteeism among transit operators, attributed results to the specific structure of sick-leave policies within each transit depot. One of the most recent meta-analyses conducted Farrell & Stamm (1988) found that organizational-wide factors (such as absence-control policies) are not only significantly related to absenteeism, but are stronger predictors than demographic and psychological factors. Other researchers suggest that the workplace culture (i.e., both formal and informal organizational rules) does much to influence how much sick-leave usage is acceptable such that the days lost to sick-leave are based upon the amount of paid sick-leave days allowed per year (Chadwick-Jones, Nicholson, & Brown, 1982):

a concept sometimes referred to as "Parkinson's Law of Sick Leave Abuse" (Kopelman, Schneller, & Silver, 1981).

However, adopting absence-control policies depends on whether employers perceive the significant proportion of sick-leave use as being illegitimate or legitimate. The dichotomy of legitimate or illegitimate absenteeism has been widely discussed throughout the literature and will receive more attention in this investigation. Comparable terms have been used in the research such as avoidable and unavoidable absenteeism (Dalton et al., 1991), type A and type B absenteeism (Chadwick-Jones, Brown, & Nicholson, 1973), voluntary and involuntary absenteeism (Chadwick-Jones et al., 1982) and imaginary illnesses (Markowich et al, 1989). Of the entire spectrum of absence research, the avoidable/unavoidable absence dichotomy is perceived by many social psychologists as an interesting and worthwhile domain since employee attitudes and decision-making strategies are fundamental to the study of what constitutes avoidable absenteeism. Consequently, absenteeism research is one area in which social scientific theory and research is directly applicable to industrial problems.

The Wellness Program and No-smoking Policies. It is logical that the introduction of absence-control policies address concerns over avoidable (type B or imaginary) absenteeism. However, what remains in question is the

proportion of overall absences accounted for by avoidable absenteeism needed to justify the introduction of absence-control policies. There is very little research that has attempted to determine the proportion. Nonetheless, Dalton et al. (1991) estimated that 60% of all absenteeism was avoidable. The researchers also suggested that only 25% of the employees accounted for this type of absenteeism, a finding which has been previously demonstrated: Garrison & Muchinsky (1977) found between 18% and 58% of the employees were responsible for 90% of the paid and unpaid absenteeism. However, since Dalton et al. (1991) derived the proportion of avoidable absenteeism by subtracting the employee's reported total absence from the number of sick days officially recorded by human resource clerks, the methodology and findings remain somewhat questionable.

Given the uncertainty in terms of what constitutes avoidable absenteeism, another feasible approach to absence-control focuses on reducing legitimate (unavoidable or type A) absenteeism by introducing policies and strategies aimed at maintaining and enhancing the physical well-being of employees in the workplace. Typically, worksite wellness programs have centered on smoking cessation, back injury prevention, cardiovascular fitness etc. (Tucker, Aldana, & Friedman, 1991).

As with absence-control programs, wellness programs have also been viewed as worthwhile strategies for reducing

absenteeism due to illness and increasing productivity (Tucker et al., 1990; Hatziandreu, Koplan, Weinstein, Caspersen, & Warner, 1988; Cox, Shephard, & Corey, 1981). Despite the fact that it is self-report in nature, such research suggests that enhancing an employee's physical well-being in the workplace is a viable avenue in addressing the costs associated with excessive absenteeism and is one of the arguments used when no-smoking policies and associated cessation programs are introduced to governments and companies. If fact, one recent article published in "Benefits Canada" (a publication not known for its scientific rigor but nonetheless acknowledged by public and private industry) states that "Studies that monitor the exact cost of a smoking-cessation program on a company's bottom line leave little doubt that smokers impact healthcare, absenteeism and productivity" (Harvey, 1994, p. 51)[1].

The Case for a No-smoking policy. Following the publication of the Royal College of Physicians on Smoking (1962) and the Report of Surgeon General's Advisory Committee on Smoking and Health (1964), research on smoking engulfed various scientific disciplines with assessments of relationships between smoking and physical well-being, mortality and other behavioural factors. Overall, the findings have suggested that higher incidences of morbidity

are reported among cigarette smokers than non-smokers: people who smoke tend to have a greater incidence of ischemic heart disease, lung cancer and other broncopulmonary diseases, peptic ulcers, and a larger proportion of chronic diseases (Athanasou, 1975). The most recent figures suggest that one in four North Americans smoke and in Canada alone, 38,000 deaths per year are attributed to smoking (Harvey, 1994).

Although the case has been strongly stated for the harmful effects of smoking on smokers, convincing evidence also exists for the harmful effects on nonsmokers. According to the Canadian Lung Association (1992), second-hand or side-stream smoke is significantly correlated with an increased incidence of lung cancer since bystanders are exposed to 50 times the amount of carcinogens inhaled by the user. Other studies suggest that exposure to cigarette smoke enhances the risk of sudden infant death syndrome (Bergman & Wiesner, 1976), elevates the risk of acute illness in children (Cameron & Robertson, 1973), and adult nonsmokers exposed to smoke display increased anxiety, fatigue and aggression (Jones and Bogat, 1978). Other research suggests that smokers and their dependents use the healthcare system an estimated six times more than non-smokers (Harvey, 1994). In the work setting, such findings are critical since employees work in close quarters, daily for hours at a time. Ferguson (1973) suggested that "...the

offence smokers cause to non-smokers who must work along side them cannot be costed (p. 64)".

In terms of business and industry, the study of the effects of smoking has had a significant impact in the areas of employee sickness-absenteeism. For instance, in the National Health Survey of the U.S. Public Service, smokers reported an excess of days lost from work, restricted activity days, and days confined to bed; chronic conditions were also reported by 11% more of the smokers. Weaver (1973) reported that respiratory illness not only is the leading cause of disability absenteeism, but also the major factor in disability benefit payment. Naus, Engler, Hetychova, & Vavreckova (1966) found that the prevalence of respiratory disease rises in a group of smokers as compared to a group of non-smokers. Coates, Bower, & Reinstein (1965) found that employees with chronic cough, wheezing and shortness of breath reported significantly more episodes of respiratory infection and more absences from work because of chest illness during a three year period than those without these symptoms. Parkes (1983) suggested that time lost through sickness, both in total days off and number of absences is greater among smokers than nonsmokers. Finally, Weis (1985) proposed that sick leave has traditionally been a benefit used excessively by smokers whose absenteeism rates are at least 50% greater than nonsmokers. Based on these findings and suggestions, it is logical to propose a

relationship between sickness absenteeism and smoking where respiratory disease may play a crucial role in an increased usage of sick-leave, and that no-smoking policies are therefore worthwhile strategies.

While there have been many encouraging findings in evaluations of no-smoking policies such as reductions in the reported number of cigarettes consumed per day (Borland, Owen, Hill, & Schofield, 1991; Biener, Abrams, Follick, & Dean, 1989; Harvey, 1994), improvements in perceived air quality (Becker, Conner, Waranch, Stillman, Pennington, Lees, & Oski, 1989), and increases in reported cessation rates (Borland, Chapman, Owen, & Hill, 1990; Sorsensen, Rigotti, Rosen, Pinney, & Prible, 1991), there has not been much experiment-based research in terms of effects on absenteeism rates. However, as cited above, there is a wealth of literature proposing a link between smoking behaviour and absenteeism. Therefore, given the relationship between employee smoking and absence due to illness, the main objective of this study is to unobtrusively analyze the absenteeism rates of government workers both before and after the introduction of a no-smoking policy in order to determine whether smoking prohibition actually influences absenteeism rates. However, predicting the effects of the policy on absenteeism rates is difficult since the health effects of smoking cessation or

reduction on employees may take years in which to occur. Therefore, this investigation maintains a purely exploratory approach.

Before aspects of the design and methods are presented, it is useful to discuss various dependent measures, findings, and methods utilized in previous absenteeism research.

Theories of Absenteeism

The Withdrawal Theory of Absence. As mentioned above, the challenge of researchers is to differentiate between absences that are legitimate from those that are not. The distinction between the two concepts is by no means definite. For example, some make the distinction by whether the employee produces a medical certificate; those who do not are assumed to be "voluntary" absences (Chadwick-Jones, et al., 1982). The element of choice is inherent in such perceptions of absenteeism categories. However, Steers & Rhodes (1978) suggest at least three incidences where absenteeism is unavoidable and therefore involuntary; illness and accidents, transportation problems, and family predicaments. Despite this, Chadwick-Jones et al. (1982) question this distinction since it is possible that some accidents may be "chosen" or some illnesses are relative to the individual or psychosomatic in nature. In both cases, absences which are perceived as involuntary may in fact be

voluntary. Although employees may legitimize their absence in the form of a medical certificate, doctor's notes are quite easy to obtain if the employee complains of ailments that are difficult to confirm medically (such as headaches or backaches); physicians more often than not accept the complaint as evidence for the illness (Chadwick-Jones et al., 1982).

Since unavoidable and avoidable absenteeism is difficult to distinguish in terms of the medical certificate, most robust theories of absenteeism focus on the employees' need to "withdraw" from the workplace by either a conscious decision or subconscious need (in other words, psychosomatic illnesses).

Hill & Trist's (1953) theory of employee withdrawal, one of the earliest in the literature, attempts to explain how seemingly involuntary absences are voluntary. They propose that a portion of voluntary absenteeism occurs when employees encounter conflicts in satisfactions and obligations such that they withdraw from the work situation by means of accidents or unauthorized absences. Once employees become familiar with the organizational culture, the norms of the organization are internalized by employees who become aware of the types and amounts of absences tolerated. According to Hill & Trist (1953), the employee realizes the amount of absences without permission which is tolerable by the employer and therefore, any absences beyond

the permissible amount occur in the form of minor accidents or ailments. While Hill & Trist's (1953) theory has been influential, it has been criticized for not emphasizing the group nature of the absence phenomenon (Chadwick-Jones et al., 1982). While they do discuss the importance of social norms and internalization, they explain a group-based phenomenon in terms of the individual utilizing uncertificated sickness absence as a means of coping with stress, or "individual internal problems" (Chadwick-Jones et al., 1982, p.10).

Social Exchange Theory of Absenteeism. In a variation of the withdrawal perspective of absenteeism, Chadwick-Jones et al. (1982) propose a theory which emphasizes the social context. The interaction between employees and employers is seen as a social exchange based upon both formal and informal contracts. Such formal contracts are pay levels, rules and policies, hours, job duties etc., while informal contracts contain supervisory styles, peer-group relations, and, relevant for this discussion, absences from work. Absences are a negative exchange in that something is taken away and withheld. In this way, absences are understood as something that occurs in response to negative working conditions, "absences may be traded against negative factors such as overly rigid working schedules" (Chadwick-Jones et al., 1982, p.11).

Consistent with Hill & Trist's (1953) theory, Chadwick-Jones et al. (1982) suggest that employees internalize the organizational rules surrounding the frequency and duration of permissible absenteeism and therefore reflect social exchange within an organization. However, among exchanges between individuals and work groups or work groups and management, Chadwick-Jones et al. (1982) found it inconceivable that there could be an exchange between the individual and the organization without the social conditions and rules. The research performed by Chadwick-Jones et al. (1982) is consistent with their claim that absences are part of an informal contract between the employee and the organization, given the particular working conditions. In a study of several organizations, they observed distinct absenteeism patterns within each in terms of seasonal fluctuations, total time used per employee and the frequency of absenteeism episodes.

Types of Absence Measures

The Time-Lost Measure of Absence. As mentioned earlier, researchers suggest that voluntary absences occur even if the employee produces a medical certificate legitimizing the illness (Chadwick-Jones et al., 1982). Support for this comes from research demonstrating a change in absenteeism rates corresponding to changes in sick-leave policies (e.g., Dalton, et al, 1991, See above). However,

it is very difficult to determine how much of the voluntary absenteeism disguised as certificated absenteeism exists. Chadwick-Jones et al. (1982; 1973) propose that certain types of absence measurements are better than others for capturing voluntary absences. Accordingly, they believe that voluntary absenteeism is probably missed if both short and long-term absence data are incorporated into one measure. Therefore, absence estimates based on time-lost measures contain more legitimate (or involuntary) cases of absenteeism simply because these estimates are heavily weighted with long-term absences.

The time-lost category of measurements, the most widely used indices of absenteeism (Farrell et al., 1988), are simply "the percentage of possible or scheduled working time lost due to all types of absences" (Chadwick-Jones et al. 1982, p.55). Most research studying various predictors of absenteeism have correlated personal and psychological factors with time-lost measures (Farrell et al., 1988; Chadwick-Jones et al., 1973). However, since voluntary absences tend to be more short-term in nature, time-lost measures are seen as less sensitive to voluntary absences. Consequently, time-lost measures have been criticized as being biased toward long-term absences and therefore inadequate measures of absenteeism (Garrison et al., 1977). Chadwick-Jones et al. (1982) suggest "one man away from work for one month with pneumoconiosis will contribute as much to

the time-lost statistic as ten men who choose to take 2-3 days a month" (p.56). However, Chadwick-Jones et al. (1973) do suggest that while time-lost measures may not be useful for voluntary absences, "they may help research in industrial medicine which is concerned with variation in type A (or unavoidable) sickness absence only" (p. 76). As well, time-lost measures are also useful for investigations into the estimation of financial liability incurred by organizations (Martocchio, 1992).

The Frequency Index and Short Term Measures of Absence. Instead of the time-lost measures, an alternative used to capture the voluntary absence phenomenon is the frequency index. This index is simply the number of absences occurring in a given time period. While time-lost indices have been recognized as heavily weighted for long-term absences (and thus unavoidable absences), frequency indices have been perceived as a more accurate measure of avoidable absences (Chadwick-Jones et al., 1973). In their research of four clothing manufacturers, Chadwick-Jones et al. (1973) compared three indices (time-lost, frequency index and short-term measures) and concluded that frequency and short-term measures were more accurate in indexing absences which were voluntary in nature than time-lost measures.

Short-term (or attitudinal) indices are derivations of frequency indices which take into account the number of absences less than a given duration (usually two days or less). For example, Chadwick-Jones et al. (1973) designated those absence-episodes which were two days in duration or less as short-term or attitudinal illnesses. Such indices are even more sensitive to voluntary absence than frequency indices (Chadwick-Jones et al., 1982).

Given the wide variation in dependent measures of absenteeism, Muchinsky (1977) suggested that absenteeism is "burdened" by the inconsistent use of various absenteeism measures because of the difficulty of comparing between studies. Furthermore, Muchinsky (1977) added that while a few studies have attempted to gauge the reliability of the absenteeism measures they employed, almost none of the articles he reviewed attempted to determine the validity of the measures; "...the methodological hodgepodge surrounding absenteeism indices plagues the evaluation and interpretation of absenteeism research" (p.322). However, Muchinsky (1977) also admitted that it will be extremely difficult to produce a single measure of absenteeism that will encompass the various types of absences.

Correlates of Absenteeism

In terms of the predictor variables studied in absence research, three main categories have been cited. The

category gaining most attention in the literature has been psychological correlates such as job satisfaction, organizational commitment, stress, and job involvement. Much of this attention probably stems from the withdrawal interpretation of absenteeism. The category which has also received attention includes personal factors such as the demographic variables, age and tenure. Finally, the category receiving little attention relative to psychological and personal factors consists of organizational-wide variables such as the effects of various type of sick-leave policies and absence control policies (Farrell et al., 1988).

Psychological factors and absenteeism. In terms of relationships between psychological factors and absenteeism, most have focused on worker attitudes or employee satisfaction and absenteeism. Nicholson, Brown, & Chadwick-Jones (1976) suggest several reasons why employee absence and job satisfaction have been a popular pair in the research. First of all, they suggest that the concept makes intuitive sense - if people are dissatisfied with their jobs, they will withdraw from the work situation. The term "withdraw" suggests another reason for popularity of the job satisfaction-absence relationship in that it is consistent with the "withdrawal theory" of absenteeism proposed by Hill & Trist (1953) (and the social exchange theory offered by

Chadwick-Jones et al., 1982). As well, the relationship is common because it provides justification for employers to actively look for ways to improve the quality of the employee work experience. Finally, there appears to be a number of reports demonstrating a relationship between worker attitudes and absenteeism.

While there have been many published articles about the satisfaction-absence relationship and several literature reviews integrating their results, as is typical of absenteeism research, inconsistencies are even inherent in the review articles. Muchinsky (1977), despite being very critical of the inconsistencies among absenteeism investigations, concluded that highly consistent results have been observed in reports relating job satisfaction to absenteeism; in most of the studies, researchers found a significant, negative relationship between the two parameters. He further concluded that this finding was "... highly logical in that withdrawal from work should be related to attitudes towards work" (p. 326).

However, Nicholson et al. (1976) were more critical of the job satisfaction-absenteeism research. In an assessment of many of the same articles cited by Muchinsky (1977), Nicholson et al. (1976) (also reported in Chadwick-Jones et al., 1982) separated them into three groups, "individual correlational" (absence and satisfaction scores are correlated across individuals), "contrasted groups" (groups

or classes of high and low scores are divided and analyzed) or "group correlational" (average absences and satisfaction scores are correlated) (p. 729). Nicholson et al. (1977) found that despite being more rigorous, "individual correlational" studies exhibited as many significant correlations as nonsignificant correlations. Further, "contrast group" studies, despite being unanimous in their findings (i.e., significant, negative relationships), were perceived as difficult to interpret since half presented only descriptive statistics and selective grouping of extreme scores may have yielded artificial differences not based on linear associations between the absences and job satisfaction. Finally, in the "group correlational" category, they suggested that they are improper studies on absenteeism because the authors neglected individual variance by grouping the data.

Consequently, when Nicholson et al. (1976) carried out a study of 1222 male and female production workers in 16 organizations differing in technologies, they found that no significant relationship existed between job satisfaction and absenteeism in most of the organizations studied. They concluded that the common perception that job satisfaction is a consistent and significant predictor of absenteeism is "empirically unsupportable" (p. 735). Chadwick-Jones et al. (1982) state that "it is not possible to establish more than a weak connection between job satisfactions and absences"

(p. 99). Later meta-analyses found similar results reflecting the weak relationship between absences and job satisfaction (Scott & Taylor, 1985).

Personal Factors and Absenteeism. Personal factors such as the demographic variables, age and tenure, have also been widely studied (Farrell et al., 1988). While studies investigating possible gender differences exist (e.g., Pines, Skulkeo, Pollak, Peritz, & Steif, 1985; Ferris, Bergin, & Wayne, 1988), none of the existing literature reviews summarizes the findings (Farrell et al., 1988). In terms of research on employee age, the basic suggestion is that we should expect less absenteeism in older employees (Chadwick-Jones et al., 1982). Theoretically, some postulate that older workers are more settled into work schedules and routines and may participate less in leisure group activities, have "fewer outside social activities" or "a smaller number of friends" (Chadwick-Jones et al., 1982, p. 106). On the other hand, if some forms of absenteeism are seen as a form of reaction to rigid work schedules, younger employees may have a stronger reaction than older employees (Chadwick-Jones et al., 1982).

There have been many articles published about employee age and tenure since they have been used to explain additional variance in job satisfaction/absence studies (Staw, 1984). Hacked & Guion (1985) attributed the weakness

of job satisfaction and absence relationship to the confounding affects of a consistent negative relationship between age and absenteeism. Muchinsky (1977) reviewed five age/absence and three tenure/absence reports only to conclude that results were highly inconsistent. However, Chadwick-Jones et al. (1982) reviewed 28 cross-sectional studies and found that age and length of service were strong and negative predictors for absence measures representing short, casual absences (i.e., frequency and short term measures) and that few significant correlations were found between age or length of service when the time-lost measure was used (i.e., the sickness or involuntary measure). Based on these results, Chadwick-Jones et al. (1982) concluded that young, short-service workers, especially males, have a higher susceptibility to casual absences, while relationships between longer-term absence (time-lost) and age and length are more variable.

Work Environmental and Organizational factors. Most of the research focusing on work environment and organizational factors has concentrated on organization-size with the most consistent finding being a positive correlation with absence rate (Muchinsky, 1977; Porter & Steers, 1973). Other less scrutinized variables also demonstrating significant relationships include pay-level, job-autonomy, the effects of incentive pay and disciplinary

systems aimed at controlling absenteeism and task repetitiveness (Farrell & Stamm, 1982; Muchinsky, 1977; Porter & Steers, 1973).

In terms of organizational-size, Porter et al. (1973) theorized that the larger an organization, "the lower group cohesiveness, higher task specialization and poorer employee communication" (p. 159). As a result, employees find it difficult to reach full expectation in the position and therefore decreased satisfaction and hence an increased desire to withdraw. Porter et al. (1973) further suggested that such a trend would not be as prevalent among white-collar workers because they typically experience more job autonomy and intrinsic incentives. While this suggestion seems intuitively feasible, there is little research demonstrating a different trend among blue and white collar workers. Nonetheless, Muchinsky (1977) did cite one article (Metzner & Mann, 1953) demonstrating a difference and the Chadwick-Jones et al. (1982) research on absenteeism trends among different industries also showed different absenteeism rates among employees from different occupational groups. From their findings, Chadwick-Jones et al. (1982) suggested that different occupational groups seem to develop their own "rules" in terms of the amount and frequency of absenteeism deemed acceptable in the organization and such "absence cultures" serve as important moderating variables between predictors and indices of absenteeism.

In a comprehensive meta-analysis of various correlates of absenteeism, Farrell & Stamm (1988) categorized 72 studies with respect to the type of dependent measure (time-lost or frequency) and predictor type (psychological, demographic, work environment or organization-wide factors). The researchers determined that both organization-wide (pay and absence-control policies) and work-environment (task autonomy) factors were better predictors of absenteeism than demographic and psychological factors. In fact, for both measures of absenteeism (frequency and time-lost), organizational-wide and work environment factors had consistent effects more than twice as often as did the same number of correlates in the demographic and psychological categories. As well, all of the consistent organizational-wide or work environment factors were statistically significant. Based on such research, it seems that work environment and organization-wide variables are the most promising areas in absence research.

Objectives of the Present Analysis

On April 1st, 1991, the Government of Newfoundland and Labrador adopted a "Smoke Free Workplace Policy" for government employees. This total smoking ban included offices, hallways, washrooms, cafeterias, etc. According to notices sent to each department, the policy was introduced to "...provide a safe and healthy work environment free from

the harmful effects of tobacco smoke." Government also offered smoking cessation programs for interested employees.

While April, 1991 was the general deadline for each department to implement the policy, several departments had already been smoke-free for as many as three years prior to this date.

In light of this event and previous studies on smoking and absenteeism, the present investigation seeks to explore the dynamics of employee absenteeism before and after the introduction of the no-smoking policy in Newfoundland's Public Service. In a time-series design, employee sick-leave records are analyzed to see whether there is a change. Since previous research demonstrates a sensitivity difference among various measures in terms of avoidable and unavoidable absence, total-time (also referred to above as the time-lost measure), frequency and short term indices are used.

This study is exploratory in nature and therefore does not make definite predictions with respect to absenteeism rates following the policy introduction. In particular, there is a problem in estimating the time during which involuntary absenteeism will be affected. It seems likely that there will be no immediate impact on involuntary absenteeism because health effects of smoking cessation or reduction may take several years in which to manifest. Consequently, it is probable that no change in the total-

time measure of absenteeism will result during the test period. However, we may predict a change in voluntary illness as indexed by both the frequency and short term measures since the work environment is more comfortable for those who are bothered by tobacco smoke. More specifically, those individuals who have made decisions to withdraw from the workplace due to excessive smoking may reduce their withdrawal behaviour when the environment becomes smoke free.

METHOD

Subjects

Three hundred and nine General Service (GS) workers from Newfoundland's Provincial Government were the subjects of this investigation. In order to limit the potential effects of occupational group (an important component of absence behaviour, Chadwick-Jones et al., 1982, 1973), only GS employees were included. This bargaining unit, which comprises more than 50% of all unionized workers in the Newfoundland Government, has a fairly equal distribution of male and female employees. It represents most office-oriented, non-management workers and abides by the same sick-leave policy which has not been altered since its introduction.

Employee Location and Departments

The fact that public service workers are distributed throughout the province offered some threat to the interpretation of results. Therefore, only those employees from two buildings in which head offices are located were selected. This was done to minimize the potential effects of distinctive variables operating at different worksites. General Service employees working in head offices were differentiated from those working at other worksites by

spatial-layout drawings created by an architectural-consulting firm frequently employed by government.

Of the 18 departments (See Table 1), 4 were selected for two reasons. First, there was a three-year difference in policy-introduction time. This strengthens the internal validity of the results by minimizing any threat due to history (Campbell & Stanley, 1966). Second, these departments were selected because they did not experience significant changes or reorganizations in the past several years. The four departments selected, the dates of the no-smoking policy introduction and the number of employees included are presented in Table 2. While there has been some staff turnover in recent years, these departments have remained reasonably constant in terms of employee-numbers, physical location and jurisdiction or purpose.

The Design

As opposed to the correlational/self-report approach typically utilized in evaluations of no-smoking policies, the approach employed here is quasi-experimental. Utilizing employee sick-leave records from April, 1989 to March, 1993 for the Departments of Finance and Employment and Labour Relations, and April, 1986 to March 1990, for the Departments of Education and Social Services, sick-leave use, both before and after the policy introduction, was compared in a time-series analysis.

Table 1

Departments of the Newfoundland Public Service and those selected for this investigation

Auditor General	Health
Industry, Trade and Technology	Legislature
Education *	Justice
Employment and Labour Relations *	Mines and Energy
Environment and Lands	Municipal and
Executive Council	Provincial Affairs
Finance *	Public Service Comm.
Fisheries	Social Services *
Forest and Agriculture	Tourism and Culture
Work, Service and Transportation	

* Selected Departments

Table 2

Selected departments, dates of policy introduction, and the number of GS employees included from each

Department	Policy Introduction Date	Number of Employees
Education	March, 1988	* 60
Finance	April, 1991	** 98
Social Services	January, 1988	* 70
Employment & Labour Relations	April, 1991	* 81
Total		**309**

* Total number of GS employees in head office
** Randomly selected from the Dept of Finance

Such a design allows for the observation of seasonal fluctuations in absenteeism and signifies the influence of other significant events occurring during the same time period. It has the added strength of incorporating four groups or departments, experiencing the introduction of the same policy at different times, as control groups (such a design has been termed a "multiple group design with switching replications", Campbell & Stanley, 1966). Thus, if changes in absenteeism rates occur in more than one department after policy introduction, strong evidence for the policy's effect would be apparent and the threat of history would be weakened (Campbell & Stanley, 1966). Similarly, if no changes in absenteeism among the departments result, there would be strong evidence of the policies lack of effect on absenteeism.

Unfortunately, the archival nature of this design makes it impossible to compare sick-leave use between smoking and non-smoking populations. While this was the original intention, obtaining permission from the unions to survey employees about their smoking status was seen as politically sensitive and therefore discouraged by Treasury Board officials. The reason for this concerned the fact that unions were, at that time, bargaining for a new collective agreement including sick-leave benefits. Consequently, it was felt that canvassing unions for permission to survey employees could have jeopardized bargaining and research.

The Dependent Measures

To measure sick-leave usage, three indices were used. The total-time (also referred to as the time-lost measure), frequency and short term indices were employed based on the proposition that each measure is uniquely sensitive to both voluntary and involuntary absenteeism. As discussed above, the total-time index appears to be a more sensitive measure of involuntary or unavoidable absenteeism since it is more biased toward longer-term absences which are typically perceived as legitimate. Conversely, both frequency and short term (or attitudinal) indices are perceived as a more powerful measure of voluntary or avoidable absenteeism since they gauge the number of absence episodes (the short term index being the most sensitive) (Chadwick-Jones et al., 1982; Farrell et al., 1988).

All three measures were based upon monthly averages and were calculated as follows:

A. the Total-Time Index (TTI) - the average number of sick-leave days per employee, per month,
B. the Frequency Index (FI) - the average number of sick-leave episodes per employee, per month, and
C. the Short-Term Index (STI) - the average number of sick-leave episodes where the number of days is two or less, per employee, per month[2].

The Departments of Social Services, Finance, and Employment and Labour Relations were represented by 48 TTI measures, 48 FI measures, and 48 STI measures, while the Department of Education was represented by 47 TTI, FI and STI measures.

The Analysis

The statistical analysis of data was carried out by conducting auto-regressive integrative moving average analyses (ARIMA(p,d,q)) developed by Box & Jenkins (1976). For each dependent measure, average monthly sick-leave use was modeled for each government department separately and for all departments combined. In total, 15 autocorrelation functions and partial autocorrelation functions were produced representing the three measures of the four departments plus three additional measures of all departments combined.

Through the process of model identification, we determined whether the scores representing the time-series illustrations of each department were autocorrelated (and therefore required the "intervention" method of data analysis) or not autocorrelated thus permitting the traditional Ordinary Least Squares (OLS) analysis of variance (ANOVA) procedures (McCain & McCleary, 1979).

RESULTS

Analyses of the Total-Time Index (TTI)

In the analyses to follow, all observations are based on a specific measure of sick-leave usage called the Total Time Index (TTI) representing the average number of monthly sick-leave days taken per employee[3].

Analysis of TTI Measures for the Department of Social Services. Illustrated in Figure 1 are the monthly TTI's for the Department of Social Services before and after the no-smoking policy was introduced during January, 1988. The average monthly number of days taken by each employee ranged from 0.3 days to 1.5 days (See Appendix A).

In Figure 2, both the ACF and PACF plots are displayed. The ACF appears stationary thus suggesting a zero value for the d component of the ARIMA model. As well, the ACF appears to die out exponentially while the PACF has one lone spike at the first lag. This suggests an autoregressive process whereby the previous value in a series allows for the prediction the current value. Since this series was identified as an autoregressive process, a value of one was assigned to the p component of the ARIMA model. Based on the ACF and PACF plots, the TTI series of the Department of Social Services was best represented by the ARIMA (1,0,0) model.

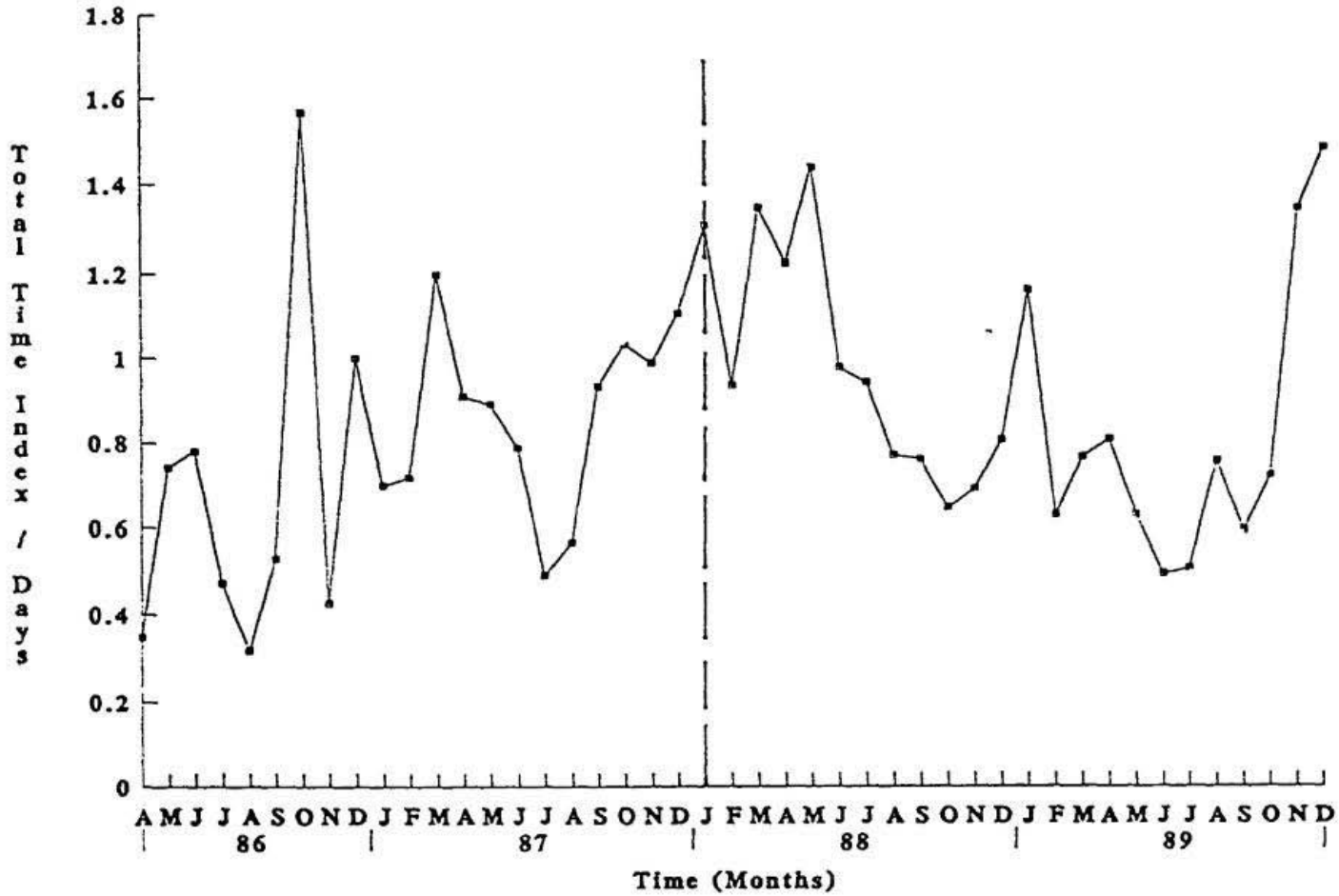
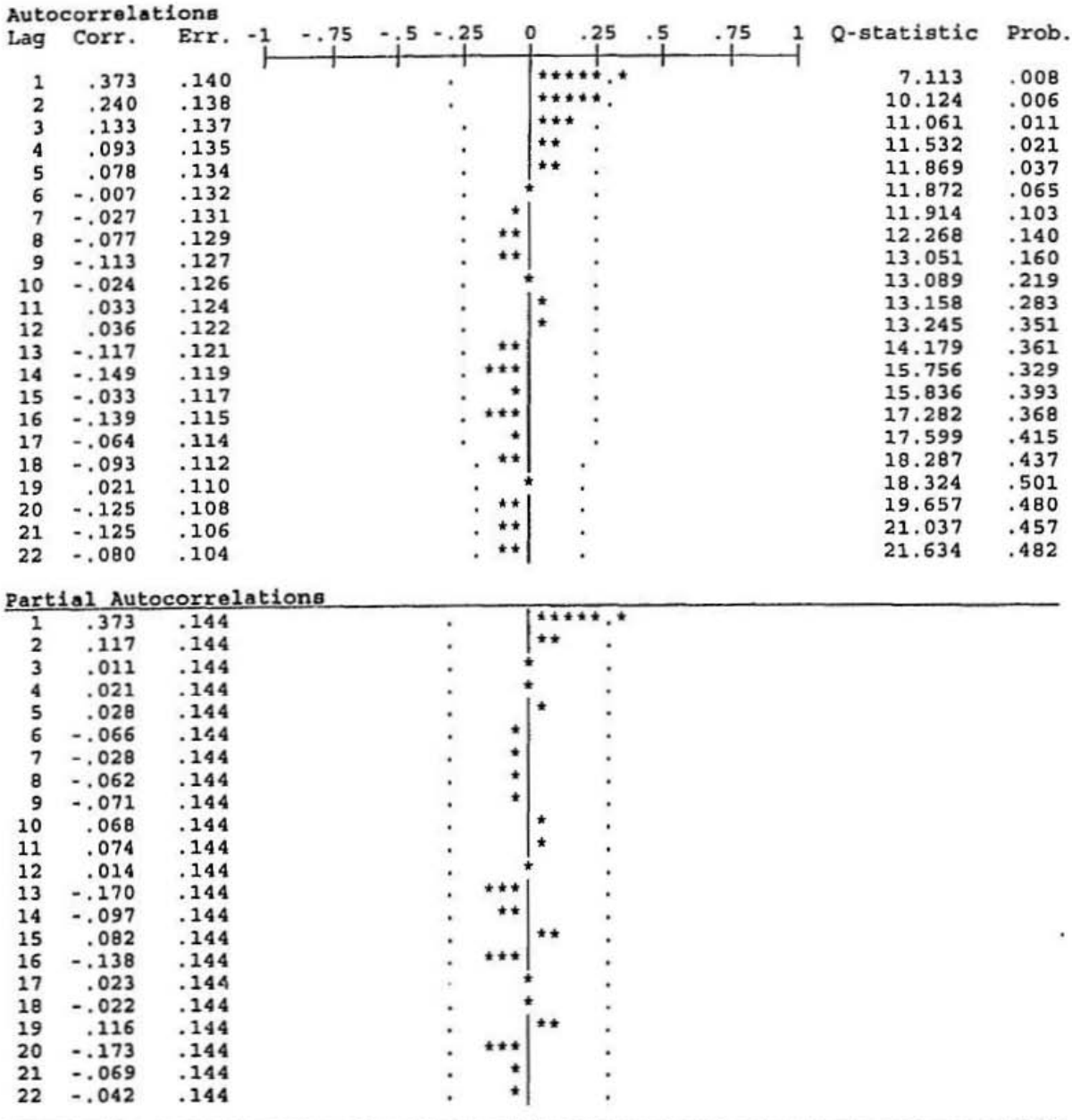


Figure 1
Average number of days taken per person per month: Department of Social Services



Autocorrelations

Lag	Corr.	Err.	Q-statistic	Prob.
1	.373	.140	7.113	.008
2	.240	.138	10.124	.006
3	.133	.137	11.061	.011
4	.093	.135	11.532	.021
5	.078	.134	11.869	.037
6	-.007	.132	11.872	.065
7	-.027	.131	11.914	.103
8	-.077	.129	12.268	.140
9	-.113	.127	13.051	.160
10	-.024	.126	13.089	.219
11	.033	.124	13.158	.283
12	.036	.122	13.245	.351
13	-.117	.121	14.179	.361
14	-.149	.119	15.756	.329
15	-.033	.117	15.836	.393
16	-.139	.115	17.282	.368
17	-.064	.114	17.599	.415
18	-.093	.112	18.287	.437
19	.021	.110	18.324	.501
20	-.125	.108	19.657	.480
21	-.125	.106	21.037	.457
22	-.080	.104	21.634	.482

Partial Autocorrelations

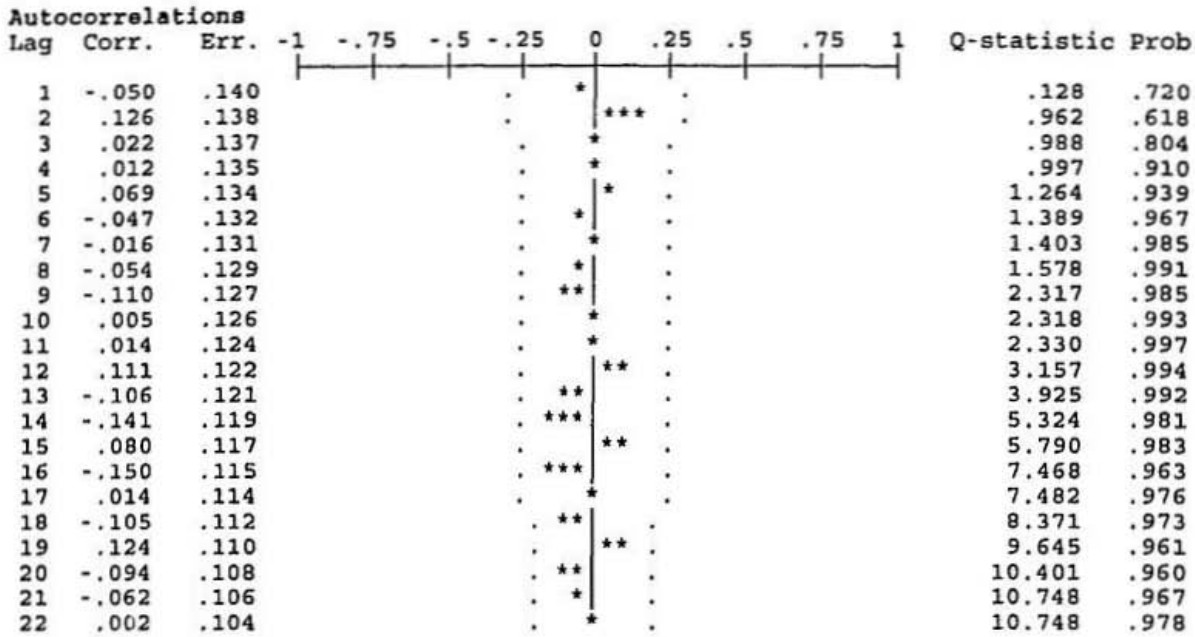
1	.373	.144	
2	.117	.144	
3	.011	.144	
4	.021	.144	
5	.028	.144	
6	-.066	.144	
7	-.028	.144	
8	-.062	.144	
9	-.071	.144	
10	.068	.144	
11	.074	.144	
12	.014	.144	
13	-.170	.144	
14	-.097	.144	
15	.082	.144	
16	-.138	.144	
17	.023	.144	
18	-.022	.144	
19	.116	.144	
20	-.173	.144	
21	-.069	.144	
22	-.042	.144	

Figure 2 - TTI ACF and PACF for the Dept of Social Services

Given this proposed model, an estimation of the magnitude of the dependency of adjacent points in the time series was carried out. In this case, the autoregressive correlation coefficient was estimated to be 0.406 ($t = 2.86$, $p = .006$). Since the autoregressive coefficient did not equal or exceed plus 1 and was significant at the .001 level, the proposed model was retained.

In the diagnosis stage, the model was tested to determine whether it accounted for the behaviour of the series and left only uncorrelated error unaccounted for. This was achieved by checking the ACF of the residuals to see whether they behaved as a white noise process. As can be seen in Figure 3, there were no spikes beyond the 95% confidence limits at either lag and all Q-statistics were not significant. Therefore, based on the results of this diagnosis stage, the ARIMA (1,0,0) model was considered acceptable.

Intervention Analysis of TTI Measures for the Department of Social Service. Once an adequate model for the series was identified, we incorporated an intervention term representing the no-smoking policy introduction into the equation. Because we were interested in whether a prolonged change existed in sick-leave behaviour following the policy introduction, we introduced a simple step function by employing dummy variables.



Autocorrelations Lag	Corr.	Err.	-1 -.75 -.5 -.25 0 .25 .5 .75 1	Q-statistic	Prob.
1	-.050	.140		.128	.720
2	.126	.138		.962	.618
3	.022	.137		.988	.804
4	.012	.135		.997	.910
5	.069	.134		1.264	.939
6	-.047	.132		1.389	.967
7	-.016	.131		1.403	.985
8	-.054	.129		1.578	.991
9	-.110	.127		2.317	.985
10	.005	.126		2.318	.993
11	.014	.124		2.330	.997
12	.111	.122		3.157	.994
13	-.106	.121		3.925	.992
14	-.141	.119		5.324	.981
15	.080	.117		5.790	.983
16	-.150	.115		7.468	.963
17	.014	.114		7.482	.976
18	-.105	.112		8.371	.973
19	.124	.110		9.645	.961
20	-.094	.108		10.401	.960
21	-.062	.106		10.748	.967
22	.002	.104		10.748	.978

Figure 3 - ACF for residuals of the Dept of Social Services

A value of zero was assigned to the series prior to the policy introduction and a value of one was introduced at the point of policy introduction (January, 1988), and for every point after.

In general, once an intervention component is introduced, the ARIMA analysis yields a coefficient indicating the direction of the change (if any) and how well the series is explained by the intervention. Generally, a negative sign suggests a decreasing trend and a positive sign suggests an increasing trend. In the case of the Social Service time-series data, the coefficient observed was 0.482 ($p = 0.109$). While the positive coefficient suggested a slight increase in the TTI, it was not significant. Based on this analysis, there was no significant change in sick-leave use for Social Services (as indexed by the TTI) following the introduction of the no-smoking policy.

Analysis of TTI Measures for the Department of Education. Figure 4 illustrates the TTI time-series for the Department of Education before and after the no-smoking policy introduction during March, 1988. As with the Department of Social Services, the TTI for the Department of Education ranged roughly between 0.3 and 1.6 days per month (See Appendix B).

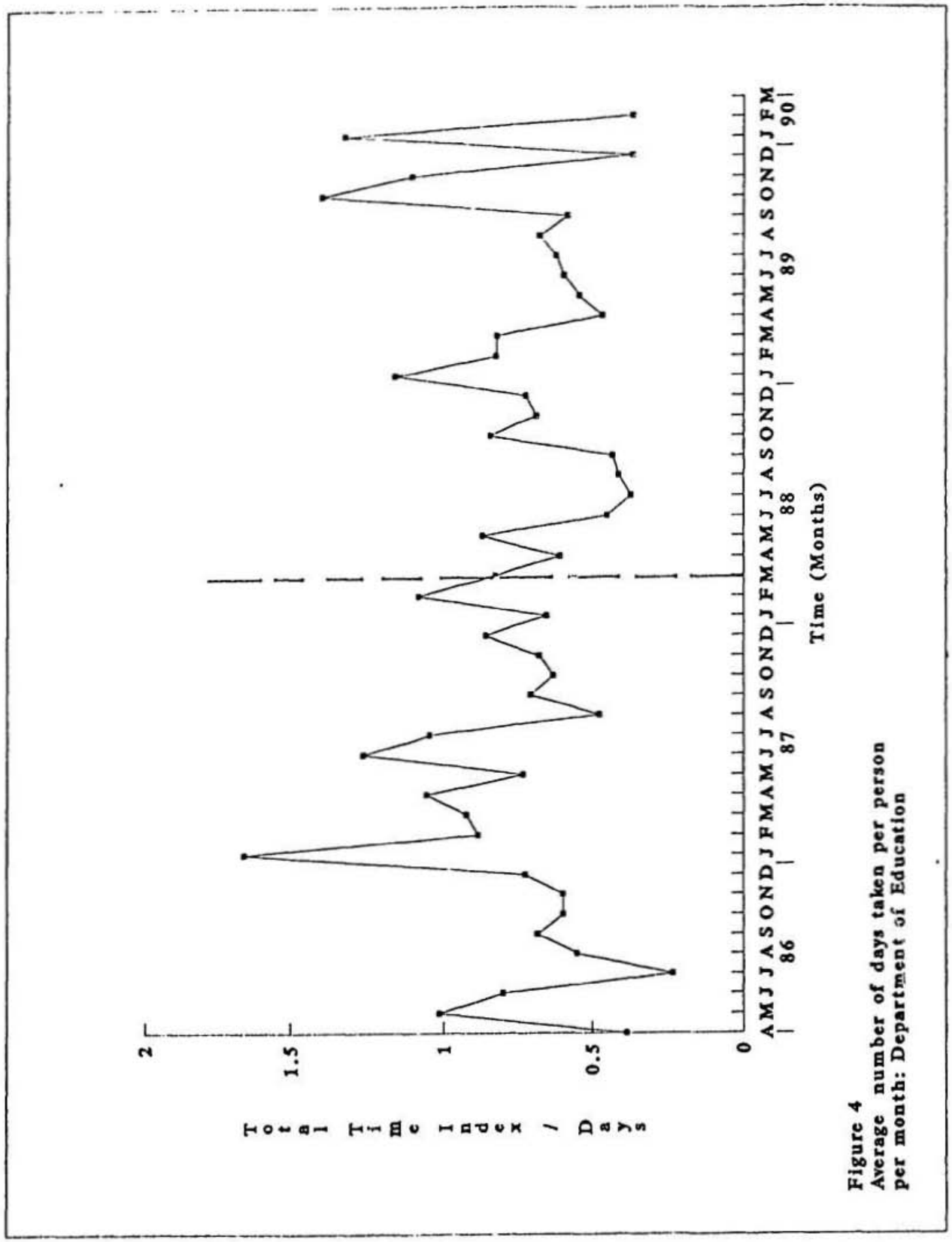


Figure 4
Average number of days taken per person per month: Department of Education

Autocorrelations

Lag	Corr.	Err.	-1 -.75 -.5 -.25 0 .25 .5 .75 1	Q-statistic	Prob.
1	.058	.141	. | * .	.167	.682
2	.054	.140	. | * .	.317	.853
3	.187	.138	. | **** .	2.145	.543
4	-.198	.137	.**** | .	4.239	.375
5	-.046	.135	. * | .	4.355	.500
6	-.273	.133	***** | .	8.528	.202
7	-.135	.132	. *** | .	9.580	.214
8	.119	.130	. | ** .	10.414	.237
9	-.065	.128	. * | .	10.669	.299
10	.148	.127	. | *** .	12.038	.283
11	-.010	.125	. * | .	12.045	.360
12	.009	.123	. * | .	12.050	.442
13	.059	.122	. | * .	12.290	.504
14	-.195	.120	.**** | .	14.954	.381
15	-.180	.118	.**** | .	17.293	.302
16	-.111	.116	. ** | .	18.212	.312
17	-.138	.114	. *** | .	19.666	.292
18	-.074	.112	. * | .	20.101	.327
19	-.081	.110	. ** | .	20.644	.357
20	.113	.108	. | ** .	21.730	.355
21	.111	.106	. | ** .	22.816	.354
22	-.050	.104	. * | .	23.043	.399

Partial Autocorrelations

1	.058	.146	. | * .	
2	.051	.146	. | * .	
3	.182	.146	. | **** .	
4	-.228	.146	.***** | .	
5	-.039	.146	. * | .	
6	-.307	.146	****** | .	
7	-.012	.146	. * | .	
8	.140	.146	. | *** .	
9	.041	.146	. | * .	
10	.083	.146	. | ** .	
11	-.168	.146	. *** | .	
12	-.030	.146	. * | .	
13	-.044	.146	. * | .	
14	-.064	.146	. * | .	
15	-.200	.146	. **** | .	
16	-.072	.146	. * | .	
17	-.091	.146	. ** | .	
18	-.084	.146	. ** | .	
19	-.098	.146	. ** | .	
20	.029	.146	. | * .	
21	-.011	.146	. * | .	
22	-.158	.146	. *** | .	

Figure 5 - TTI ACF and PACF for the Dept of Education

However, unlike Social Services, Education's ACF and PACF plots (shown in Figure 5) exhibited no significant correlations among any of its monthly TTI's as demonstrated by the absence of autocorrelation spikes beyond the 95% confidence limits and no significant Q-statistics at any lag. Based on the appearances of the ACF and PACF, the TTI series did not require differencing (hence a zero d value), and contained no evidence of an autoregressive or moving average component (and hence zero p and q values). As a result, the model was given an ARIMA (0,0,0) structure.

Since the TTI values were not significantly correlated at any lag, we compared the scores before the policy introduction with those after by means of ANOVA (the assumption of independence was not violated). While some researchers suggest that repeated measures ANOVAs are more appropriate in such cases (at least 50 to 100 cases with uncorrelated errors, McCain & McCleary, 1979), given that each score in the time-series was uncorrelated, we felt it unnecessary to account for non-significant correlations through repeated measures procedures. Therefore, for all analyses that require ANOVA in this section, all pre and post scores are treated independently.

A comparison of the pre-TTI values (24 scores with a mean of 0.7865 days) with the post-TTI values (23 scores with a mean of 0.7058 days) indicated no significant difference ($F(1,46) = .84$, $p = 0.365$).

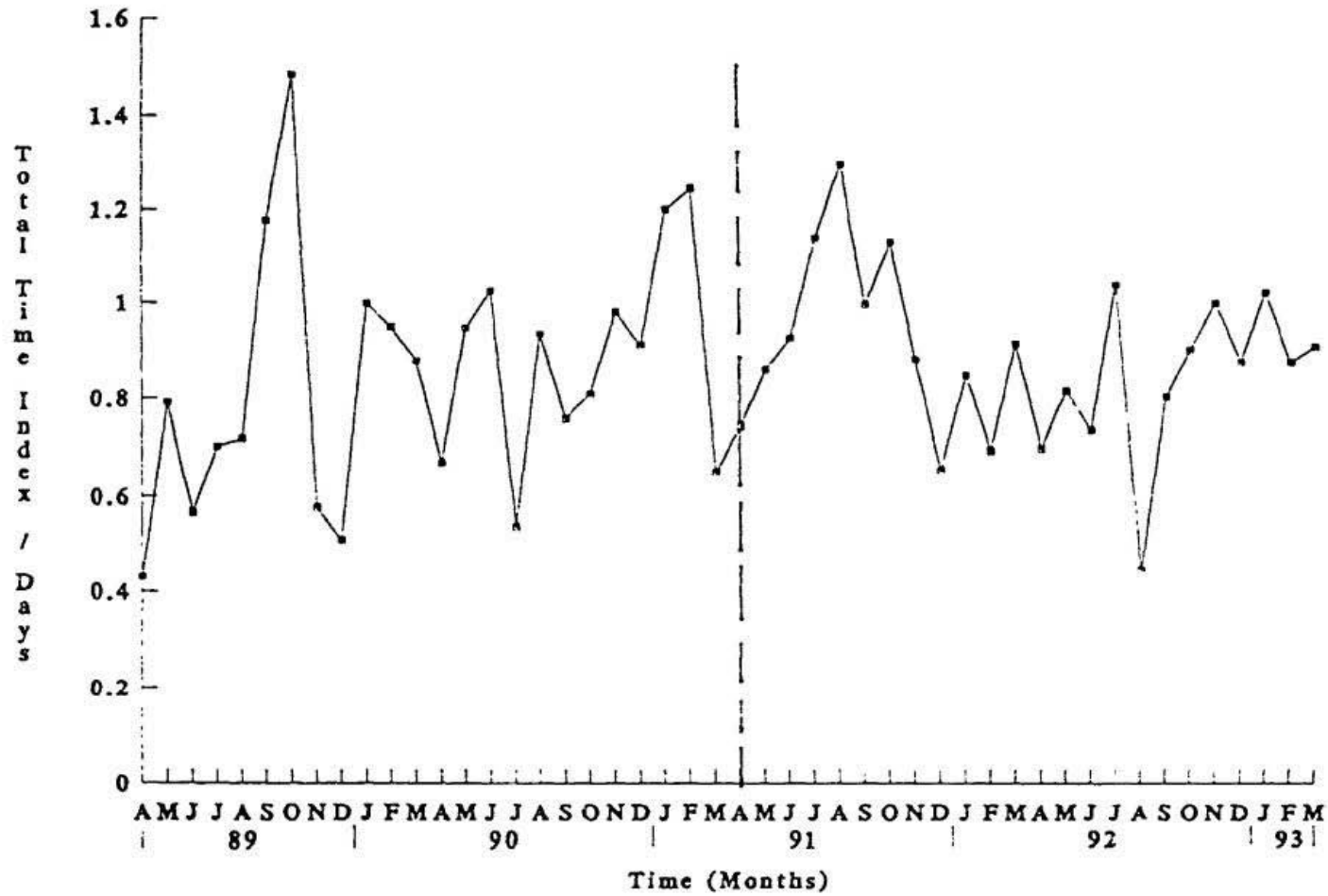
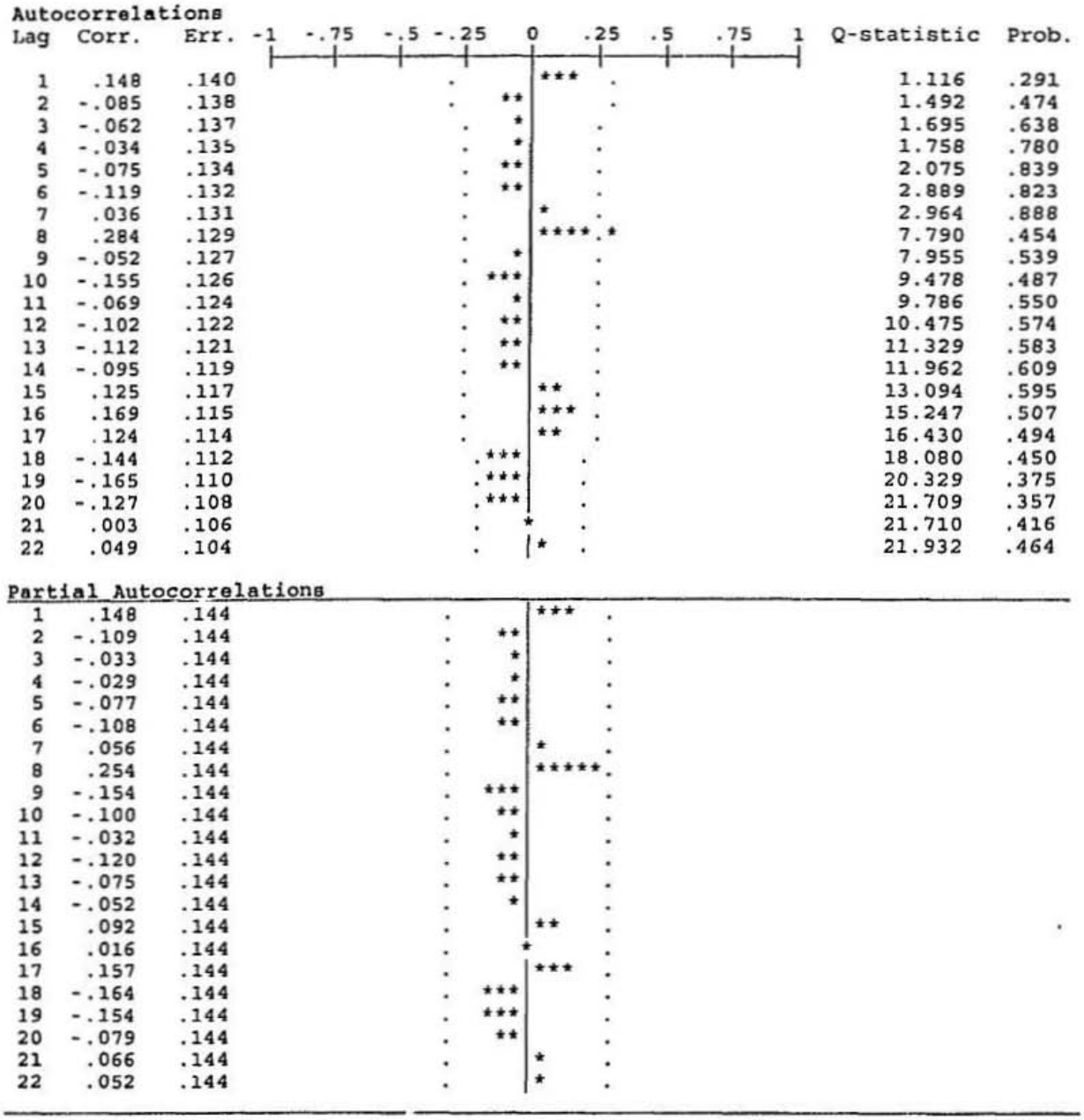


Figure 6
Average number of days taken per person per month: Department of Finance



Autocorrelations

Lag	Corr.	Err.	Q-statistic	Prob.
1	.148	.140	1.116	.291
2	-.085	.138	1.492	.474
3	-.062	.137	1.695	.638
4	-.034	.135	1.758	.780
5	-.075	.134	2.075	.839
6	-.119	.132	2.889	.823
7	.036	.131	2.964	.888
8	.284	.129	7.790	.454
9	-.052	.127	7.955	.539
10	-.155	.126	9.478	.487
11	-.069	.124	9.786	.550
12	-.102	.122	10.475	.574
13	-.112	.121	11.329	.583
14	-.095	.119	11.962	.609
15	.125	.117	13.094	.595
16	.169	.115	15.247	.507
17	.124	.114	16.430	.494
18	-.144	.112	18.080	.450
19	-.165	.110	20.329	.375
20	-.127	.108	21.709	.357
21	.003	.106	21.710	.416
22	.049	.104	21.932	.464

Partial Autocorrelations

1	.148	.144
2	-.109	.144
3	-.033	.144
4	-.029	.144
5	-.077	.144
6	-.108	.144
7	.056	.144
8	.254	.144
9	-.154	.144
10	-.100	.144
11	-.032	.144
12	-.120	.144
13	-.075	.144
14	-.052	.144
15	.092	.144
16	.016	.144
17	.157	.144
18	-.164	.144
19	-.154	.144
20	-.079	.144
21	.066	.144
22	.052	.144

Figure 7 - TTI ACF and PACF for the Dept of Finance

Hence, no significant change in the average number of sick-leave days resulted after the no-smoking policy introduction.

Analysis of TTI Measures for the Department of Finance. The time-series plot for the Department of Finance is shown in Figure 6. From April, 1989 to March, 1993, the TTI fluctuated between approximately 0.4 days and 1.5 days per month (see Appendix C). The figure also shows the introduction of the no-smoking policy during April, 1991 (the last deadline given to all remaining provincial departments not yet completely smoke free).

Again, looking at the ACF and PACF illustrations in Figure 7, while there is a slight spike exceeding the 95% confidence level at lag 8, no significant Q-statistics exist among any lag. Therefore, similar to Education, the model identified for the Department of Finance was ARIMA (0,0,0).

Given the independence among TTI points, the TTI values prior to the introduction of the no-smoking policy (24 scores with a mean of 0.8548 days) were compared to the TTI scores following the no-smoking policy (24 scores with a mean of 0.8885 days) using ANOVA. Based on the analysis of Department of Finance TTI measures, no significant difference was found ($F(1,47) = .28$, $p = 0.602$).

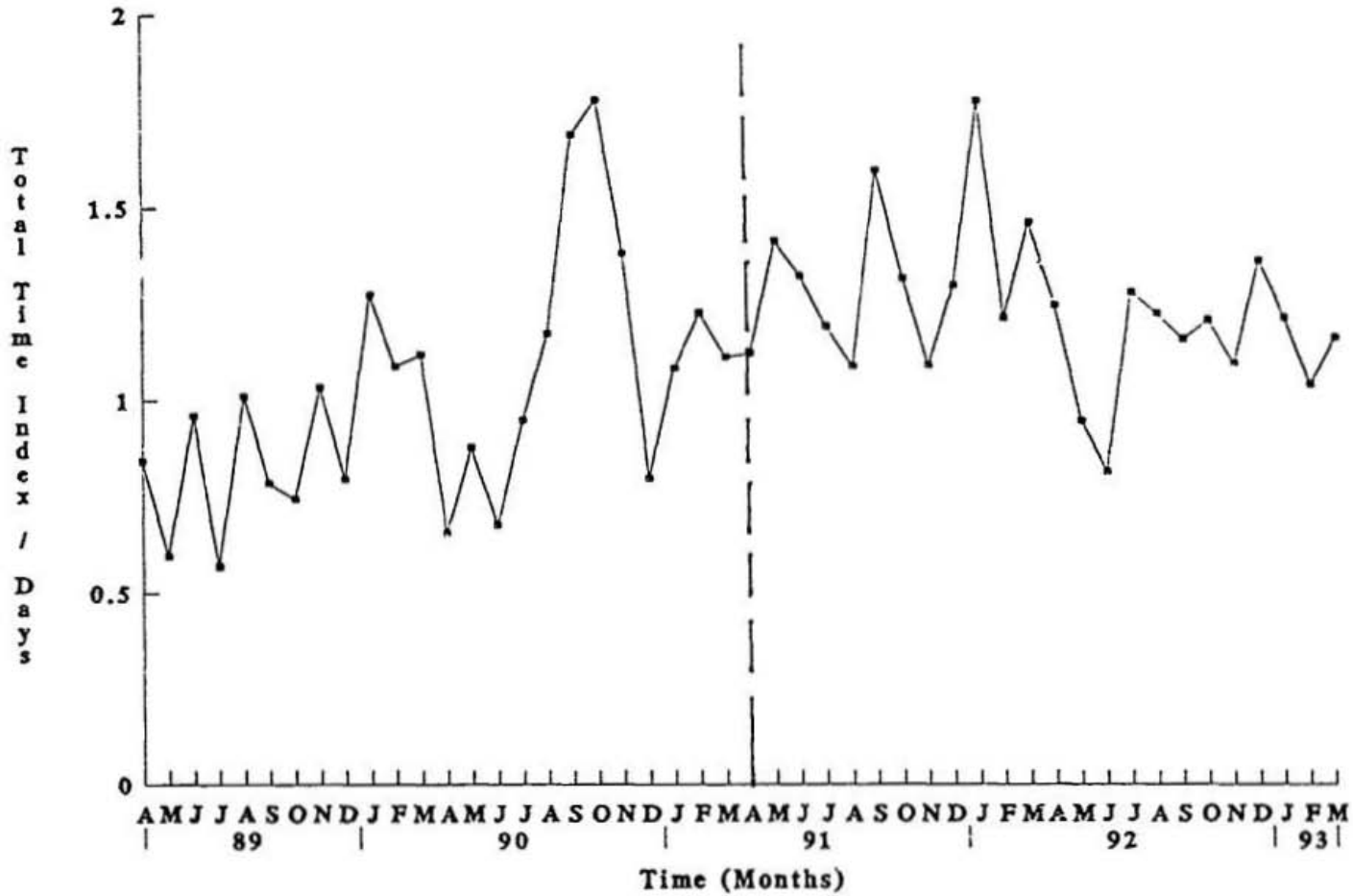
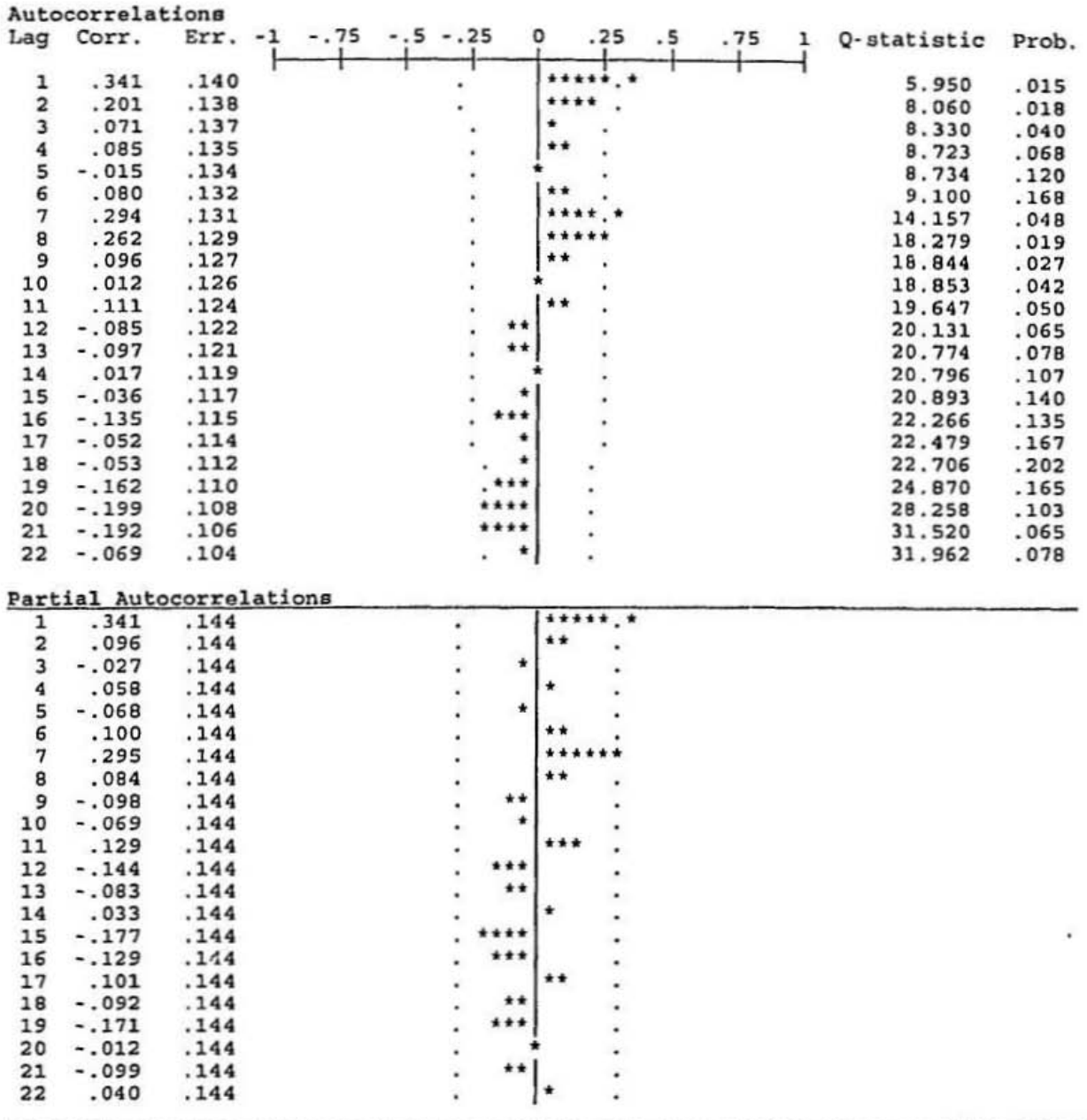


Figure 8
Average number of days taken per person per month: Dept of Employment & Labour



Autocorrelations

Lag	Corr.	Err.	Q-statistic	Prob.
1	.341	.140	5.950	.015
2	.201	.138	8.060	.018
3	.071	.137	8.330	.040
4	.085	.135	8.723	.068
5	-.015	.134	8.734	.120
6	.080	.132	9.100	.168
7	.294	.131	14.157	.048
8	.262	.129	18.279	.019
9	.096	.127	18.844	.027
10	.012	.126	18.853	.042
11	.111	.124	19.647	.050
12	-.085	.122	20.131	.065
13	-.097	.121	20.774	.078
14	.017	.119	20.796	.107
15	-.036	.117	20.893	.140
16	-.135	.115	22.266	.135
17	-.052	.114	22.479	.167
18	-.053	.112	22.706	.202
19	-.162	.110	24.870	.165
20	-.199	.108	28.258	.103
21	-.192	.106	31.520	.065
22	-.069	.104	31.962	.078

Partial Autocorrelations

1	.341	.144	
2	.096	.144	
3	-.027	.144	
4	.058	.144	
5	-.068	.144	
6	.100	.144	
7	.295	.144	
8	.084	.144	
9	-.098	.144	
10	-.069	.144	
11	.129	.144	
12	-.144	.144	
13	-.083	.144	
14	.033	.144	
15	-.177	.144	
16	-.129	.144	
17	.101	.144	
18	-.092	.144	
19	-.171	.144	
20	-.012	.144	
21	-.099	.144	
22	.040	.144	

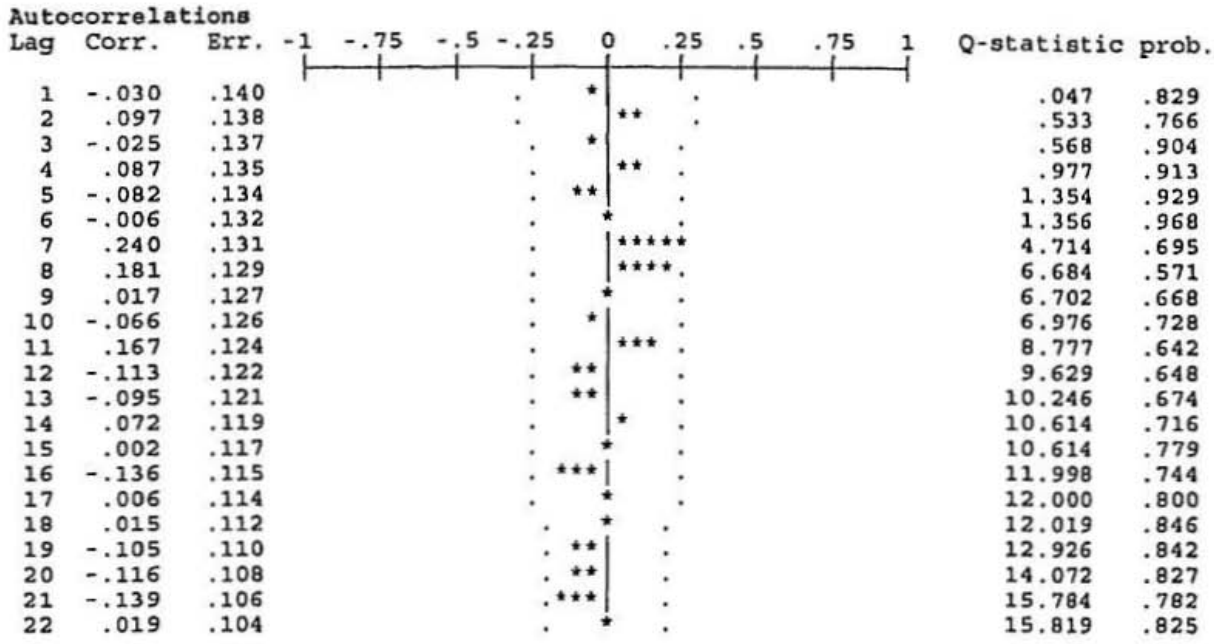
Figure 9 - TTI ACF and PACF for the Dept of Employment & Labour Relations

Analysis of TTI Measures for the Department of Employment and Labour Relations. The time-series illustration for the Department of Employment and Labour Relations is shown in Figure 8. The highest TTI value of the series occurs August, 1990 (1.78 days) and December, 1991 (1.78 days) and the lowest occurs July, 1989 (roughly 0.6 days) (see Appendix D). It also appears that larger, more variable peaks occur in 1990 and 1991 while relatively small ones occur in 1989 and 1992.

ACF and PACF plots for Employment and Labour Relations are displayed in Figure 9. Despite the ACF spike at lag 7, the exponential decay of spikes in the ACF and the one lone spike in the PACF suggested the existence of a stationary, autoregressive process. The values of 1, 0 and 0 were therefore assigned to p, d, and q respectively (an ARIMA (1,0,0) model).

Given this tentative ARIMA model, the model parameters were estimated. In this case, an autoregressive correlation coefficient was estimated at 0.339 ($t = 2.46$, $p = .017$). Since the absolute value of the coefficient was less than 1 and statistically significant, the model was retained.

Finally, as indicated by the ACF plot of the residuals resulting from the estimation phase (See Figure 10), the ARIMA (1,0,0,) model was deemed suitable because no ACF spikes occurred beyond the 95% confidence intervals and significant Q-statistics were absent.



Autocorrelations

Lag	Corr.	Err.	-1 -.75 -.5 -.25 0 .25 .5 .75 1	Q-statistic	prob.
1	-.030	.140		.047	.829
2	.097	.138		.533	.766
3	-.025	.137		.568	.904
4	.087	.135		.977	.913
5	-.082	.134		1.354	.929
6	-.006	.132		1.356	.968
7	.240	.131		4.714	.695
8	.181	.129		6.684	.571
9	.017	.127		6.702	.668
10	-.066	.126		6.976	.728
11	.167	.124		8.777	.642
12	-.113	.122		9.629	.648
13	-.095	.121		10.246	.674
14	.072	.119		10.614	.716
15	.002	.117		10.614	.779
16	-.136	.115		11.998	.744
17	.006	.114		12.000	.800
18	.015	.112		12.019	.846
19	-.105	.110		12.926	.842
20	-.116	.108		14.072	.827
21	-.139	.106		15.784	.782
22	.019	.104		15.819	.825

Figure 10 - ACF for the residuals of the Dept of Employment and Labour Relations

Intervention Analysis of TTI Measures for the Department of Employment and Labour Relations. Similar to previous procedures, an intervention was incorporated into the model to determine whether it significantly contributed to the explanation of TTI dynamics. As with the Department of Social Services, a simple step function was introduced. By assigning dummy variables representing the pre and post intervention to the model (0 and 1 respectively), a correlation coefficient rating the magnitude of the intervention was observed at 0.16 ($t = 0.471$, $p = .639$). Since this coefficient was not significant, there was no change in the average number of monthly sick-leave days following the introduction of the no-smoking policy.

Analysis of TTI Measures for all Departments Combined. In order to assess the combined dynamics of the total average monthly usage of sick-leave, the pre and post-TTI measures were combined for all four departments. Regardless of the year or month during which no-smoking policies were introduced, data were entered such that the pre-policy months for each department corresponded with one another (e.g., t-24, t-23, ... t-1): the policy introduction stood at time zero. Post-policy months were entered in a similar fashion (e.g., t+1, t+2,..., t+23). Given this data-entry format, the average number of sick-leave days per person, per month for all departments combined could be determined.

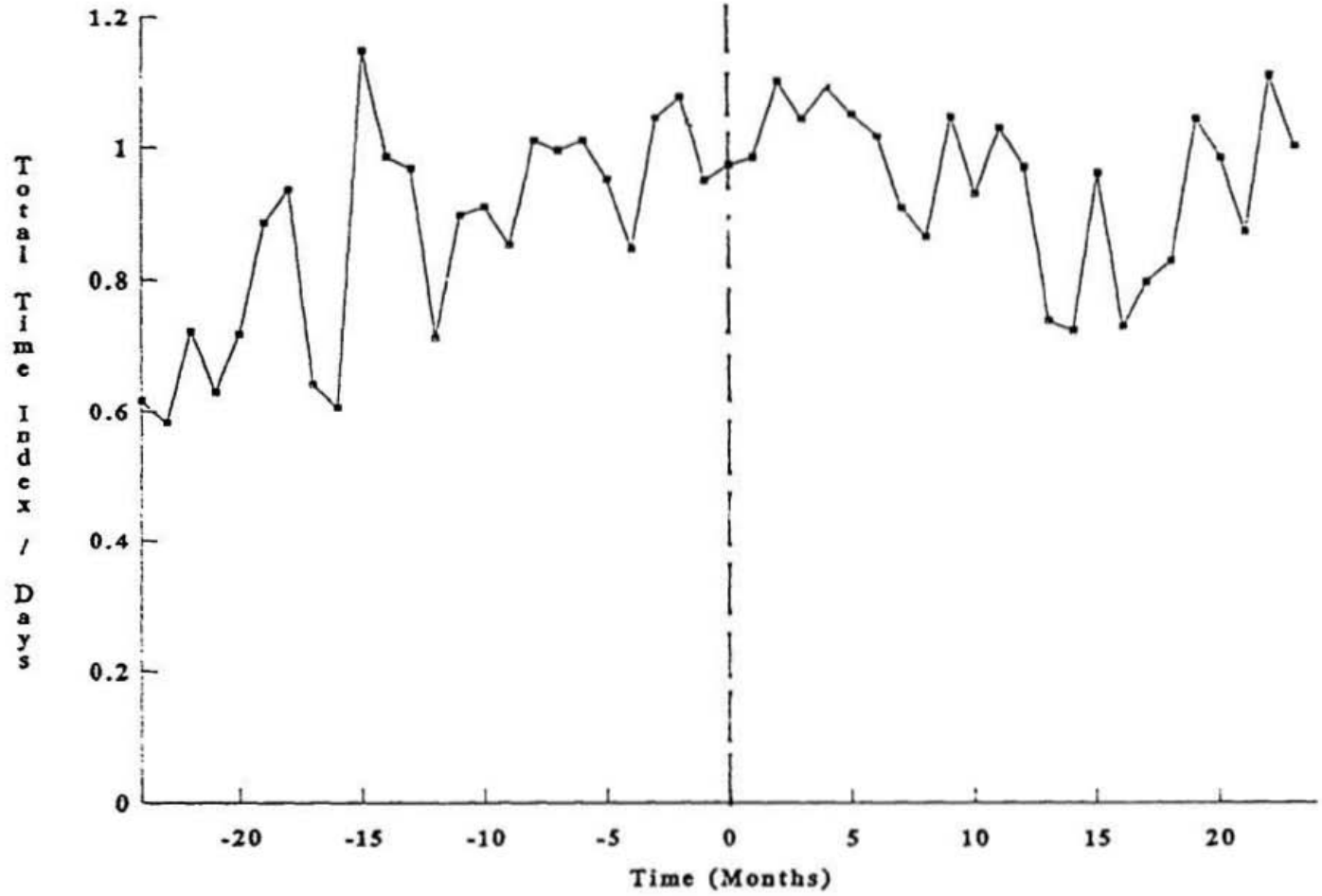


Figure 11
Average number of days taken per person per month - All departments combined

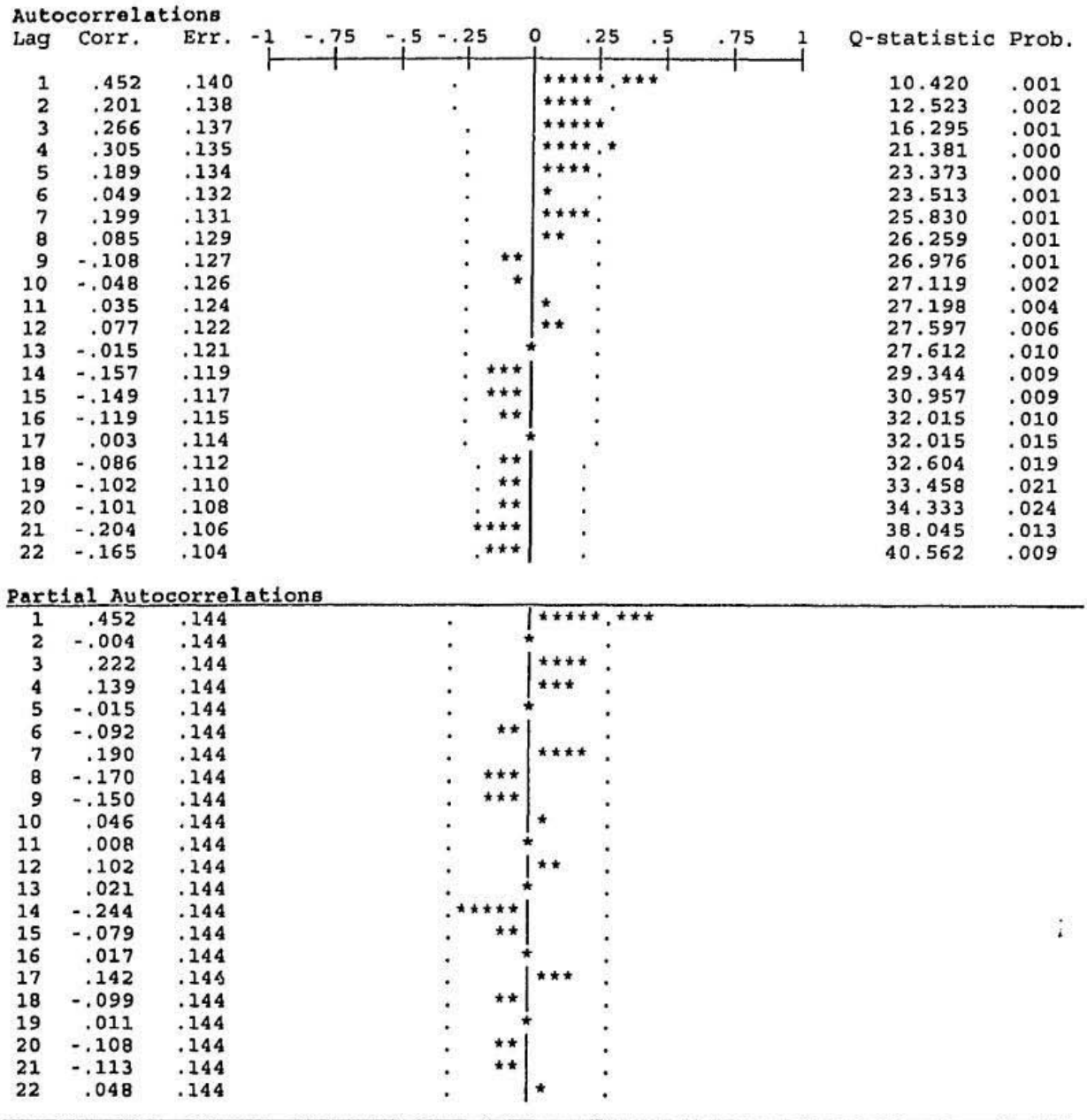


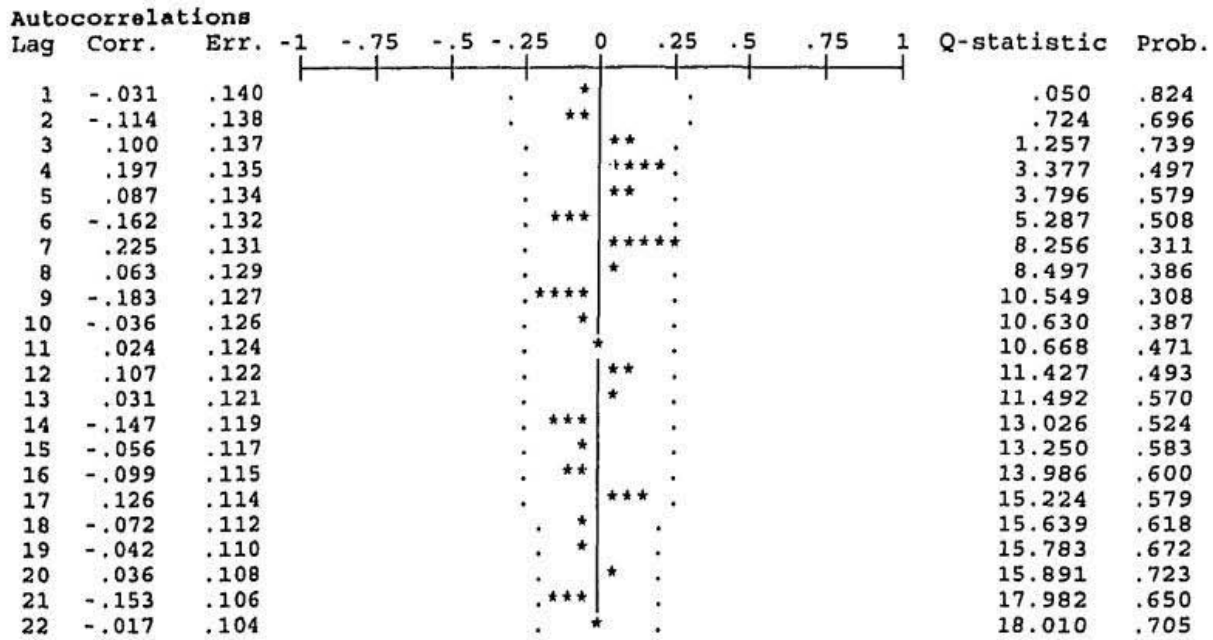
Figure 12 - TTI ACF and PACF for all departments combined

Figure 11 displays the time-series plot for all departments with the policy introduction at time zero. As the figure indicates, TTI values ranged between 0.58 days at T-23 and 1.14 at T-15 (see Appendix E). Through visual inspection, it also appears as though the TTI values are more variable before the policy was introduced.

Continuing with the model identification process, both the ACF and PACF plots are presented in Figure 12. The ACF shows spikes at lags 1 and 4 and then appears to die out exponentially. Given the lone spike at lag 1 of the PACF plot, an ARIMA (1,0,0) model was tested. As with the Departments of Social Services and Employment and Labour Relations, the model was identified as an autoregressive process without the need for differencing. Consequently, a value of 1 was assigned to the p component and 0 for the d and q components.

In the parameter estimation phase, the autoregressive correlation coefficient was found to be 0.484 ($t = 3.77$, $p = .0004$). Since the coefficient had a value less than 1 and was statistically significant, further support was given to the adequacy of the ARIMA (1,0,0) model.

In the final stage of assessing model suitability, the residuals of the model estimation process were plotted to determine if all that remained was uncorrelated error. As Figure 13 shows, the residuals did behave as white noise as the Q-statistics at every lag were not significant and



Autocorrelations

Lag	Corr.	Err.	-1 -.75 -.5 -.25 0 .25 .5 .75 1	Q-statistic	Prob.
1	-.031	.140		.050	.824
2	-.114	.138		.724	.696
3	.100	.137		1.257	.739
4	.197	.135		3.377	.497
5	.087	.134		3.796	.579
6	-.162	.132		5.287	.508
7	.225	.131		8.256	.311
8	.063	.129		8.497	.386
9	-.183	.127		10.549	.308
10	-.036	.126		10.630	.387
11	.024	.124		10.668	.471
12	.107	.122		11.427	.493
13	.031	.121		11.492	.570
14	-.147	.119		13.026	.524
15	-.056	.117		13.250	.583
16	-.099	.115		13.986	.600
17	.126	.114		15.224	.579
18	-.072	.112		15.639	.618
19	-.042	.110		15.783	.672
20	.036	.108		15.891	.723
21	-.153	.106		17.982	.650
22	-.017	.104		18.010	.705

Figure 13 - ACF for residuals of all department combined

ACF spikes extended beyond the 95% confidence limit. As a result, the ARIMA (1,0,0) model was considered an appropriate model for the series.

Intervention Analysis of TTI Measures for all Departments Combined. Similar to the Social Service and Employment and Labour Relations' intervention analyses, we introduced a step function whereby all periods prior to the policy introduction were assigned dummy variable values of 0 while those after were assigned dummy variable values of 1. By incorporating this intervention component into the model, the analysis of the step function yielded a non-significant step coefficient of 0.044 ($t = 0.283$, $p = .779$). Based on this finding, it seems evident for all departments combined that no significant change in the TTI occurred following the introduction of the no-smoking policy.

Analyses of the Frequency Index (FI)

This section focuses on similar analyses for a measure denoting the average number of sick-leave episodes per month, per employee (the Frequency Index (FI)).

Analysis of FI Measures for the Department of Social Services. The FI time-series plot for the Department of Social Services is presented in Figure 14. FI values range between 0.71 episodes during January, 1988 (the policy

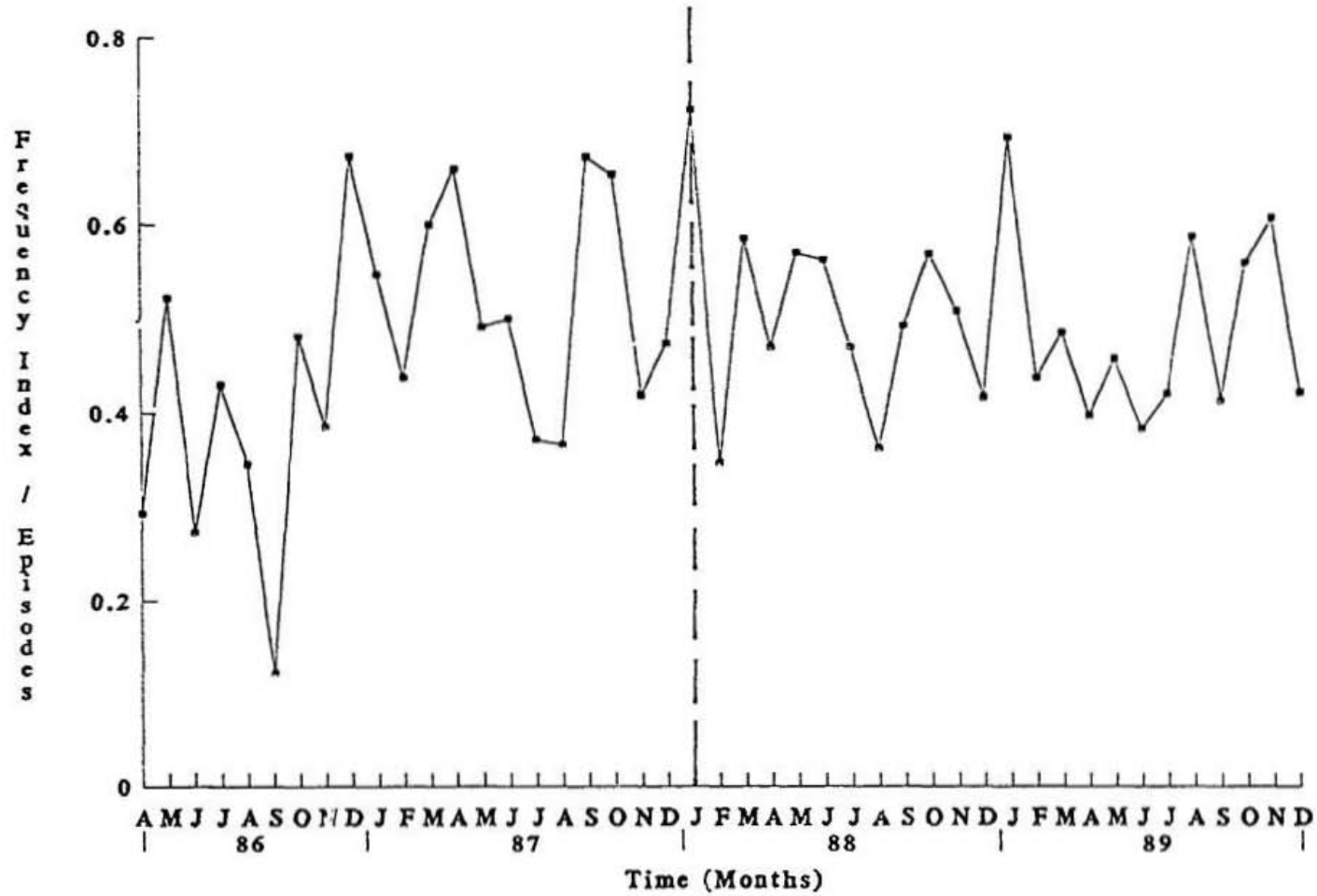


Figure 14
Average number of sick-leave episodes per person/month: Dpt of Social Services

Autocorrelations

Lag	Corr.	Err.	-1 -.75 -.5 -.25 0 .25 .5 .75 1	Q-statistic	Prob.
1	.016	.140	. * .	.014	.906
2	.079	.138	. |** .	.341	.843
3	.063	.137	. |* .	.555	.907
4	.072	.135	. |* .	.842	.933
5	.044	.134	. |* .	.952	.966
6	.043	.132	. |* .	1.058	.983
7	.020	.131	. * .	1.082	.993
8	-.143	.129	. *** | .	2.310	.970
9	.078	.127	. |** .	2.680	.976
10	.001	.126	. * .	2.680	.988
11	-.069	.124	. *| .	2.991	.991
12	.015	.122	. * .	3.006	.996
13	-.089	.121	. **| .	3.544	.995
14	-.063	.119	. *| .	3.824	.996
15	.027	.117	. |* .	3.879	.998
16	-.072	.115	. *| .	4.267	.998
17	.083	.114	. |** .	4.795	.998
18	-.165	.112	. *** .	6.965	.990
19	-.153	.110	. *** .	8.902	.975
20	-.038	.108	. *| .	9.029	.983
21	-.061	.106	. *| .	9.360	.986
22	.077	.104	. |** .	9.910	.987

Partial Autocorrelations

1	.016	.144	. * .	
2	.079	.144	. |** .	
3	.061	.144	. |* .	
4	.065	.144	. |* .	
5	.034	.144	. |* .	
6	.029	.144	. |* .	
7	.006	.144	. * .	
8	-.160	.144	. *** | .	
9	.070	.144	. |* .	
10	.014	.144	. * .	
11	-.070	.144	. *| .	
12	.028	.144	. |* .	
13	-.083	.144	. **| .	
14	-.054	.144	. *| .	
15	.050	.144	. |* .	
16	-.084	.144	. **| .	
17	.134	.144	. |*** .	
18	-.165	.144	. ***| .	
19	-.187	.144	. ****| .	
20	.025	.144	. * .	
21	-.081	.144	. **| .	
22	.137	.144	. |*** .	

Figure 15 - FI ACF and PACF for the Dept of Social Services

introduction date) and an unusually low value of 0.10 episodes during September, 1986 (See Appendix A). It was later determined that this low FI value was the result of a two-week general strike that occurred at that time. It is interesting to note that the strike influenced the FI measure but not the TTI measure. Perhaps the TTI measure accounted for people who went on extended sick-leave just prior to the strike and remained on it during the strike. The result therefore would be a less notable dip in sick-leave use. For the FI however, people on strike cannot use sick-leave even once, let alone on a more frequent basis. Hence, we see a more extreme dip in the FI measure.

Based on the ACF and PACF illustrations in Figure 15, it is evident that no significant relationship exists among the FI points since none of the ACF spikes exceed the 95% confidence limits and significant Q-statistics are absent at every lag. Given the absence of significant dependence among FI scores, the model was identified as an ARIMA (0,0,0) model.

As a result, FI values prior to policy introduction (a mean of 0.4509 episodes) were compared to the remaining FI values (a mean of 0.4923 episodes) by means of ANOVA. The results showed that no significant difference was observed between pre- and post-policy FI scores ($F(1,47) = 1.23$, $p = 0.272$). Hence, no significant change in the average monthly sick-leave episodes was found following policy introduction.

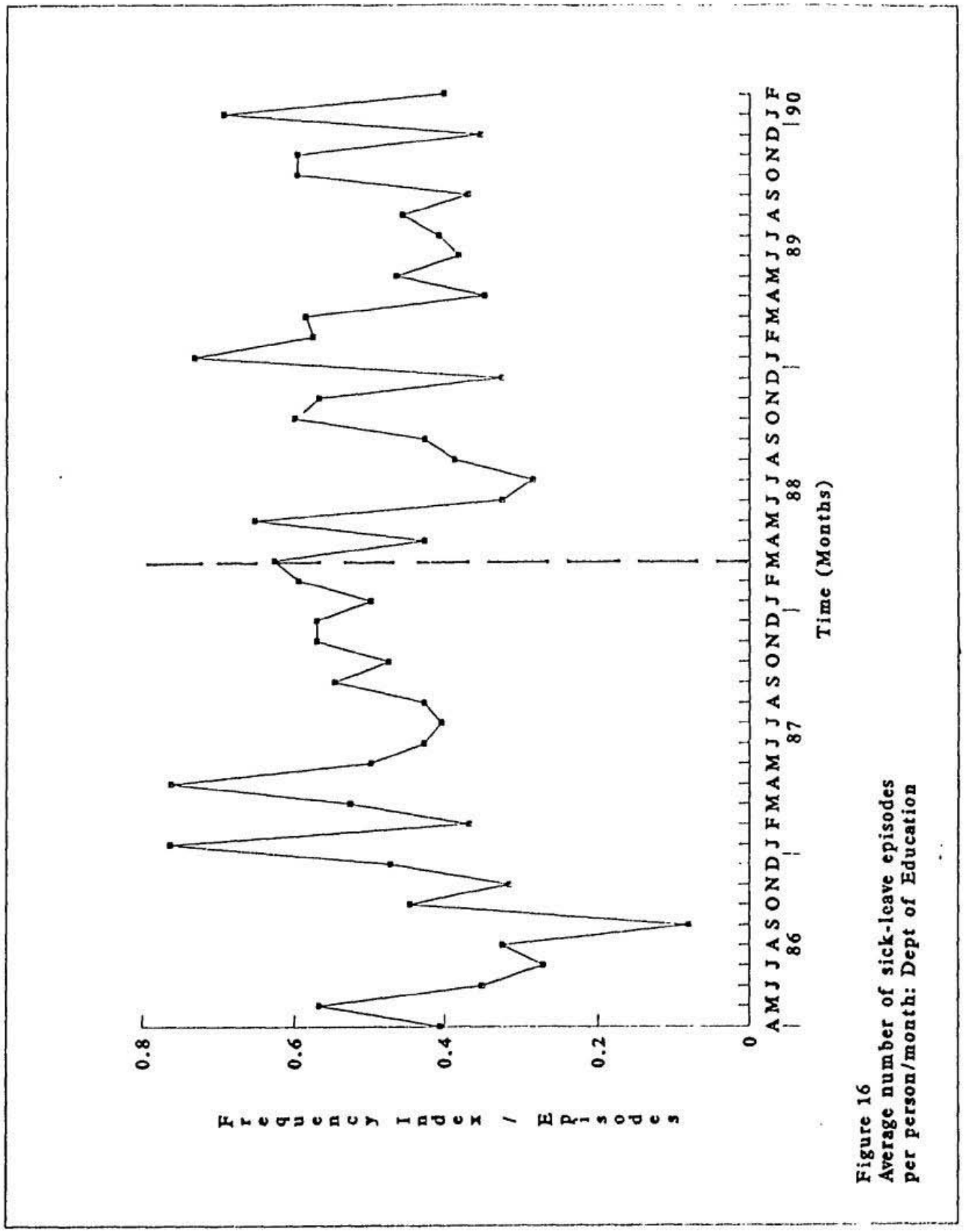
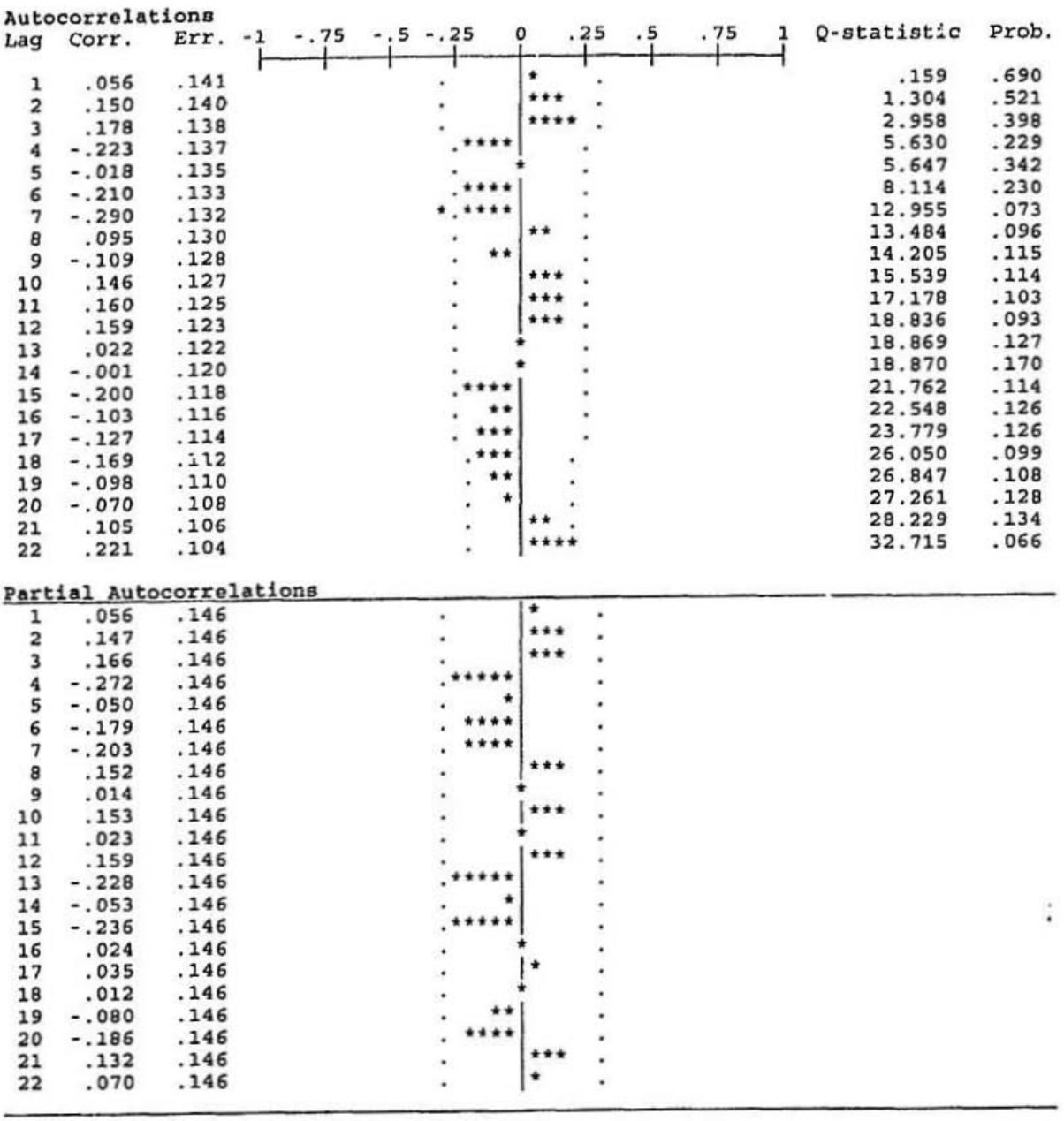


Figure 16
Average number of sick-leave episodes per person/month: Dept of Education



Autocorrelations

Lag	Corr.	Err.	Q-statistic	Prob.
1	.056	.141	.159	.690
2	.150	.140	1.304	.521
3	.178	.138	2.958	.398
4	-.223	.137	5.630	.229
5	-.018	.135	5.647	.342
6	-.210	.133	8.114	.230
7	-.290	.132	12.955	.073
8	.095	.130	13.484	.096
9	-.109	.128	14.205	.115
10	.146	.127	15.539	.114
11	.160	.125	17.178	.103
12	.159	.123	18.836	.093
13	.022	.122	18.869	.127
14	-.001	.120	18.870	.170
15	-.200	.118	21.762	.114
16	-.103	.116	22.548	.126
17	-.127	.114	23.779	.126
18	-.169	.112	26.050	.099
19	-.098	.110	26.847	.108
20	-.070	.108	27.261	.128
21	.105	.106	28.229	.134
22	.221	.104	32.715	.066

Partial Autocorrelations

1	.056	.146
2	.147	.146
3	.166	.146
4	-.272	.146
5	-.050	.146
6	-.179	.146
7	-.203	.146
8	.152	.146
9	.014	.146
10	.153	.146
11	.023	.146
12	.159	.146
13	-.228	.146
14	-.053	.146
15	-.236	.146
16	.024	.146
17	.035	.146
18	.012	.146
19	-.080	.146
20	-.186	.146
21	.132	.146
22	.070	.146

Figure 17 - FI ACF and PACF for the Dept of Education

Analysis of FI Measures for the Department of Education. Similar to the trend demonstrated in Figure 14, the FI time-series for the Department of Education in Figure 16 also shows a notable dip during September, 1986 (an FI of 0.081 episodes). Again, the influence of the general strike is evident (see Appendix B). The effect suggests much more variability among FI scores before policy introduction as the FI peaks to 0.76 episodes.

For an assessment of the degree of dependency among FI points, Figure 17 illustrates the ACF and PACF for the Department of Education. Again, there were no significant correlations among FI values at any lag and an absence of significant ACF spikes (therefore an ARIMA (0,0,0) model). Due to the statistical independence among FI scores, an ANOVA was carried out to compare pre- and post-policy FI scores (24 scores with a mean of 0.4644 episodes and 23 scores with a mean of 0.4879 episodes). There was no significant change in FI values following the no-smoking policy introduction for the Department of Education ($F(1,46) = .84$, $p = 0.365$).

Analysis of FI Measures for the Department of Finance. Figure 18 presents the Department of Finance's average number of monthly sick-leave episodes per employee between April, 1989 and March, 1993. As the figure shows, FI values fluctuate between approximately 0.3 episodes and 0.65

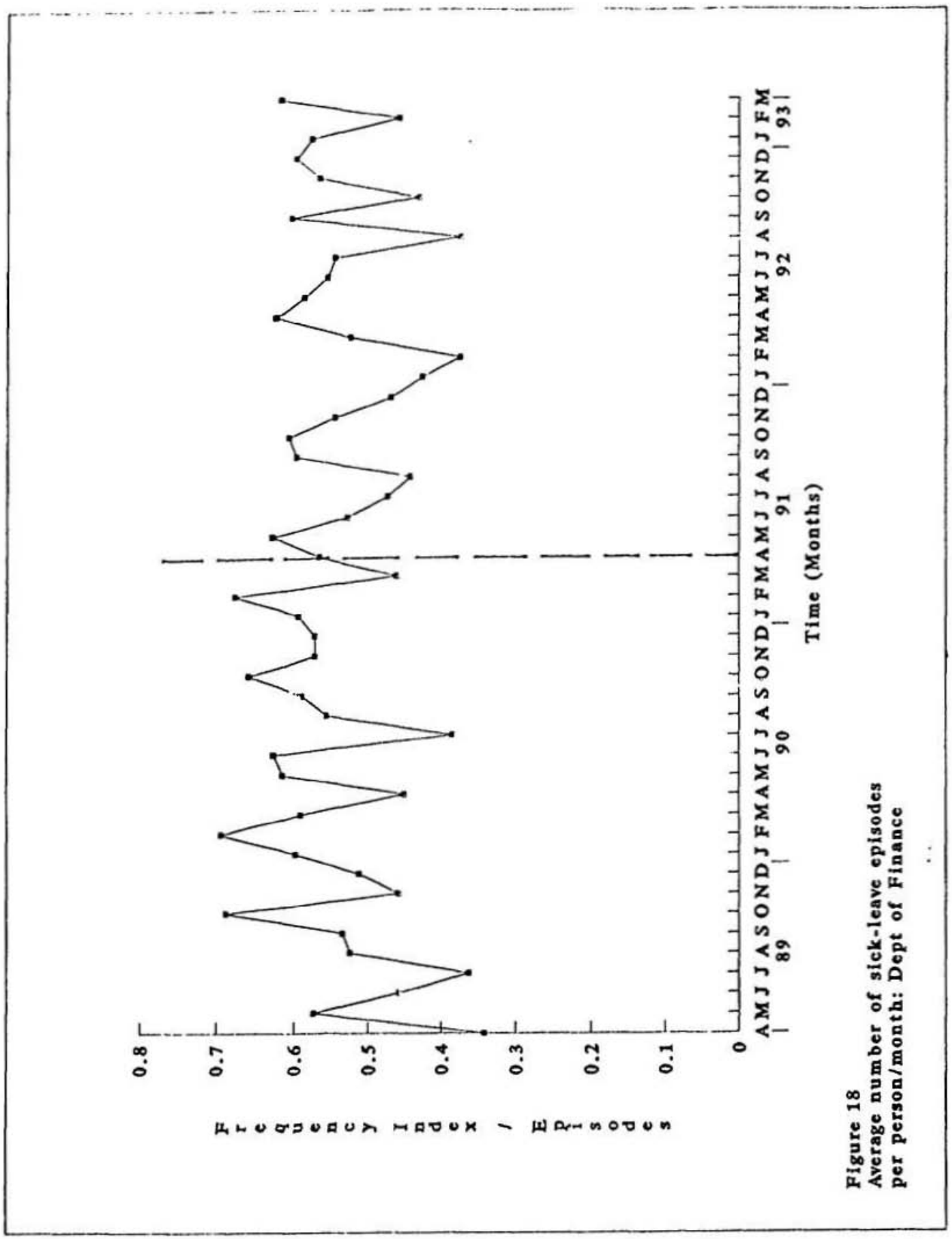
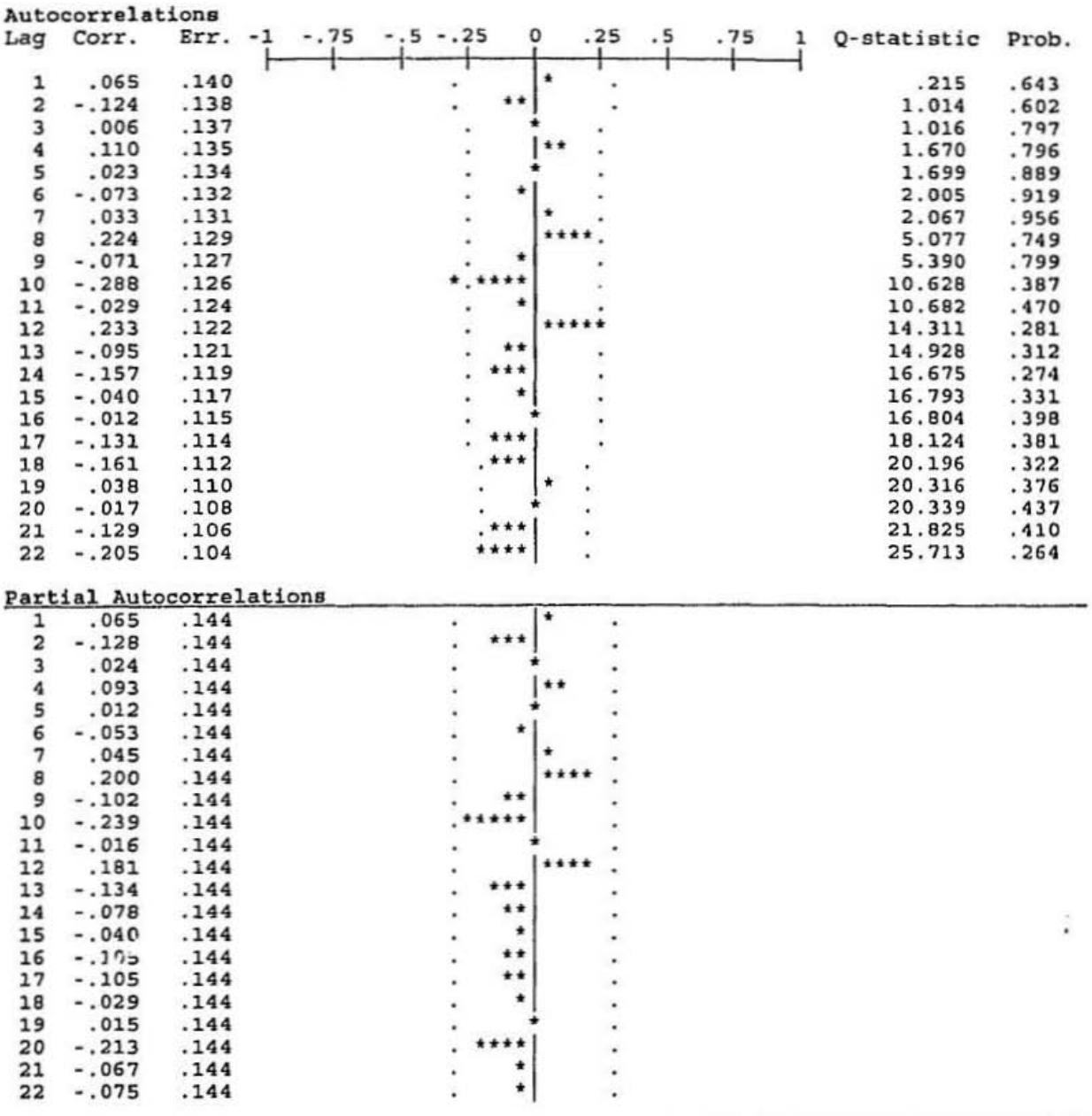


Figure 18
Average number of sick-leave episodes per person/month: Dept of Finance



Autocorrelations

Lag	Corr.	Err.	Q-statistic	Prob.
1	.065	.140	.215	.643
2	-.124	.138	1.014	.602
3	.006	.137	1.016	.797
4	.110	.135	1.670	.796
5	.023	.134	1.699	.889
6	-.073	.132	2.005	.919
7	.033	.131	2.067	.956
8	.224	.129	5.077	.749
9	-.071	.127	5.390	.799
10	-.288	.126	10.628	.387
11	-.029	.124	10.682	.470
12	.233	.122	14.311	.281
13	-.095	.121	14.928	.312
14	-.157	.119	16.675	.274
15	-.040	.117	16.793	.331
16	-.012	.115	16.804	.398
17	-.131	.114	18.124	.381
18	-.161	.112	20.196	.322
19	.038	.110	20.316	.376
20	-.017	.108	20.339	.437
21	-.129	.106	21.825	.410
22	-.205	.104	25.713	.264

Partial Autocorrelations

1	.065	.144
2	-.128	.144
3	.024	.144
4	.093	.144
5	.012	.144
6	-.053	.144
7	.045	.144
8	.200	.144
9	-.102	.144
10	-.239	.144
11	-.016	.144
12	.181	.144
13	-.134	.144
14	-.078	.144
15	-.040	.144
16	-.105	.144
17	-.105	.144
18	-.029	.144
19	.015	.144
20	-.213	.144
21	-.067	.144
22	-.075	.144

Figure 19 - FI ACF and PACF for the Dept of Finance

episodes (see Appendix C). Overall, the variability among FI scores appears rather consistent from year to year.

The ACF and PACF plots are given in Figure 19. Despite the significant spike at lag 10, an ARIMA (0,0,0,) model was identified since all Q-statistics were non-significant. This was yet another case where the lack of statistical dependence among scores allowed for the employment of ANOVA procedures.

In the comparison of 24 pre- and post-policy FI scores (with means of 0.5390 and 0.5285 episodes respectively), there was no significant change in average monthly sick-leave episodes after the no-smoking policy was introduced ($F(1,47) = .16$, $p = 0.693$).

Analysis of FI Measures for the Department of Employment and Labour Relations. The time-series graph for the Department of Employment and Labour Relations' average monthly sick-leave episodes is presented in Figure 20. Overall, FI values range between 0.39 and 0.73 episodes (see Appendix D).

The ACF and PACF plots for this department are displayed in Figure 21. As is typical in all departments discussed in this section, the ACF and PACF suggest no dependency among FI scores. In particular, there were no ACF spikes beyond the 95% confidence level and Q-statistics at every lag were not significant. However, there was one

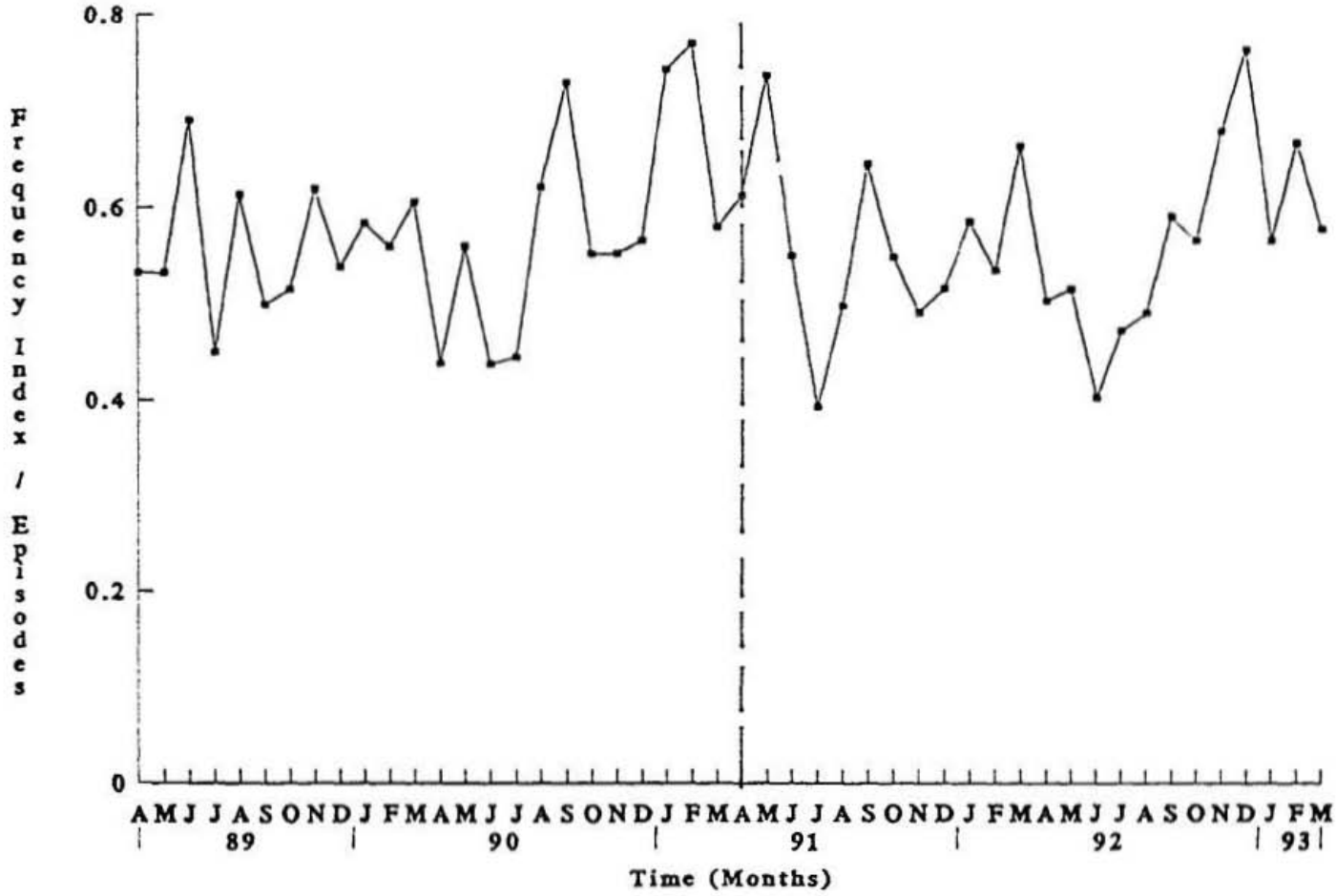


Figure 20
Average number of sick-leave episodes per person/month: Employment & Labour

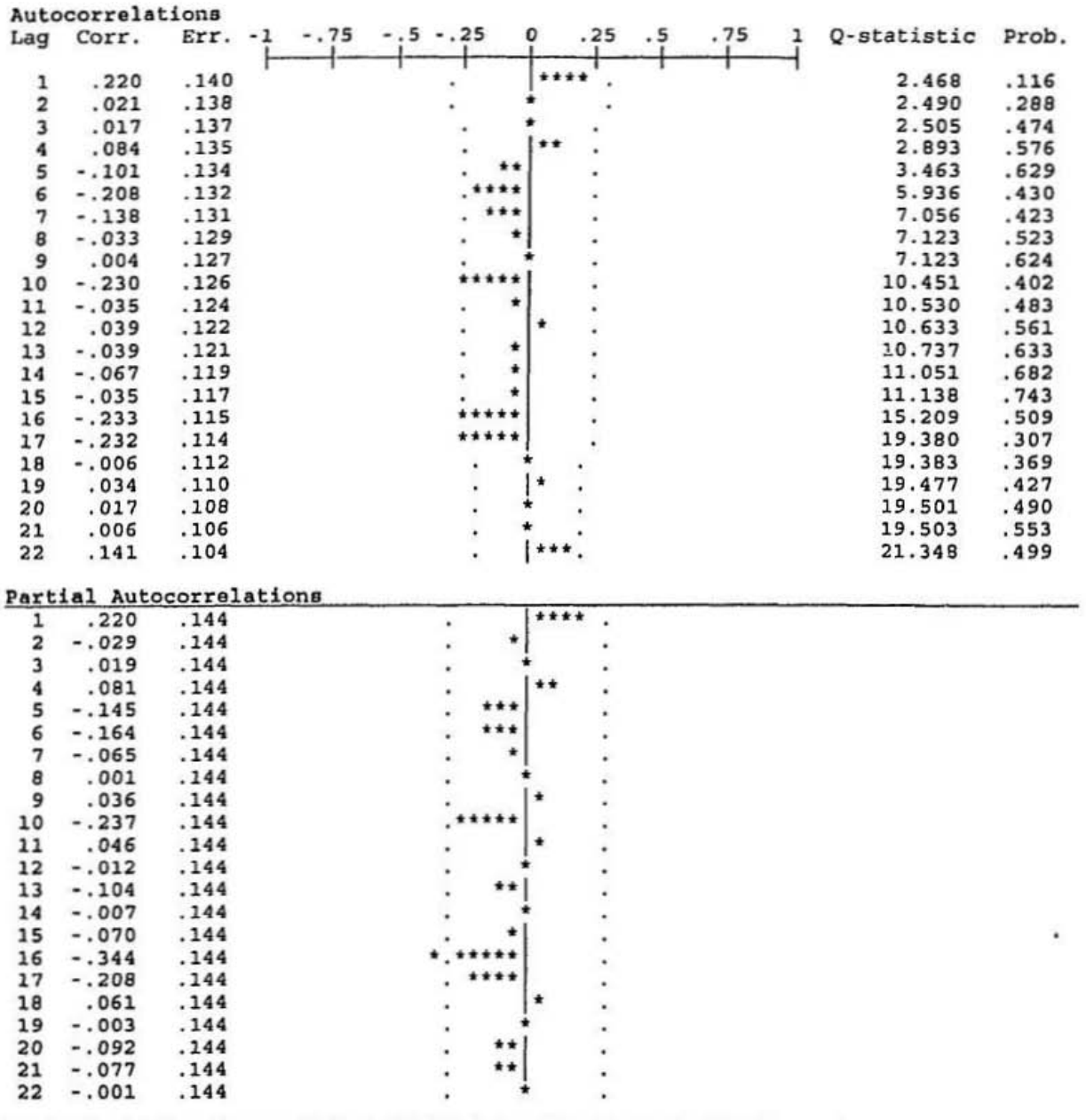


Figure 21 - FI ACF and PACF for the Dept of Employment and Labour Relations

significant spike in the PACF at lag 16. Again, since an ARIMA (0,0,0) model was identified, the FI scores were considered statistically independent and the pre-FI scores were compared to the post-FI scores using ANOVA. The pre-FI mean of 0.5729 episodes was not significantly different from the post-FI mean of 0.5692 episodes ($F(1,47) = .02$, $p = 0.889$). Therefore, no significant change in FI values resulted.

Analysis of FI Measures for All Departments Combined. Through visual inspection, the time-series graph in Figure 22 appears more variable among pre-policy scores as compared to post-policy scores. As well, FI values range from 0.36 to 0.64 episodes. (see Appendix E).

The ACF plot displayed in Figure 23 shows no significant Q-statistics until lag 18 when all remaining Q-statistics are significant. As well, while no significant ACF spikes occur in early lags, three significant spikes exceed the 95% confidence limits at lags 16, 17 and 18. The PACF however, does not exhibit any significant spikes at either lag. Since the first several lags of any ACF and PACF usually dictate the type of ARIMA model, the lack of significant spikes and Q-statistics in the first several lags in both functions suggests an ARIMA (0,0,0) model.

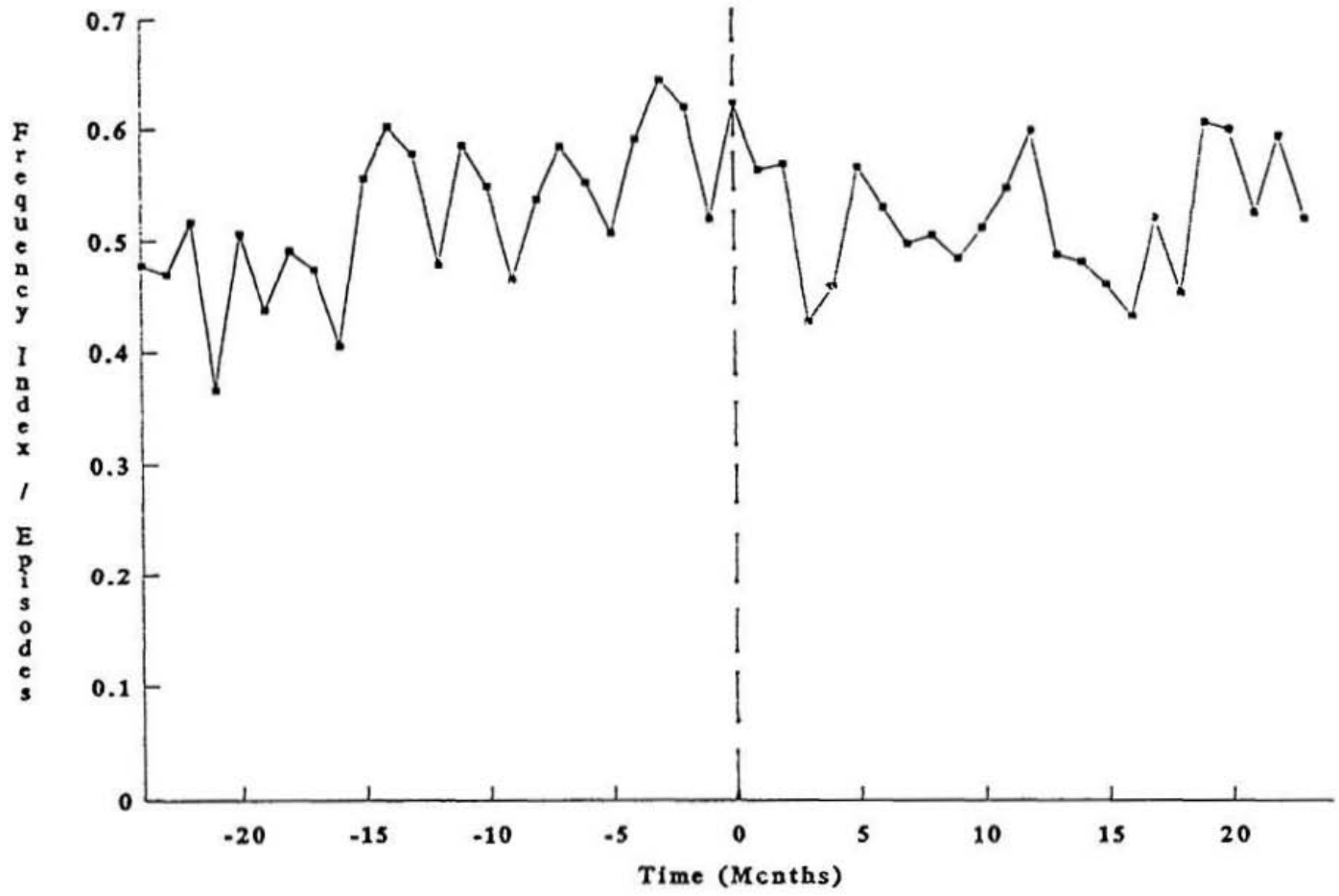


Figure 22
Average number of sick-leave episodes per person/month: All depts combined

Autocorrelations

Lag	Corr.	Err.	-1 -.75 -.5 -.25 0 .25 .5 .75 1	Q-statistic	Prob.
1	.267	.140	. |***** .	3.648	.056
2	.148	.138	. |*** .	4.789	.091
3	.166	.137	. |*** .	6.263	.100
4	.116	.135	. |** .	7.003	.136
5	.060	.134	. |* .	7.206	.206
6	-.171	.132	. *** | .	8.869	.181
7	.070	.131	. |* .	9.152	.242
8	.019	.129	. * | .	9.174	.328
9	-.068	.127	. * | .	9.462	.396
10	-.084	.126	. ** | .	9.913	.448
11	.047	.124	. |* .	10.057	.525
12	.078	.122	. |** .	10.467	.575
13	-.131	.121	. *** | .	11.641	.557
14	-.131	.119	. *** | .	12.853	.538
15	-.039	.117	. * | .	12.965	.605
16	-.277	.115	*.**** | .	18.735	.283
17	-.335	.114	**.**** | .	27.424	.052
18	-.296	.112	**.*** | .	34.421	.011
19	-.114	.110	. ** | .	35.489	.012
20	-.055	.108	. * | .	35.752	.016
21	-.184	.106	**** | .	38.755	.010
22	.055	.104	. |* .	39.030	.014

Partial Autocorrelations

1	.267	.144	. |*****.	
2	.082	.144	. |** .	
3	.117	.144	. |** .	
4	.042	.144	. |* .	
5	-.002	.144	. * | .	
6	-.236	.144	.***** | .	
7	.158	.144	. |*** .	
8	-.013	.144	. * | .	
9	-.046	.144	. * | .	
10	-.066	.144	. * | .	
11	.115	.144	. |** .	
12	.010	.144	. * | .	
13	-.119	.144	. ** | .	
14	-.111	.144	. ** | .	
15	.005	.144	. * | .	
16	-.312	.144	****** | .	
17	-.151	.144	. *** | .	
18	-.136	.144	. *** | .	
19	.035	.144	. |* .	
20	.059	.144	. |* .	
21	-.045	.144	. * | .	
22	.068	.144	. |* .	

Figure 23 - FI ACF and PACF for all depts combined

Strengthening this conclusion is the fact that each of the four departments had previously demonstrated no significant dependency among FI scores.

Recognizing the scores of this series as statistically independent, we compared pre- and post-FI scores using ANOVA. There was no significant difference between the mean of the pre-policy FI values (0.5185 episodes) and the post-policy FI values (0.5230 episodes) ($F(1,47) = .57$, $p = 0.812$).

Analyses of the Short-Term Index (STI)

In this final section, all observations relevant to the Short Term Index (STI) are presented. This index represents the average number of sick-leave episodes numbering two days or less per month, per person.

Analysis of STI Measures for the Department of Social Services. The time-series graph for Social Service's STI measures is presented in Figure 24. Perhaps the most notable low point of this figure occurs during September, 1986. Again, as discussed in the previous section, this unusual low point (approximately 0.05 episodes) resulted from the government worker's general strike. Since both the STI and FI measures account for sick-leave frequency, we can see the strike's influence in the STI time-series graph.

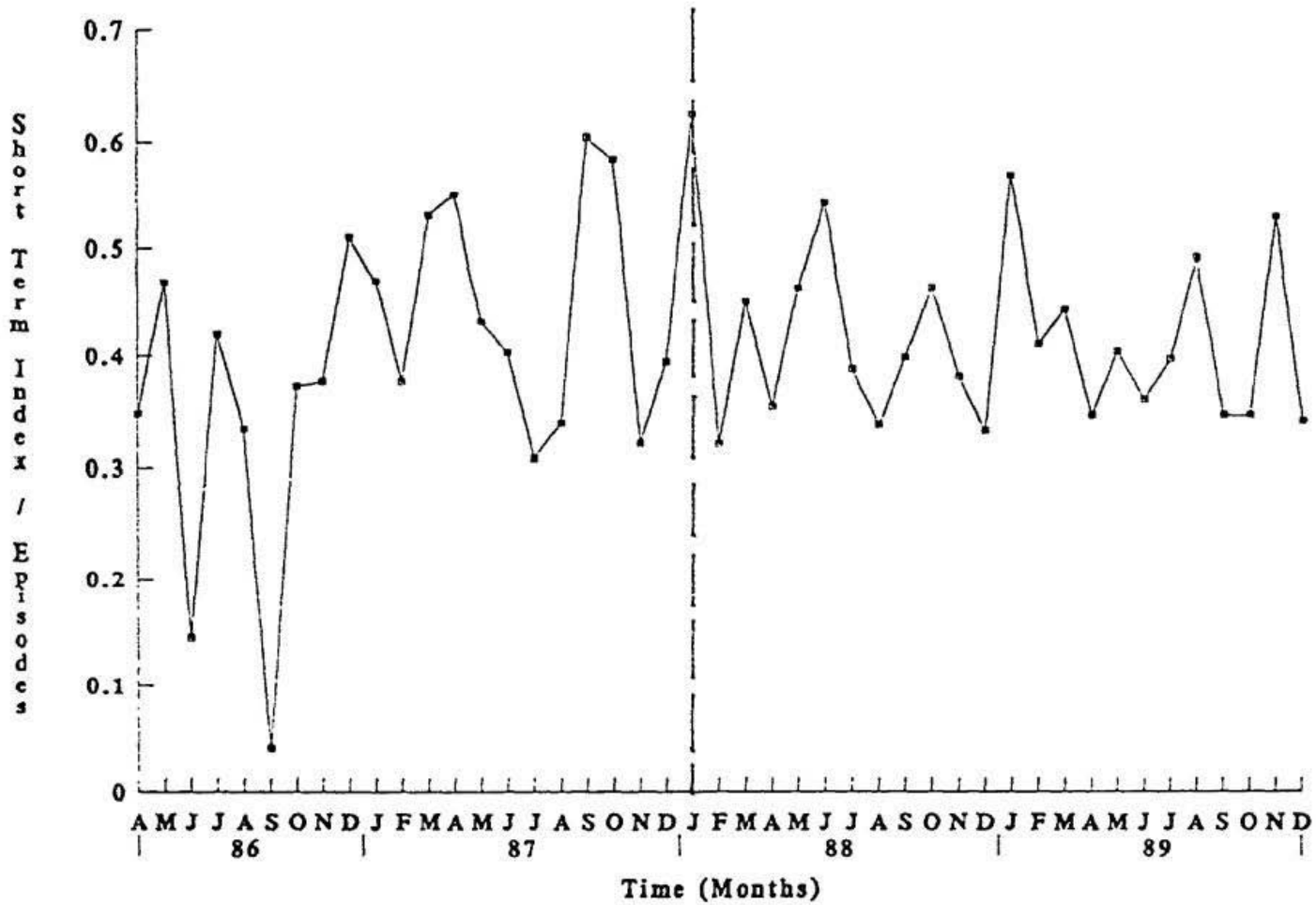
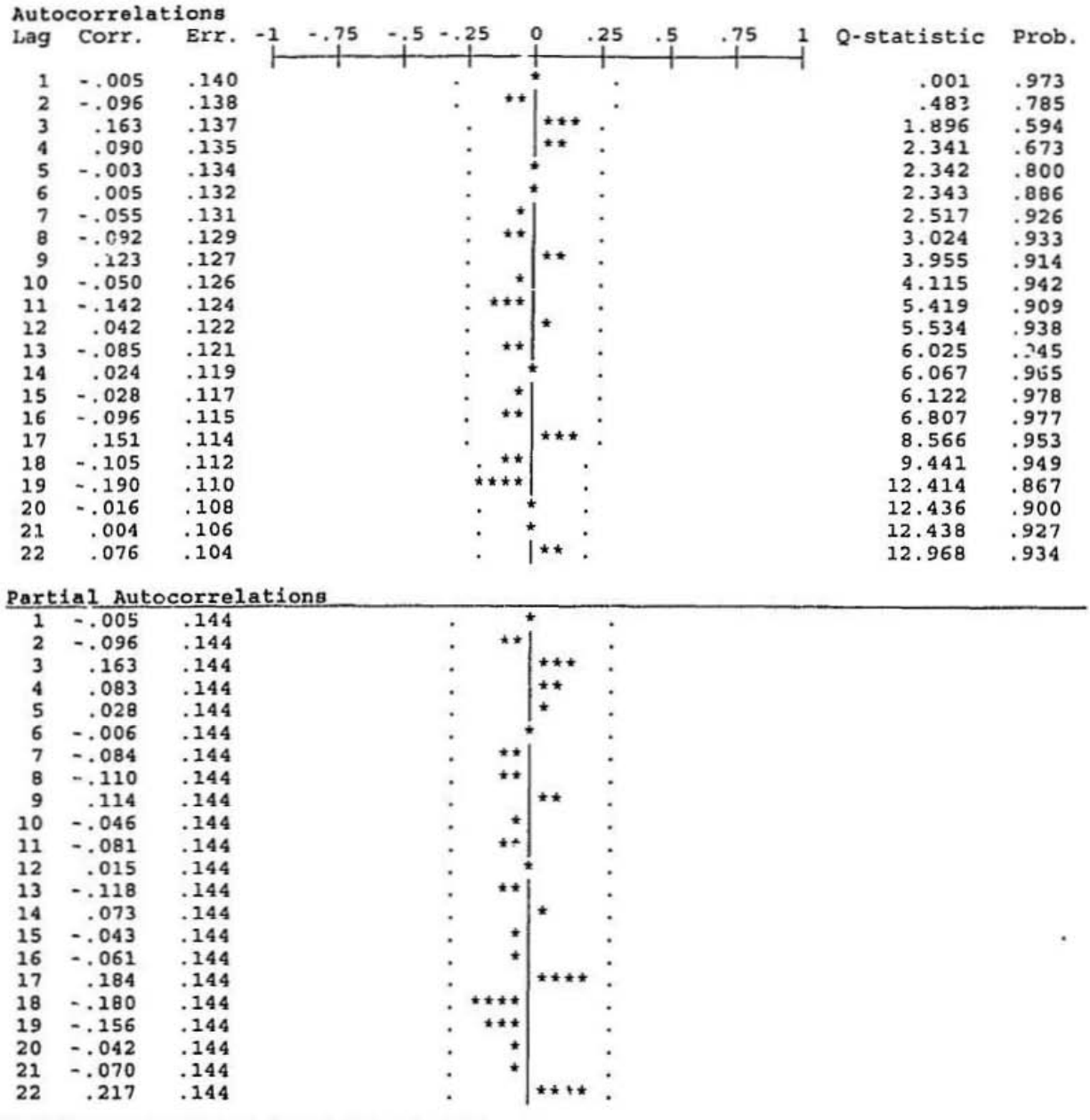


Figure 24
Average number of episodes < 2 days per person/month: Dept of Social Services



Autocorrelations

Lag	Corr.	Err.	Q-statistic	Prob.
1	-.005	.140	.001	.973
2	-.096	.138	.483	.785
3	.163	.137	1.896	.594
4	.090	.135	2.341	.673
5	-.003	.134	2.342	.800
6	.005	.132	2.343	.886
7	-.055	.131	2.517	.926
8	-.092	.129	3.024	.933
9	.123	.127	3.955	.914
10	-.050	.126	4.115	.942
11	-.142	.124	5.419	.909
12	.042	.122	5.534	.938
13	-.085	.121	6.025	.945
14	.024	.119	6.067	.965
15	-.028	.117	6.122	.978
16	-.096	.115	6.807	.977
17	.151	.114	8.566	.953
18	-.105	.112	9.441	.949
19	-.190	.110	12.414	.867
20	-.016	.108	12.436	.900
21	.004	.106	12.438	.927
22	.076	.104	12.968	.934

Partial Autocorrelations

1	-.005	.144
2	-.096	.144
3	.163	.144
4	.083	.144
5	.028	.144
6	-.006	.144
7	-.084	.144
8	-.110	.144
9	.114	.144
10	-.046	.144
11	-.081	.144
12	.015	.144
13	-.118	.144
14	.073	.144
15	-.043	.144
16	-.061	.144
17	.184	.144
18	-.180	.144
19	-.156	.144
20	-.042	.144
21	-.070	.144
22	.217	.144

Figure 25 - STI ACF and PACF for the Dept of Social Services

However, there was also a unexplained low point occurring during June of the same year (around 1.5 episodes).

Figure 25 displays the ACF and PACF plots of Social Service's STI measures. As the figure shows, the absence of significant ACF spikes and Q-statistics suggested an ARIMA (0,0,0) model. Since stationarity exists and there is no evidence of either an autoregressive or moving average process, a zero value was assigned to the p, d, and q parameters. Consequently, because there were no significant correlations among STI scores, ANOVA was used to compare pre-policy STI scores with post-policy STI scores. The difference between pre- and post-policy STI scores (a pre-mean of 0.3985 episodes and a post-mean of 0.4326 episodes) was not significant ($F(1,47) = .96$, $p = 0.333$).

Analysis of STI Measures for the Department of Education. Figure 26 presents the time-series plot for STI measures representing the Department of Education. As with the Department of Social Services, the low STI value for September, 1986 is evident. There also appears to be notable variability among scores in that measures range from approximately 0.26 to 0.68 episodes (not including September, 1986) (see Appendix B).

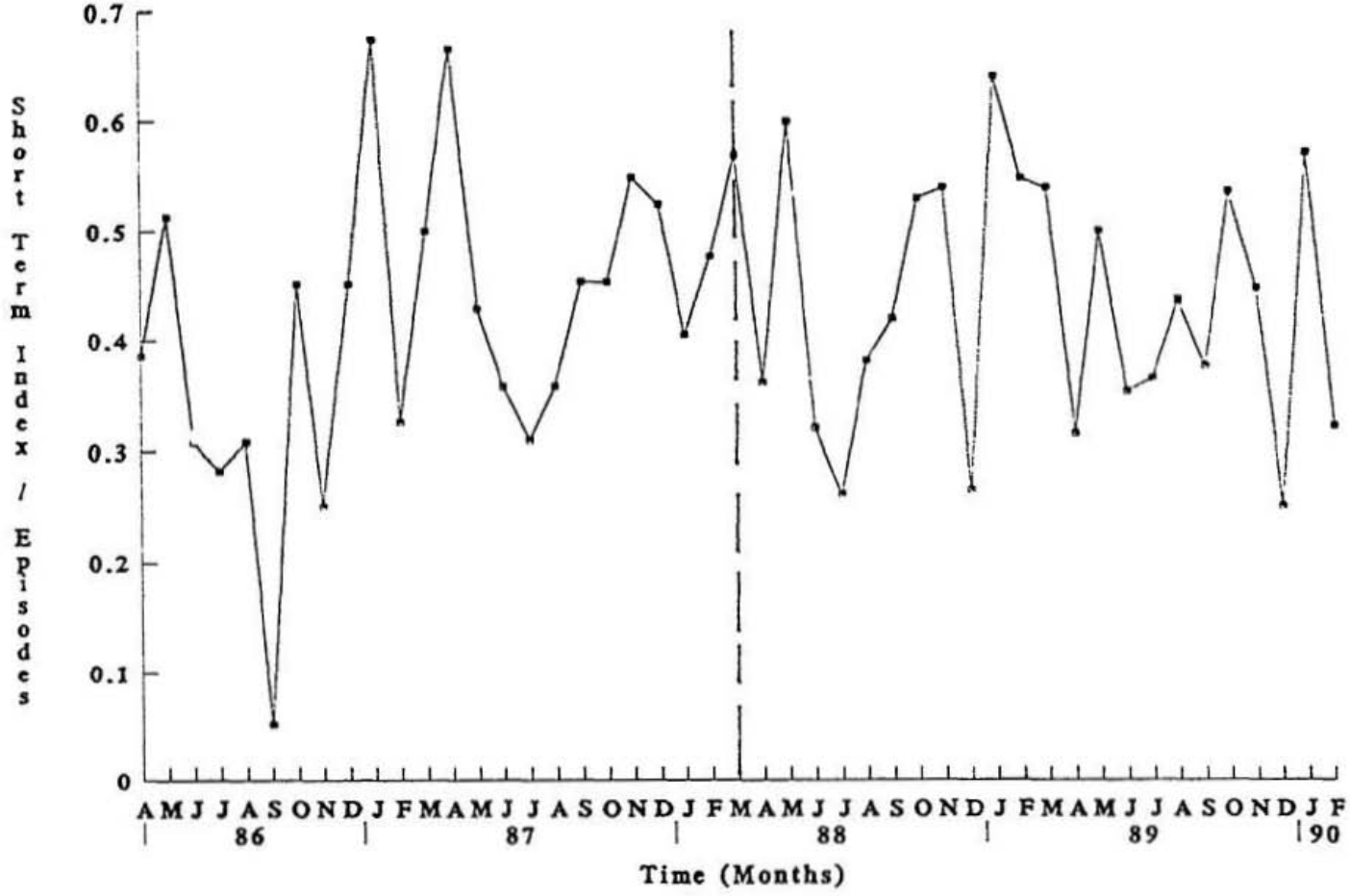


Figure 26
Average number of episodes < 2 days per person/month: Dept of Education

Autocorrelations

Lag	Corr.	Err.	Q-statistic	Prob.
1	.000	.141	.000	.997
2	.098	.140	.491	.782
3	.151	.138	1.692	.639
4	-.272	.137	5.665	.226
5	-.011	.135	5.672	.339
6	-.146	.133	6.864	.334
7	-.271	.132	11.094	.135
8	.095	.130	11.631	.168
9	-.084	.128	12.062	.210
10	.117	.127	12.908	.229
11	.224	.125	16.117	.137
12	.171	.123	18.045	.114
13	-.033	.122	18.118	.153
14	.043	.120	18.246	.196
15	-.205	.118	21.266	.129
16	-.090	.116	21.862	.148
17	-.015	.114	21.879	.189
18	-.192	.112	24.807	.130
19	-.030	.110	24.882	.164
20	-.096	.108	25.661	.177
21	.037	.106	25.785	.215
22	.257	.104	31.848	.080

Partial Autocorrelations

1	.000	.146
2	.098	.146
3	.153	.146
4	-.289	.146
5	-.042	.146
6	-.118	.146
7	-.202	.146
8	.067	.146
9	-.015	.146
10	.117	.146
11	.111	.146
12	.216	.146
13	-.210	.146
14	-.025	.146
15	-.196	.146
16	.017	.146
17	.081	.146
18	-.026	.146
19	-.052	.146
20	-.233	.146
21	.096	.146
22	.087	.146

Figure 27 - STI ACF and PACF for the Dept of Education

Based on the ACF and PACF displayed in Figure 27, a familiar trend is evident. Given the absence of significant Q-statistics at every lag and only one significant ACF spike at lag 22, the model identified was again ARIMA (0,0,0). Since the ARIMA (0,0,0) model signifies the statistical independence of STI scores, 24 pre- and 23 post-policy STI scores were compared using ANOVA.

While there appeared to be a slight increase in STI measures after the policy introduction (0.4184 episodes as compared to 0.4303 episodes), this difference was not significant ($F(1,46) = .11$, $p = 0.747$).

Analysis of STI Measures for the Department of Finance. In Figure 28, the time-series plot of STI values for the Department of Finance shows that STI scores fluctuated between approximately 0.22 episodes and 0.62 episodes (see Appendix C).

Looking at the ACF and PACF graphs in Figure 29, independence among STI measures is again evident as there are no significant Q-statistics or ACF spikes at any lag (therefore an ARIMA (0,0,0) model).

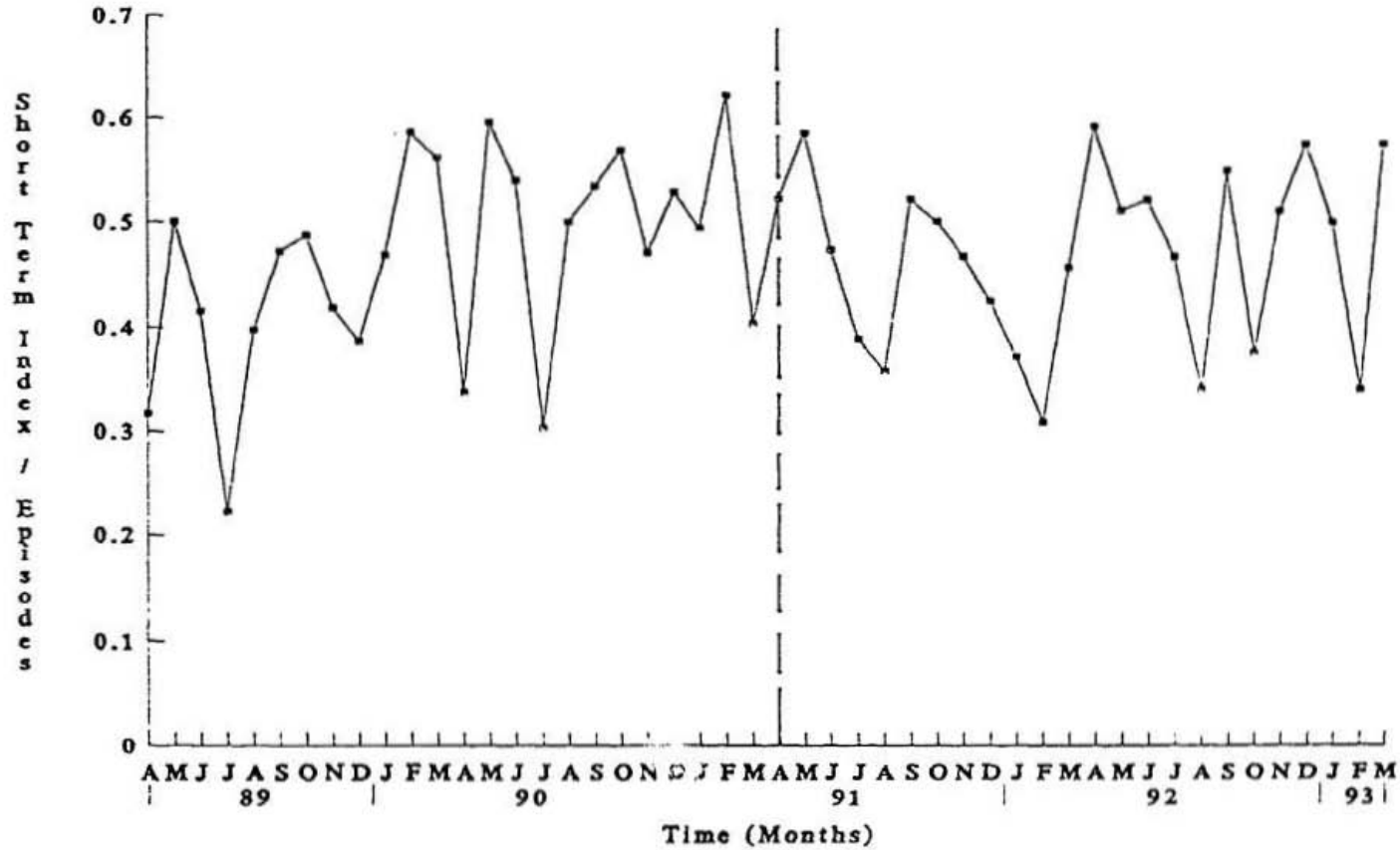


Figure 28
Average number of episodes < 2 days per person/month: Dept of Finance

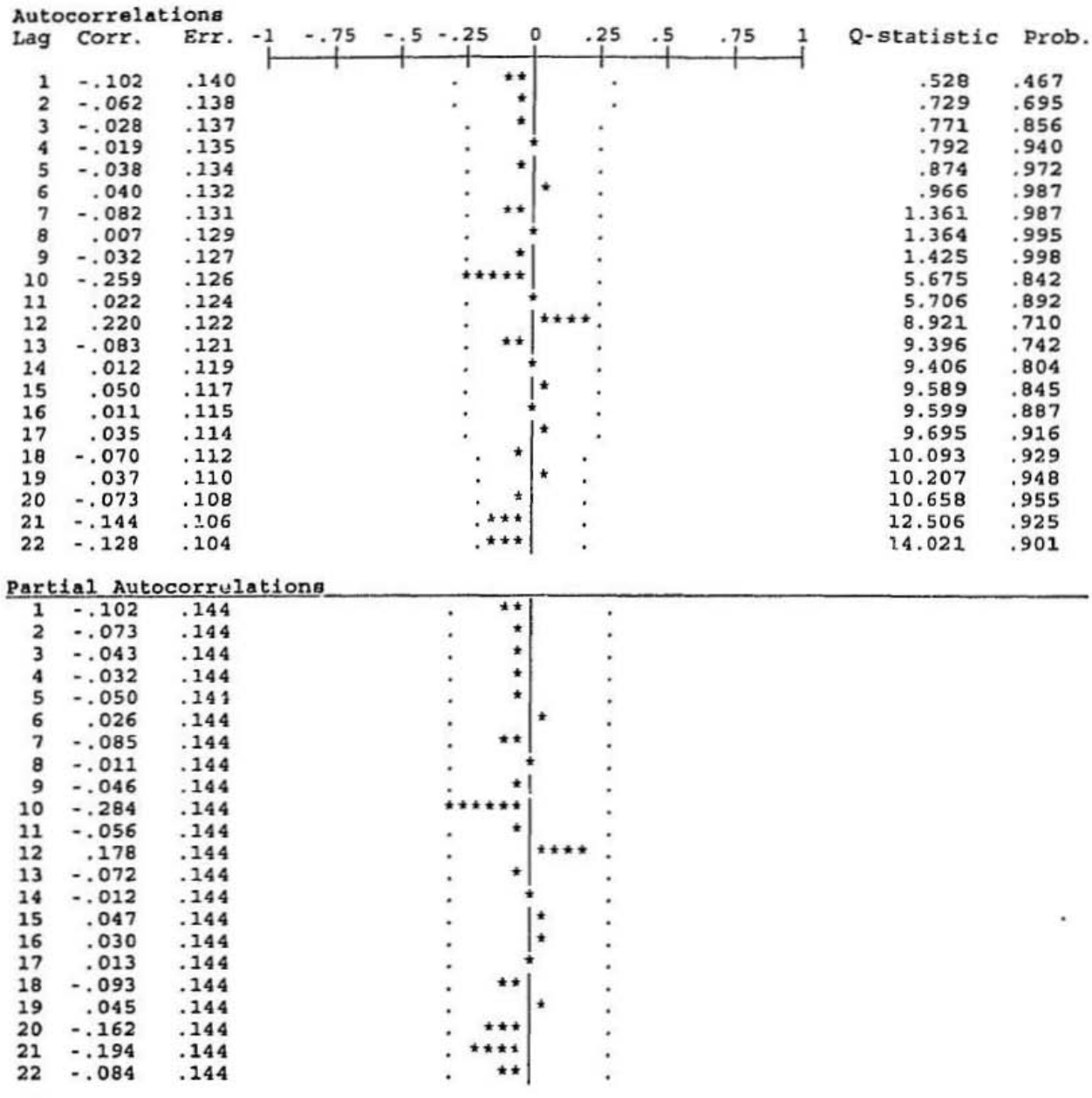


Figure 29 - STI ACF and PACF for the Dept of Finance

The results of the ANOVA performed on the pre- and post-policy STI values show that the pre- and post-STI means (0.4618 episodes and 0.4682 episodes respectively) were not significantly different ($F(1,47) = .06$, $p = 0.811$).

Analysis of STI Measures for the Department of Employment and Labour Relations. Presented in Figure 30 is the STI time-series plot for the Department of Employment and Labour Relations. As the figure shows, STI values range from approximately 0.35 to 0.64 episodes (see Appendix D).

The ACF and PACF are displayed in Figure 31. Despite the significant ACF spike at lag 22, all remaining spikes do not exceed the 95% confidence interval. As well, given the absence of significant Q-statistics at every lag, the ARIMA (0,0,0) model was again utilized.

Treating each STI score independently, the pre- and post-policy scores were compared using ANOVA. The difference between pre-policy STI scores (with a mean of 0.4932) and post-policy STI scores (with a mean of 0.4858) was not significant ($F(1,47) = .10$, $p = 0.757$).

Analysis of STI Measures for All Departments Combined. All departments were again combined in order to conduct an overall comparison between pre- and post-policy STI scores. As is shown in Figure 32, STI scores fluctuate between 0.31

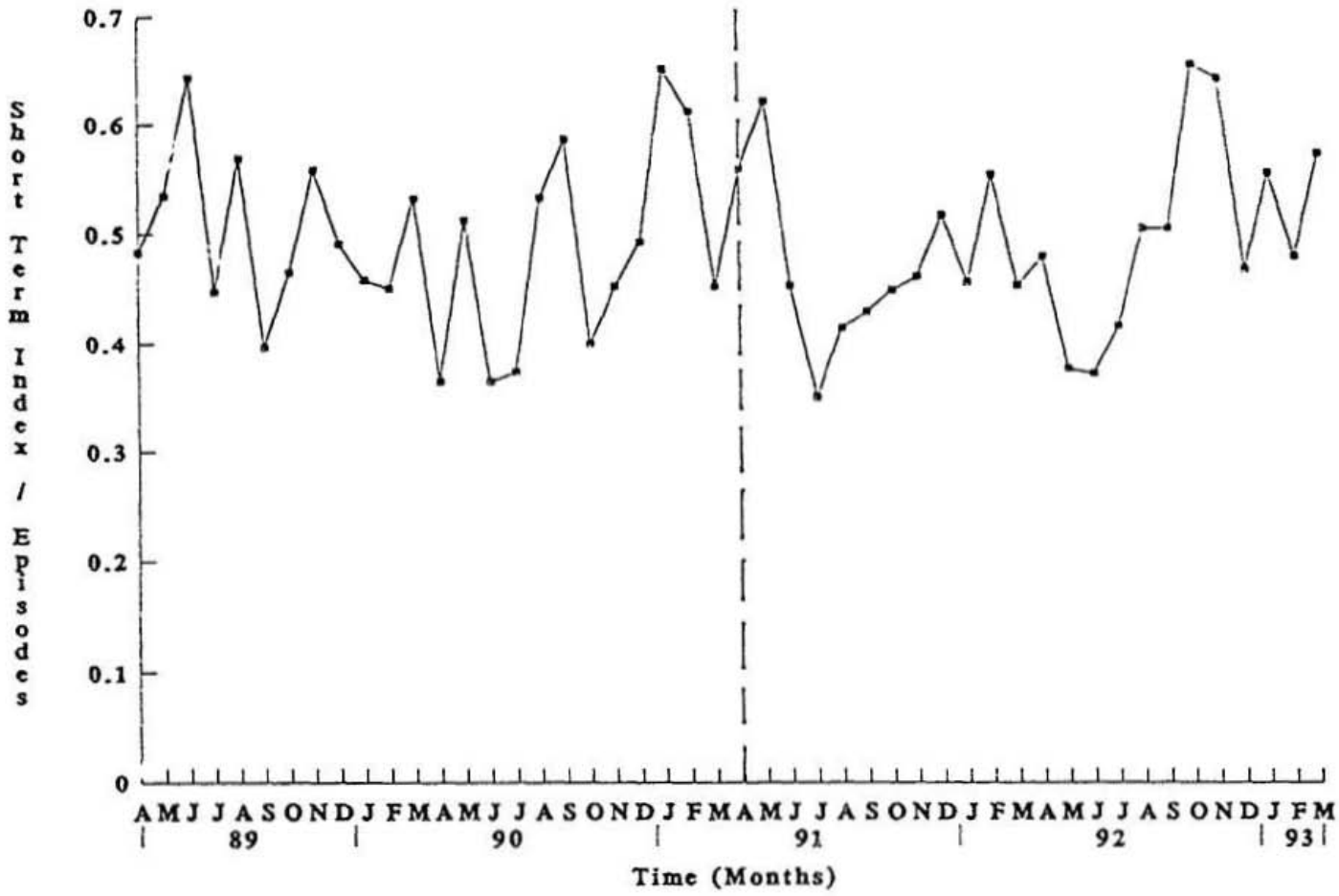
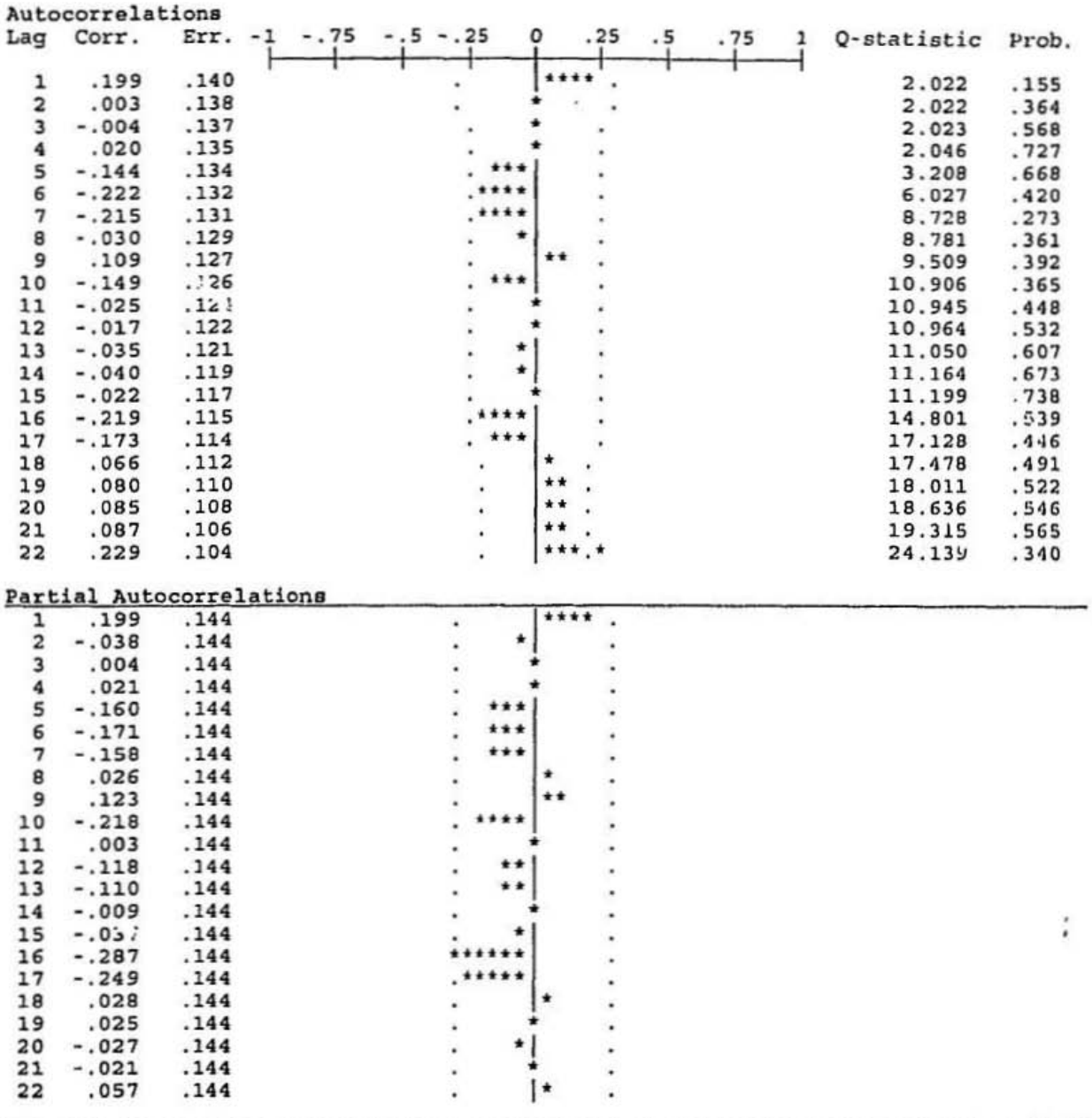


Figure 30
Average number of episodes < 2 days per person/month: Employment & Labour



Autocorrelations

Lag	Corr.	Err.	Q-statistic	Prob.
1	.199	.140	2.022	.155
2	.003	.138	2.022	.364
3	-.004	.137	2.023	.568
4	.020	.135	2.046	.727
5	-.144	.134	3.208	.668
6	-.222	.132	6.027	.420
7	-.215	.131	8.728	.273
8	-.030	.129	8.781	.361
9	.109	.127	9.509	.392
10	-.149	.126	10.906	.365
11	-.025	.124	10.945	.448
12	-.017	.122	10.964	.532
13	-.035	.121	11.050	.607
14	-.040	.119	11.164	.673
15	-.022	.117	11.199	.738
16	-.219	.115	14.801	.539
17	-.173	.114	17.128	.446
18	.066	.112	17.478	.491
19	.080	.110	18.011	.522
20	.085	.108	18.636	.546
21	.087	.106	19.315	.565
22	.229	.104	24.139	.340

Partial Autocorrelations

1	.199	.144	
2	-.038	.144	
3	.004	.144	
4	.021	.144	
5	-.160	.144	
6	-.171	.144	
7	-.158	.144	
8	.026	.144	
9	.123	.144	
10	-.218	.144	
11	.003	.144	
12	-.118	.144	
13	-.110	.144	
14	-.009	.144	
15	-.057	.144	
16	-.287	.144	
17	-.249	.144	
18	.028	.144	
19	.025	.144	
20	-.027	.144	
21	-.021	.144	
22	.057	.144	

Figure 31 - STI ACF and PACF for the Dept of Employment and Labour Relations

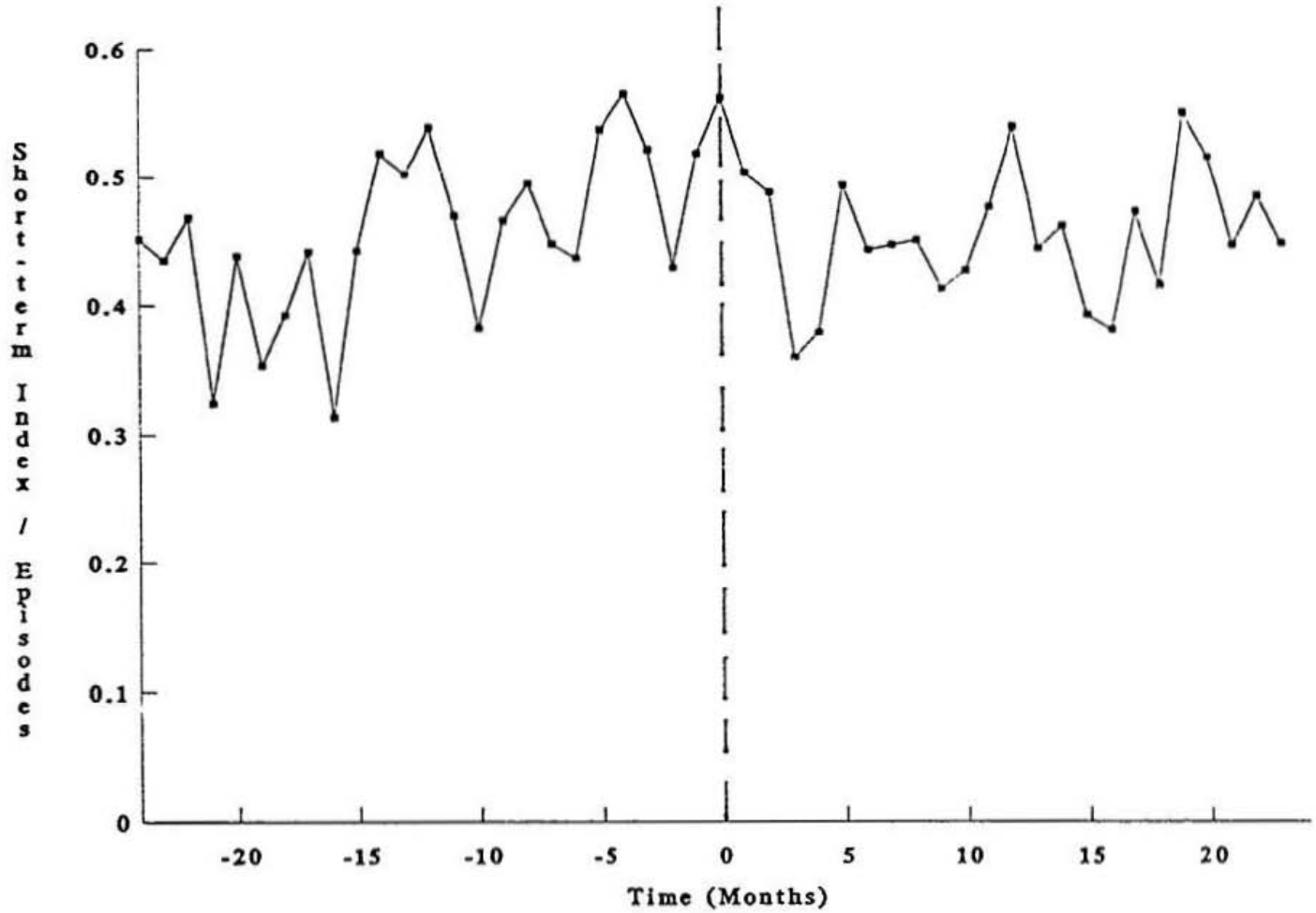


Figure 32
Average number of episodes < 2 days per person/month: All departments combined

Autocorrelations

Lag	Corr.	Err.	-1 -.75 -.5 -.25 0 .25 .5 .75 1	Q-statistic	Prob.
1	.186	.140	. |**** .	1.765	.184
2	-.031	.138	. * | .	1.814	.404
3	.092	.137	. |** .	2.266	.519
4	-.067	.135	. * | .	2.509	.643
5	-.139	.134	. *** | .	3.584	.611
6	-.067	.132	. * | .	3.837	.699
7	-.093	.131	. ** | .	4.346	.739
8	-.035	.129	. * | .	4.421	.817
9	.053	.127	. | * .	4.593	.868
10	-.007	.126	. * .	4.596	.916
11	.214	.124	. |**** .	7.579	.750
12	.034	.122	. |* .	7.657	.811
13	-.024	.121	. * .	7.697	.863
14	.045	.119	. |* .	7.837	.898
15	.044	.117	. |* .	7.978	.925
16	-.219	.115	.**** | .	11.564	.773
17	-.218	.114	.**** | .	15.260	.577
18	-.124	.112	. ** | .	16.496	.558
19	-.015	.110	. * .	16.514	.623
20	-.081	.108	. ** | .	17.078	.648
21	-.087	.106	. ** | .	17.755	.664
22	.195	.104	. |****	21.281	.503

Partial Autocorrelations

1	.186	.144	. |**** .
2	-.068	.144	. * | .
3	.115	.144	. |** .
4	-.116	.144	. ** | .
5	-.095	.144	. ** | .
6	-.044	.144	. * | .
7	-.074	.144	. * | .
8	.011	.144	. * .
9	.043	.144	. |* .
10	-.034	.144	. * | .
11	.228	.144	. |***** .
12	-.103	.144	. ** | .
13	.028	.144	. |* .
14	-.006	.144	. * .
15	.068	.144	. |* .
16	-.216	.144	. **** | .
17	-.138	.144	. *** | .
18	-.088	.144	. ** | .
19	.087	.144	. |** .
20	-.148	.144	. *** | .
21	-.057	.144	. * | .
22	.132	.144	. |*** .

Figure 33 - STI ACF and PACF for all departments combined

and 0.55 episodes per month. While the STI scores appear more variable during the pre-policy time period, this is probably due to the effects of the general strike observed in the Departments of Social Services and Education.

Similar to the non-significant ACFs and PACFs observed in each department separately and as illustrated in Figure 33, all ACF spikes and Q-statistics were not significant at any lag for all departments combined. Given an ARIMA (0,0,0) model, and following the procedures of previous sections, pre- and post-STI scores were statistically compared using ANOVA. The difference between the pre-policy STI mean (0.4519 episodes) and the post-policy STI mean (0.4681 episodes) was not significant ($F(1,47) = .07$, $p = 0.403$).

DISCUSSION

This study was carried out to test claims made by those who suggest that employee smoking is a significant contributor to absenteeism. Indeed, statements like "Studies that monitor the exact cost of a smoking-cessation program on a company's bottom line leave little doubt that smokers impact healthcare, absenteeism and productivity" (Harvey, 1994, p. 51) need to be empirically tested. Based on the results obtained in the investigation of four Newfoundland Government departments, it appears that the no-smoking policy did not influence sick-leave use two years after its introduction. In no case was there a significant change in sick-leave use regardless of dependent measure, time of policy introduction, or department.

Given the archival nature of the investigation and thus the inability to differentiate the smoking population from the non-smoking population, the reason why no effect was found remains somewhat questionable. It seems that there was no change in employee-health in the first two years (as indexed by the TTI measure) and hence no change in absenteeism during this period. Arguably, any health improvements caused by such a policy may take years in which to surface. In this study, we allowed only two years following the policy introduction and therefore may have been too early to observe the policy's influence. However,

there was also no change in avoidable absences as measured by both the FI and the STI. This is curious since it seems logical that improving air quality should also lead to an increased comfort level and a decreased need to withdraw from the work environment.

It is possible that while the policy may have been a health improvement for non-smokers, denying smokers an opportunity to smoke may have led to an increase in sick-leave use among this group. A mixture of non-smoker's reduction in sick-leave use and smoker's increase in sick-leave use may have resulted in no significant overall change. Based on the nature of the data however, we cannot test this explanation.

On the other hand, there may have been a general improvement in health status and comfort for all employees but it did not manifest itself in the form of sick-leave use. While sick-leave is offered to employees during times of illness, as suggested in the introduction, a notable portion of sick-leave use is not due to illness. Perhaps the lack of results of this investigation support the claim that because sick-leave use does not totally reflect the number of legitimate illnesses, it is not a sensitive measure of employee well-being. However, we did incorporate different sick-leave indices in order to capture legitimate and illegitimate sick-leave use. Since there was no change

in either measure, it appeared that neither avoidable nor unavoidable absenteeism was influenced by the policy.

Difference in Autocorrelations Among the TTI, FI and STI Measures

While we did not find any change in sick-leave use as a function of the policy, we did observe differences among the sick-leave measures during ARIMA identification. Unlike the FI and STI measures, the TTI measure (commonly perceived as an unavoidable absenteeism measure) produced distinct time-series in two departments, and for all departments combined. In particular, for the Departments of Social Services and Employment and Labour Relations, and for all departments combined, the ARIMA procedure found rapid exponential decay in the first several lags of each ACF and one spike at the first lag for each PACF. As a result, ARIMA judged each series to be autoregressive such that each current value in the series was predicted by the previous value of the series. However, for both the FI and STI measures, no significant relationship among the points of either series was found.

The reason for this difference is not clear. One possible explanation is that TTI illnesses are more likely to last longer than avoidable absences (as indexed by the FI and STI measures). Thus, they would be more likely to span more than one month. Such long-term illnesses would

contribute not only to the current month but also the following one. Therefore, given that this type of illness may contribute to more than one TTI measure, the relationship is between the months is strengthened, and hence an existence of autocorrelations among the points.

This difference among dependent measures offers some support for the fact that our indices were measuring the two distinct types of absenteeism, avoidable and unavoidable.

The Future of Absenteeism Research and Absence-Control Policies

As discussed in the introduction, employee absenteeism has been perceived as a very complex phenomenon influenced by a variety of variables operating in the work environment. Researchers have accounted for some absenteeism as a reflection of psychological factors such as employee satisfaction. It has also been suggested that personal and demographic variables such as age, tenure and gender also significantly account for the rate and duration of absenteeism. In general however, for one proposition or another, each variable has been linked with the Withdrawal Theory and the need for employees to deal with organizational dissatisfactions by "withdrawing" from the workplace through excessive sick-leave use (Muchinsky, 1977).

While the Withdrawal Theory may be reliable, given the inconsistency surrounding the effects of such psychological variables as worker satisfaction and the variable observations in studies involving personal and demographic variables, more recent research has supported the effects of organization-wide variables as the strongest predictors of absenteeism. In fact, as was discussed in the introduction, along with work-environment factors such as work autonomy, research has suggested that organization-wide factors (such as the specific structure of sick-leave policies themselves) were better predictors of absenteeism than demographic and psychological factors (Farrell & Stamm, 1988).

Researchers propose that absence-control policies are an interesting area for future research and according to previously published literature reviews, (Farrell et al., 1988; Muchinsky, 1977), reliable scientific investigation has rendered the area very promising for explaining a significant proportion of variance associated with employee absenteeism. Overall, most absence-control policies such as incentives, posters, feedback, and behaviour modification systems have been effective (Farrell, et al., 1988). Scientifically comparing absence-control policies in different organizational structures will be valuable for research in the applied setting.

Conclusion

This investigation found no evidence of the no-smoking policy's effect on absenteeism rates. One possible explanation is that sick-leave use is not a sensitive or accurate measure of the health benefits of no-smoking policies. Given that employee absenteeism is a complex, culturally-based phenomenon, it may not be a sensitive measure of employee wellness. If an accurate method of data collection existed, the quantification of such variables as employee comfort, productivity, aggression, and/or irritability, for example, might be better indicators of workplace improvements such as ridding the office air of cigarette smoke.

Had other dependent measures been employed to investigate the possible effects of the no-smoking policy, the investigation would have had to distribute questionnaires. However, it was not the intent of this investigation to evaluate the effects through the use of an obtrusive, qualitative approach. Since the no-smoking policy was introduced between three and six years ago, it seemed too ambitious to have employees rely on their recollections to report any changes in smoking behaviour or how they felt shortly after the policy was introduced. As well, there are other problems (such as response desirability) associated with soliciting opinions from surveys. This is particularly true if the issues are

surrounded by strong social influence (such as the debate over smoker and non-smoker rights). By analyzing sick-leave use over a period of time, we obtained an unobtrusive measure of what we thought might be an indicator of employee wellness. Given the highly publicized relationship between short and long-term illness, comfort, and cigarette smoke, the investigation seemed to be a logical procedure.

In general, based on the apparent acceptance of the health and economic benefits of no-smoking policies and smoking cessation programs among public and private organizations, the intent of this investigation was to determine if the no-smoking policy had any affect on absenteeism. Given the clear and consistent observations of this study, strong evidence exists that the no-smoking policy should not be justified on the basis of reducing absenteeism.

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FOOTNOTES

1. This article does not cite any scientific research supporting this claim.

2. A 2-day criterion was chosen because (according to the General Service sick-leave policy) a 3 day absence requires employees to validate illnesses in the form of a medical certificate.

3. All data analyses were performed using SPSS\PC Software.

Appendix A

TTI, FI and STI measures for The Department of Social Services

SPSS/PC PRINTOUT OF TOTAL TIME, FREQUENCY AND SHORT TERM INDICES FOR THE DEPARTMENT OF SOCIAL SERVICES

Summaries of TMINUS24 January, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6667	.8226	117
DEPMEAS	1	TOTAL TIME INDEX	.6500	.8102	40
DEPMEAS	2	FREQUENCY INDEX	.6757	.8516	37
DEPMEAS	3	SHORT TERM INDEX	.6750	.8286	40

Total Cases = 207
Missing Cases = 90 OR 43.5 PCT.

Summaries of TMINUS23 February, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.2521	.7060	117
DEPMEAS	1	TOTAL TIME INDEX	.3375	1.0215	40
DEPMEAS	2	FREQUENCY INDEX	.2162	.4793	37
DEPMEAS	3	SHORT TERM INDEX	.2000	.4641	40

Total Cases = 207
Missing Cases = 90 OR 43.5 PCT.

Summaries of TMINUS22 March, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3205	.5889	117
DEPMEAS	1	TOTAL TIME INDEX	.3875	.7205	40
DEPMEAS	2	FREQUENCY INDEX	.2973	.5199	37
DEPMEAS	3	SHORT TERM INDEX	.2750	.5057	40

Total Cases = 207
Missing Cases = 90 OR 43.5 PCT.

Summaries of TMINUS21 April, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3605	.6844	147
DEPMEAS	1	TOTAL TIME INDEX	.4400	.8184	50
DEPMEAS	2	FREQUENCY INDEX	.2979	.5866	47
DEPMEAS	3	SHORT TERM INDEX	.3400	.6263	50

Total Cases = 207
Missing Cases = 60 OR 29.0 PCT.

Summaries of TMINUS20 May, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5782	1.0398	147
DEPMEAS	1	TOTAL TIME INDEX	.7400	1.4682	50
DEPMEAS	2	FREQUENCY INDEX	.5319	.7475	47
DEPMEAS	3	SHORT TERM INDEX	.4600	.7060	50

Total Cases = 207
Missing Cases = 60 OR 29.0 PCT.

Summaries of TMINUS19 June, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4014	1.1098	147
DEPMEAS	1	TOTAL TIME INDEX	.7800	1.7675	50
DEPMEAS	2	FREQUENCY INDEX	.2553	.4408	47
DEPMEAS	3	SHORT TERM INDEX	.1600	.3703	50

Total Cases = 207
Missing Cases = 60 OR 29.0 PCT.

Summaries of TMINUS18 July, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4400	.7348	150
DEPMEAS	1	TOTAL TIME INDEX	.4706	.8741	51
DEPMEAS	2	FREQUENCY INDEX	.4375	.6812	48
DEPMEAS	3	SHORT TERM INDEX	.4118	.6380	51

Total Cases = 207
Missing Cases = 57 OR 27.5 PCT.

Summaries of TMINUS17 August, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3301	.5797	153
DEPMEAS	1	TOTAL TIME INDEX	.3173	.5690	52
DEPMEAS	2	FREQUENCY INDEX	.3469	.5969	49
DEPMEAS	3	SHORT TERM INDEX	.3269	.5848	52

Total Cases = 207
Missing Cases = 54 OR 26.1 PCT.

Summaries of TMINUS16 September, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.2320	1.3341	153
DEPMEAS	1	TOTAL TIME INDEX	.5288	2.2414	52
DEPMEAS	2	FREQUENCY INDEX	.1020	.3058	49
DEPMEAS	3	SHORT TERM INDEX	.0577	.2354	52

Total Cases = 207
Missing Cases = 54 OR 26.1 PCT.

Summaries of TMINUS15 October, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.8137	2.4319	153
DEPMEAS	1	TOTAL TIME INDEX	1.5673	4.0135	52
DEPMEAS	2	FREQUENCY INDEX	.4898	.6165	49
DEPMEAS	3	SHORT TERM INDEX	.3654	.5250	52

Total Cases = 207
Missing Cases = 54 OR 26.1 PCT.

Summaries of TMINUS14 November, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3962	.7315	159
DEPMEAS	1	TOTAL TIME INDEX	.4259	.8655	54
DEPMEAS	2	FREQUENCY INDEX	.3922	.6657	51
DEPMEAS	3	SHORT TERM INDEX	.3704	.6529	54

Total Cases = 207
Missing Cases = 48 OR 23.2 PCT.

Summaries of TMINUS13 December, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7296	1.0505	159
DEPMEAS	1	TOTAL TIME INDEX	1.0000	1.4730	54
DEPMEAS	2	FREQUENCY INDEX	.6667	.7394	51
DEPMEAS	3	SHORT TERM INDEX	.5185	.6934	54

Total Cases = 207
Missing Cases = 48 OR 23.2 PCT.

Summaries of TMINUS12 January, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5714	.7580	161
DEPMEAS	1	TOTAL TIME INDEX	.6981	.9575	53
DEPMEAS	2	FREQUENCY INDEX	.5185	.6366	54
DEPMEAS	3	SHORT TERM INDEX	.5000	.6369	54

Total Cases = 183
Missing Cases = 22 OR 12.0 PCT.

Summaries of TMINUS11 February, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5093	1.3387	161
DEPMEAS	1	TOTAL TIME INDEX	.7170	1.9575	53
DEPMEAS	2	FREQUENCY INDEX	.4444	.9450	54
DEPMEAS	3	SHORT TERM INDEX	.3704	.8309	54

Total Cases = 183
Missing Cases = 22 OR 12.0 PCT.

Summaries of TMINUS10 March, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7733	1.8940	161
DEPMEAS	1	TOTAL TIME INDEX	1.1981	3.1414	53
DEPMEAS	2	FREQUENCY INDEX	.5926	.6593	54
DEPMEAS	3	SHORT TERM INDEX	.5370	.6648	54

Total Cases = 183
Missing Cases = 22 OR 12.0 PCT.

Summaries of TMINUS9 April, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7065	1.1492	155
DEPMEAS	1	TOTAL TIME INDEX	.9118	1.6574	51
DEPMEAS	2	FREQUENCY INDEX	.6346	.7928	52
DEPMEAS	3	SHORT TERM INDEX	.5769	.7758	52

Total Cases = 183
Missing Cases = 28 OR 15.3 PCT.

Summaries of TMINUS8 May, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6044	1.0468	158
DEPMEAS	1	TOTAL TIME INDEX	.8942	1.5318	52
DEPMEAS	2	FREQUENCY INDEX	.5000	.6934	53
DEPMEAS	3	SHORT TERM INDEX	.4245	.6309	53

Total Cases = 183
Missing Cases = 25 OR 13.7 PCT.

Summaries of TMINUS7 June, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5633	1.1112	158
DEPMEAS	1	TOTAL TIME INDEX	.7885	1.6784	52
DEPMEAS	2	FREQUENCY INDEX	.4906	.7238	53
DEPMEAS	3	SHORT TERM INDEX	.4151	.6024	53

Total Cases = 183
Missing Cases = 25 OR 13.7 PCT.

Summaries of TMINUS6 July, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3892	.9587	158
DEPMEAS	1	TOTAL TIME INDEX	.4904	1.3844	52
DEPMEAS	2	FREQUENCY INDEX	.3585	.6820	53
DEPMEAS	3	SHORT TERM INDEX	.3208	.6437	53

Total Cases = 183
Missing Cases = 25 OR 13.7 PCT.

Summaries of TMINUS5 August, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4224	.9740	161
DEPMEAS	1	TOTAL TIME INDEX	.5660	1.5033	53
DEPMEAS	2	FREQUENCY INDEX	.3704	.5595	54
DEPMEAS	3	SHORT TERM INDEX	.3333	.5494	54

Total Cases = 183
Missing Cases = 22 OR 12.0 PCT.

Summaries of TMINUS4 September, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7377	1.3000	162
DEPMEAS	1	TOTAL TIME INDEX	.9352	1.9716	54
DEPMEAS	2	FREQUENCY INDEX	.6667	.8009	54
DEPMEAS	3	SHORT TERM INDEX	.6111	.7376	54

Total Cases = 183
Missing Cases = 21 OR 11.5 PCT.

Summaries of TMINUS3 October, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7593	1.5814	162
DEPMEAS	1	TOTAL TIME INDEX	1.0370	2.4299	54
DEPMEAS	2	FREQUENCY INDEX	.6481	.8935	54
DEPMEAS	3	SHORT TERM INDEX	.5926	.8799	54

Total Cases = 183
Missing Cases = 21 OR 11.5 PCT.

Summaries of TMINUS2 November, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5772	1.2293	162
DEPMEAS	1	TOTAL TIME INDEX	.9907	1.9340	54
DEPMEAS	2	FREQUENCY INDEX	.4259	.5697	54
DEPMEAS	3	SHORT TERM INDEX	.3148	.5075	54

Total Cases = 183
Missing Cases = 21 OR 11.5 PCT.

Summaries of TMINUS1 December, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6626	1.8912	163
DEPMEAS	1	TOTAL TIME INDEX	1.1091	3.0922	55
DEPMEAS	2	FREQUENCY INDEX	.4630	.6926	54
DEPMEAS	3	SHORT TERM INDEX	.4074	.6300	54

Total Cases = 183
Missing Cases = 20 OR 10.9 PCT.

Summaries of TOPOLICY January, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.8727	1.9472	161
DEPMEAS	1	TOTAL TIME INDEX	1.3100	3.1894	50
DEPMEAS	2	FREQUENCY INDEX	.7143	.9856	56
DEPMEAS	3	SHORT TERM INDEX	.6364	.8685	55

Total Cases = 201
Missing Cases = 40 OR 19.9 PCT.

Summaries of TPLUS1 February, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5217	1.8289	161
DEPMEAS	1	TOTAL TIME INDEX	.9400	3.1810	50
DEPMEAS	2	FREQUENCY INDEX	.3571	.5197	56
DEPMEAS	3	SHORT TERM INDEX	.3091	.4664	55

Total Cases = 201
Missing Cases = 40 OR 19.9 PCT.

Summaries of TPLUS2 March, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7795	2.0046	161
DEPMEAS	1	TOTAL TIME INDEX	1.3500	3.3492	50
DEPMEAS	2	FREQUENCY INDEX	.5714	.8281	56
DEPMEAS	3	SHORT TERM INDEX	.4727	.7663	55

Total Cases = 201
Missing Cases = 40 OR 19.9 PCT.

Summaries of TPLUS3 April, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6657	1.7318	178
DEPMEAS	1	TOTAL TIME INDEX	1.2273	2.9120	55
DEPMEAS	2	FREQUENCY INDEX	.4516	.6697	62
DEPMEAS	3	SHORT TERM INDEX	.3770	.5821	61

Total Cases = 201
Missing Cases = 23 OR 11.4 PCT.

Summaries of TPLUS4 May, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.8062	2.0537	178
DEPMEAS	1	TOTAL TIME INDEX	1.4455	3.5220	55
DEPMEAS	2	FREQUENCY INDEX	.5565	.6147	62
DEPMEAS	3	SHORT TERM INDEX	.4836	.5914	61

Total Cases = 201
Missing Cases = 23 OR 11.4 PCT.

Summaries of TPLUS5 June, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6854	1.8045	178
DEPMEAS	1	TOTAL TIME INDEX	.9818	2.9281	55
DEPMEAS	2	FREQUENCY INDEX	.5645	.9342	62
DEPMEAS	3	SHORT TERM INDEX	.5410	.9412	61

Total Cases = 201
Missing Cases = 23 OR 11.4 PCT.

Summaries of TPLUS6 July, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5899	1.3861	178
DEPMEAS	1	TOTAL TIME INDEX	.9455	2.2846	55
DEPMEAS	2	FREQUENCY INDEX	.4677	.6457	62
DEPMEAS	3	SHORT TERM INDEX	.3934	.6132	61

Total Cases = 201
Missing Cases = 23 OR 11.4 PCT.

Summaries of TPLUS7 August, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4803	1.7566	178
DEPMEAS	1	TOTAL TIME INDEX	.7727	3.0166	55
DEPMEAS	2	FREQUENCY INDEX	.3710	.6333	62
DEPMEAS	3	SHORT TERM INDEX	.3279	.6251	61

Total Cases = 201
Missing Cases = 23 OR 11.4 PCT.

Summaries of TPLUS8 September, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5444	.8989	180
DEPMEAS	1	TOTAL TIME INDEX	.7636	1.3328	55
DEPMEAS	2	FREQUENCY INDEX	.4762	.6185	63
DEPMEAS	3	SHORT TERM INDEX	.4194	.5881	62

Total Cases = 201
Missing Cases = 21 OR 10.4 PCT.

Summaries of TPLUS9 October, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5583	.7535	180
DEPMEAS	1	TOTAL TIME INDEX	.6455	.9607	55
DEPMEAS	2	FREQUENCY INDEX	.5238	.6440	63
DEPMEAS	3	SHORT TERM INDEX	.5161	.6464	62

Total Cases = 201
Missing Cases = 21 OR 10.4 PCT.

Summaries of TPLUS10 November, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5222	.8601	180
DEPMEAS	1	TOTAL TIME INDEX	.6909	1.1804	55
DEPMEAS	2	FREQUENCY INDEX	.4921	.7156	63
DEPMEAS	3	SHORT TERM INDEX	.4032	.6130	62

Total Cases = 201
Missing Cases = 21 OR 10.4 PCT.

Summaries of TPLUS11 December, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5083	1.2150	180
DEPMEAS	1	TOTAL TIME INDEX	.8091	2.0081	55
DEPMEAS	2	FREQUENCY INDEX	.4127	.6126	63
DEPMEAS	3	SHORT TERM INDEX	.3387	.5703	62

Total Cases = 201
Missing Cases = 21 OR 10.4 PCT.

Summaries of TPLUS12 January, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.8112	1.2238	188
DEPMEAS	1	TOTAL TIME INDEX	1.1667	1.7086	63
DEPMEAS	2	FREQUENCY INDEX	.6935	.8606	62
DEPMEAS	3	SHORT TERM INDEX	.5714	.8174	63

Total Cases = 209
Missing Cases = 21 OR 10.0 PCT.

Summaries of TPLUS13 February, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4920	.9155	188
DEPMEAS	1	TOTAL TIME INDEX	.6270	1.3228	63
DEPMEAS	2	FREQUENCY INDEX	.4355	.6173	62
DEPMEAS	3	SHORT TERM INDEX	.4127	.6126	63

Total Cases = 209
Missing Cases = 21 OR 10.0 PCT.

Summaries of TPLUS14 March, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5670	1.1961	194
DEPMEAS	1	TOTAL TIME INDEX	.7692	1.8458	65
DEPMEAS	2	FREQUENCY INDEX	.4844	.6665	64
DEPMEAS	3	SHORT TERM INDEX	.4462	.6381	65

Total Cases = 209
Missing Cases = 15 OR 7.2 PCT.

Summaries of TPLUS15 April, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5194	1.2830	206
DEPMEAS	1	TOTAL TIME INDEX	.8116	2.0239	69
DEPMEAS	2	FREQUENCY INDEX	.3971	.6263	68
DEPMEAS	3	SHORT TERM INDEX	.3478	.5898	69

Total Cases = 209
Missing Cases = 3 OR 1.4 PCT.

Summaries of TPLUS16 May, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4976	.7910	206
DEPMEAS	1	TOTAL TIME INDEX	.6304	1.0629	69
DEPMEAS	2	FREQUENCY INDEX	.4559	.6092	68
DEPMEAS	3	SHORT TERM INDEX	.4058	.6019	69

Total Cases = 209
Missing Cases = 3 OR 1.4 PCT.

Summaries of TPLUS17 June, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4126	.7552	206
DEPMEAS	1	TOTAL TIME INDEX	.4928	.9095	69
DEPMEAS	2	FREQUENCY INDEX	.3824	.6698	68
DEPMEAS	3	SHORT TERM INDEX	.3623	.6636	69

Total Cases = 209
Missing Cases = 3 OR 1.4 PCT.

Summaries of TPLUS18 July, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4417	.7661	206
DEPMEAS	1	TOTAL TIME INDEX	.5072	.9334	69
DEPMEAS	2	FREQUENCY INDEX	.4191	.6725	68
DEPMEAS	3	SHORT TERM INDEX	.3986	.6674	69

Total Cases = 209
Missing Cases = 3 OR 1.4 PCT.

Summaries of TPLUS19 August, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6141	.9616	206
DEPMEAS	1	TOTAL TIME INDEX	.7609	1.3246	69
DEPMEAS	2	FREQUENCY INDEX	.5882	.7378	68
DEPMEAS	3	SHORT TERM INDEX	.4928	.6779	69

Total Cases = 209
Missing Cases = 3 OR 1.4 PCT.

Summaries of TPLUS20 September, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4515	.8752	206
DEPMEAS	1	TOTAL TIME INDEX	.5942	1.2286	69
DEPMEAS	2	FREQUENCY INDEX	.4118	.6519	68
DEPMEAS	3	SHORT TERM INDEX	.3478	.5898	69

Total Cases = 209
Missing Cases = 3 OR 1.4 PCT.

Summaries of TPLUS21 October, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5971	.8324	206
DEPMEAS	1	TOTAL TIME INDEX	.7246	1.1898	69
DEPMEAS	2	FREQUENCY INDEX	.5588	.5829	68
DEPMEAS	3	SHORT TERM INDEX	.5072	.5590	69

Total Cases = 209
Missing Cases = 3 OR 1.4 PCT.

Summaries of TPLUS22 November, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.8301	1.8111	209
DEPMEAS	1	TOTAL TIME INDEX	1.3500	2.9134	70
DEPMEAS	2	FREQUENCY INDEX	.6087	.7320	69
DEPMEAS	3	SHORT TERM INDEX	.5286	.6751	70

Total Cases = 209

Summaries of TPLUS23 December, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7536	2.6558	209
DEPMEAS	1	TOTAL TIME INDEX	1.4929	4.4212	70
DEPMEAS	2	FREQUENCY INDEX	.4203	.7155	69
DEPMEAS	3	SHORT TERM INDEX	.3429	.6111	70

Total Cases = 209

Appendix B

TTI, FI and STI measure for The Department of Education

SPSS/PC PRINTOUT OF TOTAL TIME, FREQUENCY AND SHORT TERM INDICES FOR THE DEPARTMENT OF EDUCATION

Due to temporary selection criteria or missing value declarations, the following table is empty..

TMINUS24 DEPMEAS

Summaries of TMINUS23 April, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3913	.7338	115
DEPMEAS	1	TOTAL TIME INDEX	.3846	.7819	39
DEPMEAS	2	FREQUENCY INDEX	.4054	.7249	37
DEPMEAS	3	SHORT TERM INDEX	.3846	.7114	39

Total Cases = 177
Missing Cases = 62 OR 35.0 PCT.

Summaries of TMINUS22 May, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7000	2.0389	115
DEPMEAS	1	TOTAL TIME INDEX	1.0128	3.3609	39
DEPMEAS	2	FREQUENCY INDEX	.5676	.7280	37
DEPMEAS	3	SHORT TERM INDEX	.5128	.7208	39

Total Cases = 177
Missing Cases = 62 OR 35.0 PCT.

Summaries of TMINUS21 June, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4870	1.4977	115
DEPMEAS	1	TOTAL TIME INDEX	.7949	2.4568	39
DEPMEAS	2	FREQUENCY INDEX	.3514	.5383	37
DEPMEAS	3	SHORT TERM INDEX	.3077	.5208	39

Total Cases = 177
Missing Cases = 62 OR 35.0 PCT.

Summaries of TMINUS20 July, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.2609	.4310	115
DEPMEAS	1	TOTAL TIME INDEX	.2308	.3948	39
DEPMEAS	2	FREQUENCY INDEX	.2703	.4502	37
DEPMEAS	3	SHORT TERM INDEX	.2821	.4559	39

Total Cases = 177
Missing Cases = 62 OR 35.0 PCT.

Summaries of TMINUS19 August, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3957	.8151	115
DEPMEAS	1	TOTAL TIME INDEX	.5513	1.1686	39
DEPMEAS	2	FREQUENCY INDEX	.3243	.5299	37
DEPMEAS	3	SHORT TERM INDEX	.3077	.5691	39

Total Cases = 177
Missing Cases = 62 OR 35.0 PCT.

Summaries of TMINUS18 September, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.2739	1.8886	115
DEPMEAS	1	TOTAL TIME INDEX	.6795	3.2128	39
DEPMEAS	2	FREQUENCY INDEX	.0811	.2767	37
DEPMEAS	3	SHORT TERM INDEX	.0513	.2235	39

Total Cases = 177
Missing Cases = 62 OR 35.0 PCT.

Summaries of TMINUS17 October, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5000	.8573	118
DEPMEAS	1	TOTAL TIME INDEX	.6000	1.0634	40
DEPMEAS	2	FREQUENCY INDEX	.4474	.7604	38
DEPMEAS	3	SHORT TERM INDEX	.4500	.7143	40

Total Cases = 177
Missing Cases = 59 OR 33.3 PCT.

Summaries of TMINUS16 November, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3898	.9960	118
DEPMEAS	1	TOTAL TIME INDEX	.6000	1.4641	40
DEPMEAS	2	FREQUENCY INDEX	.3158	.6619	38
DEPMEAS	3	SHORT TERM INDEX	.2500	.5883	40

Total Cases = 177
Missing Cases = 59 OR 33.3 PCT.

Summaries of TMINUS15 December, 1986

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5470	1.2173	117
DEPMEAS	1	TOTAL TIME INDEX	.7179	1.4500	39
DEPMEAS	2	FREQUENCY INDEX	.4737	.7618	38
DEPMEAS	3	SHORT TERM INDEX	.4500	.6385	40

Total Cases = 177
Missing Cases = 60 OR 33.9 PCT.

Summaries of TMINUS14 January, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			1.0381	2.2314	118
DEPMEAS	1	TOTAL TIME INDEX	1.6625	3.6275	40
DEPMEAS	2	FREQUENCY INDEX	.7632	.8522	38
DEPMEAS	3	SHORT TERM INDEX	.6750	.6938	40

Total Cases = 177
Missing Cases = 59 OR 33.3 PCT.

Summaries of TMINUS13 February, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5297	1.9285	118
DEPMEAS	1	TOTAL TIME INDEX	.8875	3.1935	40
DEPMEAS	2	FREQUENCY INDEX	.3684	.6334	38
DEPMEAS	3	SHORT TERM INDEX	.3250	.6155	40

Total Cases = 177
Missing Cases = 59 OR 33.3 PCT.

Summaries of TMINUS12 March, 1987
By levels of DEPMEAS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6552	1.5721	116
DEPMEAS	1	TOTAL TIME INDEX	.9250	2.5559	40
DEPMEAS	2	FREQUENCY INDEX	.5263	.6035	38
DEPMEAS	3	SHORT TERM INDEX	.5000	.5575	38

Total Cases = 143
Missing Cases = 27 OR 18.9 PCT.

Summaries of TMINUS11 April, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.8294	1.5429	126
DEPMEAS	1	TOTAL TIME INDEX	1.0595	2.4550	42
DEPMEAS	2	FREQUENCY INDEX	.7619	.8500	42
DEPMEAS	3	SHORT TERM INDEX	.6667	.6502	42

Total Cases = 143
Missing Cases = 17 OR 11.9 PCT.

Summaries of TMINUS10 May, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5516	.9248	126
DEPMEAS	1	TOTAL TIME INDEX	.7262	1.2107	42
DEPMEAS	2	FREQUENCY INDEX	.5000	.7408	42
DEPMEAS	3	SHORT TERM INDEX	.4286	.7373	42

Total Cases = 143
Missing Cases = 17 OR 11.9 PCT.

Summaries of TMINUS9 June, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6825	2.2223	126
DEPMEAS	1	TOTAL TIME INDEX	1.2619	3.7355	42
DEPMEAS	2	FREQUENCY INDEX	.4286	.5474	42
DEPMEAS	3	SHORT TERM INDEX	.3571	.5329	42

Total Cases = 143
Missing Cases = 17 OR 11.9 PCT.

Summaries of TMINUS8 July, 1987
By levels of DEPMEAS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5873	1.7687	126
DEPMEAS	1	TOTAL TIME INDEX	1.0476	2.9234	42
DEPMEAS	2	FREQUENCY INDEX	.4048	.6270	42
DEPMEAS	3	SHORT TERM INDEX	.3095	.5174	42

Total Cases = 143
Missing Cases = 17 OR 11.9 PCT.

Summaries of TMINUS7 August, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4206	.6585	126
DEPMEAS	1	TOTAL TIME INDEX	.4762	.7960	42
DEPMEAS	2	FREQUENCY INDEX	.4286	.5903	42
DEPMEAS	3	SHORT TERM INDEX	.3571	.5768	42

Total Cases = 143
Missing Cases = 17 OR 11.9 PCT.

Summaries of TMINUS6 September, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5675	.7358	126
DEPMEAS	1	TOTAL TIME INDEX	.7024	.9819	42
DEPMEAS	2	FREQUENCY INDEX	.5476	.5927	42
DEPMEAS	3	SHORT TERM INDEX	.4524	.5501	42

Total Cases = 143
Missing Cases = 17 OR 11.9 PCT.

Summaries of TMINUS5 October, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5198	.7111	126
DEPMEAS	1	TOTAL TIME INDEX	.6310	.9567	42
DEPMEAS	2	FREQUENCY INDEX	.4762	.5516	42
DEPMEAS	3	SHORT TERM INDEX	.4524	.5501	42

Total Cases = 143
Missing Cases = 17 OR 11.9 PCT.

Summaries of TMINUS4 November, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5984	.8238	127
DEPMEAS	1	TOTAL TIME INDEX	.6744	.9813	43
DEPMEAS	2	FREQUENCY INDEX	.5714	.7373	42
DEPMEAS	3	SHORT TERM INDEX	.5476	.7392	42

Total Cases = 143
Missing Cases = 16 OR 11.2 PCT.

Summaries of TMINUS3 December, 1987

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5945	.8351	127
DEPMEAS	1	TOTAL TIME INDEX	.6860	1.0061	43
DEPMEAS	2	FREQUENCY INDEX	.5714	.7696	42
DEPMEAS	3	SHORT TERM INDEX	.5238	.7067	42

Total Cases = 143
Missing Cases = 16 OR 11.2 PCT.

Summaries of TMINUS2 January, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5231	.8280	130
DEPMEAS	1	TOTAL TIME INDEX	.6522	1.0998	46
DEPMEAS	2	FREQUENCY INDEX	.5000	.6344	42
DEPMEAS	3	SHORT TERM INDEX	.4048	.6270	42

Total Cases = 143
Missing Cases = 13 OR 9.1 PCT.

Summaries of TMINUS1 February, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7308	1.3485	130
DEPMEAS	1	TOTAL TIME INDEX	1.0870	1.9588	46
DEPMEAS	2	FREQUENCY INDEX	.5952	.8281	[illegible]
DEPMEAS	3	SHORT TERM INDEX	.4762	.7726	[illegible]

Total Cases = 143
Missing Cases = 13 OR 9.1 PCT.

Summaries of T0POLICY March, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6731	.8253	130
DEPMEAS	1	TOTAL TIME INDEX	.8256	1.0402	43
DEPMEAS	2	FREQUENCY INDEX	.6279	.6909	43
DEPMEAS	3	SHORT TERM INDEX	.5682	.6954	44

Total Cases = 175
Missing Cases = 45 OR 25.7 PCT.

Summaries of TPLUS1 April, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4664	1.0245	149
DEPMEAS	1	TOTAL TIME INDEX	.6100	1.5659	50
DEPMEAS	2	FREQUENCY INDEX	.4286	.6124	49
DEPMEAS	3	SHORT TERM INDEX	.3600	.5628	50

Total Cases = 175
Missing Cases = 26 OR 14.9 PCT.

Summaries of TPLUS2 May, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7081	1.0464	149
DEPMEAS	1	TOTAL TIME INDEX	.8700	1.3470	50
DEPMEAS	2	FREQUENCY INDEX	.6531	.8792	49
DEPMEAS	3	SHORT TERM INDEX	.6000	.8330	50

Total Cases = 175
Missing Cases = 26 OR 14.9 PCT.

Summaries of TPLUS3 June, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3658	.5624	149
DEPMEAS	1	TOTAL TIME INDEX	.4500	.7089	50
DEPMEAS	2	FREQUENCY INDEX	.3265	.4738	49
DEPMEAS	3	SHORT TERM INDEX	.3200	.4712	50

Total Cases = 175
Missing Cases = 26 OR 14.9 PCT.

Summaries of TPLUS4 July, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3054	.6252	149
DEPMEAS	1	TOTAL TIME INDEX	.3700	.8318	50
DEPMEAS	2	FREQUENCY INDEX	.2857	.5000	49
DEPMEAS	3	SHORT TERM INDEX	.2600	.4870	50

Total Cases = 175
Missing Cases = 26 OR 14.9 PCT.

Summaries of TPLUS5 August, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3926	.6275	149
DEPMEAS	1	TOTAL TIME INDEX	.4100	.7402	50
DEPMEAS	2	FREQUENCY INDEX	.3878	.5707	49
DEPMEAS	3	SHORT TERM INDEX	.3800	.5675	50

Total Cases = 175
Missing Cases = 26 OR 14.9 PCT.

Summaries of TPLUS6 September, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4262	.6404	149
DEPMEAS	1	TOTAL TIME INDEX	.4300	.7072	50
DEPMEAS	2	FREQUENCY INDEX	.4286	.6124	49
DEPMEAS	3	SHORT TERM INDEX	.4200	.6091	50

Total Cases = 175
Missing Cases = 26 OR 14.9 PCT.

Summaries of TPLUS7 October, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6579	1.2172	152
DEPMEAS	1	TOTAL TIME INDEX	.8431	1.8452	51
DEPMEAS	2	FREQUENCY INDEX	.6000	.8081	50
DEPMEAS	3	SHORT TERM INDEX	.5294	.6117	51

Total Cases = 175
Missing Cases = 23 OR 13.1 PCT.

Summaries of TPLUS8 November, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5968	.8975	155
DEPMEAS	1	TOTAL TIME INDEX	.6827	1.1204	52
DEPMEAS	2	FREQUENCY INDEX	.5686	.8063	51
DEPMEAS	3	SHORT TERM INDEX	.5385	.7266	52

Total Cases = 175
Missing Cases = 20 OR 11.4 PCT.

Summaries of TPLUS9 December, 1988

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4367	1.2412	158
DEPMEAS	1	TOTAL TIME INDEX	.7170	1.9892	53
DEPMEAS	2	FREQUENCY INDEX	.3269	.5503	52
DEPMEAS	3	SHORT TERM INDEX	.2642	.5244	53

Total Cases = 175
Missing Cases = 17 OR 9.7 PCT.

Summaries of TPLUS10 January, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.8481	1.4362	158
DEPMEAS	1	TOTAL TIME INDEX	1.1698	2.1793	53
DEPMEAS	2	FREQUENCY INDEX	.7308	.8882	52
DEPMEAS	3	SHORT TERM INDEX	.6415	.7363	53

Total Cases = 175
Missing Cases = 17 OR 9.7 PCT.

Summaries of TPLUS11 February, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6487	1.0490	158
DEPMEAS	1	TOTAL TIME INDEX	.8208	1.3626	53
DEPMEAS	2	FREQUENCY INDEX	.5769	.8710	52
DEPMEAS	3	SHORT TERM INDEX	.5472	.8220	53

Total Cases = 175
Missing Cases = 17 OR 9.7 PCT.

Summaries of TPLUS12 March, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6485	1.2125	165
DEPMEAS	1	TOTAL TIME INDEX	.8182	1.7622	55
DEPMEAS	2	FREQUENCY INDEX	.6071	.8241	56
DEPMEAS	3	SHORT TERM INDEX	.5185	.7948	54

Total Cases = 180
Missing Cases = 15 OR 8.3 PCT.

Summaries of TPLUS13 April, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3772	.8222	171
DEPMEAS	1	TOTAL TIME INDEX	.4649	1.0768	57
DEPMEAS	2	FREQUENCY INDEX	.3448	.6636	58
DEPMEAS	3	SHORT TERM INDEX	.3214	.6635	56

Total Cases = 180
Missing Cases = 9 OR 5.0 PCT.

Summaries of TPLUS14 May, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5029	.7544	171
DEPMEAS	1	TOTAL TIME INDEX	.5439	.9272	57
DEPMEAS	2	FREQUENCY INDEX	.4828	.6816	58
DEPMEAS	3	SHORT TERM INDEX	.4821	.6322	56

Total Cases = 180
Missing Cases = 9 OR 5.0 PCT.

Summaries of TPLUS15 June, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4444	.8161	171
DEPMEAS	1	TOTAL TIME INDEX	.5965	1.1551	57
DEPMEAS	2	FREQUENCY INDEX	.3966	.5906	58
DEPMEAS	3	SHORT TERM INDEX	.3393	.5486	56

Total Cases = 180
Missing Cases = 9 OR 5.0 PCT.

Summaries of TPLUS16 July, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4655	1.0867	174
DEPMEAS	1	TOTAL TIME INDEX	.6207	1.6893	58
DEPMEAS	2	FREQUENCY INDEX	.4237	.6487	59
DEPMEAS	3	SHORT TERM INDEX	.3509	.5172	57

Total Cases = 180
Missing Cases = 6 OR 3.3 PCT.

Summaries of TPLUS17 August, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5230	1.0394	174
DEPMEAS	1	TOTAL TIME INDEX	.6724	1.5688	58
DEPMEAS	2	FREQUENCY INDEX	.4576	.6248	59
DEPMEAS	3	SHORT TERM INDEX	.4386	.6273	57

Total Cases = 180
Missing Cases = 6 OR 3.3 PCT.

Summaries of TPLUS18 September, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4435	1.0083	177
DEPMEAS	1	TOTAL TIME INDEX	.5847	1.4358	59
DEPMEAS	2	FREQUENCY INDEX	.3833	.7152	60
DEPMEAS	3	SHORT TERM INDEX	.3621	.6933	58

Total Cases = 180
Missing Cases = 3 OR 1.7 PCT.

Summaries of TPLUS19 October, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.8446	2.1293	177
DEPMEAS	1	TOTAL TIME INDEX	1.3983	3.4588	59
DEPMEAS	2	FREQUENCY INDEX	.6000	.8068	60
DEPMEAS	3	SHORT TERM INDEX	.5345	.8211	58

Total Cases = 180
Missing Cases = 3 OR 1.7 PCT.

Summaries of TPLUS20 November, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7203	1.8238	177
DEPMEAS	1	TOTAL TIME INDEX	1.1102	2.6670	59
DEPMEAS	2	FREQUENCY INDEX	.5667	1.1842	60
DEPMEAS	3	SHORT TERM INDEX	.4828	1.1584	58

Total Cases = 180
Missing Cases = 3 OR 1.7 PCT.

Summaries of TPLUS21 December, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3249	.6745	177
DEPMEAS	1	TOTAL TIME INDEX	.3644	.8602	59
DEPMEAS	2	FREQUENCY INDEX	.3167	.5964	60
DEPMEAS	3	SHORT TERM INDEX	.2931	.5301	58

Total Cases = 180
Missing Cases = 3 OR 1.7 PCT.

Summaries of TPLUS22 January, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.8644	1.9051	177
DEPMEAS	1	TOTAL TIME INDEX	1.3220	3.1263	59
DEPMEAS	2	FREQUENCY INDEX	.7000	.6713	60
DEPMEAS	3	SHORT TERM INDEX	.5690	.6783	58

Total Cases = 180
Missing Cases = 3 OR 1.7 PCT.

Summaries of TPLUS23 February, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3644	.5653	177
DEPMEAS	1	TOTAL TIME INDEX	.3644	.6005	59
DEPMEAS	2	FREQUENCY INDEX	.3833	.5552	60
DEPMEAS	3	SHORT TERM INDEX	.3448	.5478	58

Total Cases = 180
Missing Cases = 3 OR 1.7 PCT.

Appendix C

TTI, FI and STI for The Department of Finance

SPSS/PC PRINTOUT OF TOTAL TIME, FREQUENCY AND SHORT TERM INDICES
FOR THE DEPARTMENT OF FINANCE

Summaries of TMINUS24 April, 1989
By levels of DEPMEAS

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3613	.7418	238
DEPMEAS	1	TOTAL TIME INDEX	.4304	1.0055	79
DEPMEAS	2	FREQUENCY INDEX	.3375	.5941	80
DEPMEAS	3	SHORT TERM INDEX	.3165	.5447	79

Total Cases = 284
Missing Cases = 46 OR 16.2 PCT.

Summaries of TMINUS23 May, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6239	1.2343	238
DEPMEAS	1	TOTAL TIME INDEX	.7911	1.8753	79
DEPMEAS	2	FREQUENCY INDEX	.5625	.7436	80
DEPMEAS	3	SHORT TERM INDEX	.5190	.7136	79

Total Cases = 284
Missing Cases = 46 OR 16.2 PCT.

Summaries of TMINUS22 June, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4793	.7068	241
DEPMEAS	1	TOTAL TIME INDEX	.5688	.8814	80
DEPMEAS	2	FREQUENCY INDEX	.4691	.6141	81
DEPMEAS	3	SHORT TERM INDEX	.4000	.5868	80

Total Cases = 284
Missing Cases = 43 OR 15.1 PCT.

Summaries of TMINUS21 July, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4336	1.2246	241
DEPMEAS	1	TOTAL TIME INDEX	.7063	1.9270	80
DEPMEAS	2	FREQUENCY INDEX	.3210	.6088	81
DEPMEAS	3	SHORT TERM INDEX	.2750	.5948	80

Total Cases = 284
Missing Cases = 43 OR 15.1 PCT.

Summaries of TMINUS20 August, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5512	1.0698	244
DEPMEAS	1	TOTAL TIME INDEX	.7222	1.6125	81
DEPMEAS	2	FREQUENCY INDEX	.5000	.7071	82
DEPMEAS	3	SHORT TERM INDEX	.4321	.5687	81

Total Cases = 284
Missing Cases = 40 OR 14.1 PCT.

Summaries of TMINUS19 September, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7251	1.9895	247
DEPMEAS	1	TOTAL TIME INDEX	1.1768	3.2512	82
DEPMEAS	2	FREQUENCY INDEX	.5337	.7510	83
DEPMEAS	3	SHORT TERM INDEX	.4671	.7536	82

Total Cases = 284
Missing Cases = 37 OR 13.0 PCT.

Summaries of TMINUS18 October, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.8880	2.2297	250
DEPMEAS	1	TOTAL TIME INDEX	1.4819	3.6388	83
DEPMEAS	2	FREQUENCY INDEX	.6548	.8430	84
DEPMEAS	3	SHORT TERM INDEX	.5301	.7705	83

Total Cases = 284
Missing Cases = 34 OR 12.0 PCT.

Summaries of TMINUS17 November, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4880	.7643	250
DEPMEAS	1	TOTAL TIME INDEX	.5783	.9483	83
DEPMEAS	2	FREQUENCY INDEX	.4583	.6550	84
DEPMEAS	3	SHORT TERM INDEX	.4277	.6539	83

Total Cases = 284
Missing Cases = 34 OR 12.0 PCT.

Summaries of TMINUS16 December, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4760	.7627	250
DEPMEAS	1	TOTAL TIME INDEX	.5181	.9054	83
DEPMEAS	2	FREQUENCY INDEX	.4762	.7024	84
DEPMEAS	3	SHORT TERM INDEX	.4337	.6661	83

Total Cases = 284
Missing Cases = 34 OR 12.0 PCT.

Summaries of TMINUS15 January, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6917	1.4364	253
DEPMEAS	1	TOTAL TIME INDEX	1.0000	2.2761	84
DEPMEAS	2	FREQUENCY INDEX	.5882	.6951	85
DEPMEAS	3	SHORT TERM INDEX	.4881	.6676	84

Total Cases = 284
Missing Cases = 31 OR 10.9 PCT.

Summaries of TMINUS14 February, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7412	1.2157	255
DEPMEAS	1	TOTAL TIME INDEX	.9524	1.6730	84
DEPMEAS	2	FREQUENCY INDEX	.6744	.9260	86
DEPMEAS	3	SHORT TERM INDEX	.6000	.8756	85

Total Cases = 284
Missing Cases = 29 OR 10.2 PCT.

Summaries of TMINUS13 March, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6745	1.3071	255
DEPMEAS	1	TOTAL TIME INDEX	.8810	2.0024	84
DEPMEAS	2	FREQUENCY INDEX	.6047	.7712	86
DEPMEAS	3	SHORT TERM INDEX	.5412	.7328	85

Total Cases = 284
Missing Cases = 29 OR 10.2 PCT.

Summaries of TMINUS12 April, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4870	1.0225	269
DEPMEAS	1	TOTAL TIME INDEX	.6742	1.5394	89
DEPMEAS	2	FREQUENCY INDEX	.4333	.6369	90
DEPMEAS	3	SHORT TERM INDEX	.3556	.5866	90

Total Cases = 279
Missing Cases = 10 OR 3.6 PCT.

Summaries of TMINUS11 May, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7193	1.5604	269
DEPMEAS	1	TOTAL TIME INDEX	.9494	2.5103	89
DEPMEAS	2	FREQUENCY INDEX	.6222	.7123	90
DEPMEAS	3	SHORT TERM INDEX	.5889	.7173	90

Total Cases = 279
Missing Cases = 10 OR 3.6 PCT.

Summaries of TMINUS10 June, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7305	1.4909	269
DEPMEAS	1	TOTAL TIME INDEX	1.0281	2.3359	89
DEPMEAS	2	FREQUENCY INDEX	.6222	.7872	90
DEPMEAS	3	SHORT TERM INDEX	.5444	.7368	90

Total Cases = 279
Missing Cases = 10 OR 3.6 PCT.

Summaries of TMINUS9 July, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4108	1.0310	269
DEPMEAS	1	TOTAL TIME INDEX	.5449	1.4841	89
DEPMEAS	2	FREQUENCY INDEX	.3778	.7728	90
DEPMEAS	3	SHORT TERM INDEX	.3111	.6297	90

Total Cases = 279
Missing Cases = 10 OR 3.6 PCT.

Summaries of TMINUS8 August, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6635	1.4790	266
DEPMEAS	1	TOTAL TIME INDEX	.9375	2.3621	88
DEPMEAS	2	FREQUENCY INDEX	.5506	.7073	89
DEPMEAS	3	SHORT TERM INDEX	.5056	.6763	89

Total Cases = 279
Missing Cases = 13 OR 4.7 PCT.

Summaries of TMINUS7 September, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6278	.8404	266
DEPMEAS	1	TOTAL TIME INDEX	.7614	1.1089	88
DEPMEAS	2	FREQUENCY INDEX	.5955	.6862	89
DEPMEAS	3	SHORT TERM INDEX	.5281	.6412	89

Total Cases = 279
Missing Cases = 13 OR 4.7 PCT.

Summaries of TMINUS6 October, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6786	1.0312	266
DEPMEAS	1	TOTAL TIME INDEX	.8125	1.4270	88
DEPMEAS	2	FREQUENCY INDEX	.6517	.7848	89
DEPMEAS	3	SHORT TERM INDEX	.5730	.7368	89

Total Cases = 279
Missing Cases = 13 OR 4.7 PCT.

Summaries of TMINUS5 November, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6747	1.1841	269
DEPMEAS	1	TOTAL TIME INDEX	.9831	1.7717	89
DEPMEAS	2	FREQUENCY INDEX	.5778	.7340	90
DEPMEAS	3	SHORT TERM INDEX	.4667	.6569	90

Total Cases = 279
Missing Cases = 10 OR 3.6 PCT.

Summaries of TMINUS4 December, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6710	1.5082	269
DEPMEAS	1	TOTAL TIME INDEX	.9157	2.3138	89
DEPMEAS	2	FREQUENCY INDEX	.5778	.8609	90
DEPMEAS	3	SHORT TERM INDEX	.5222	.8510	90

Total Cases = 279
Missing Cases = 10 OR 3.6 PCT.

Summaries of TMINUS3 January, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7621	1.7030	269
DEPMEAS	1	TOTAL TIME INDEX	1.2022	2.7362	89
DEPMEAS	2	FREQUENCY INDEX	.6000	.7465	90
DEPMEAS	3	SHORT TERM INDEX	.4889	.6909	90

Total Cases = 279
Missing Cases = 10 OR 3.6 PCT.

Summaries of TMINUS2 February, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.8442	1.5378	269
DEPMEAS	1	TOTAL TIME INDEX	1.2416	2.4134	89
DEPMEAS	2	FREQUENCY INDEX	.6811	.7430	90
DEPMEAS	3	SHORT TERM INDEX	.6144	.7563	90

Total Cases = 279
Missing Cases = 10 OR 3.6 PCT.

Summaries of TMINUS1 March, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5074	.8767	269
DEPMEAS	1	TOTAL TIME INDEX	.6573	1.2004	89
DEPMEAS	2	FREQUENCY INDEX	.4667	.6737	90
DEPMEAS	3	SHORT TERM INDEX	.4000	.6325	90

Total Cases = 279
Missing Cases = 10 OR 3.6 PCT.

Summaries of TOPOLICY April, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6109	.8583	275
DEPMEAS	1	TOTAL TIME INDEX	.7473	1.1140	91
DEPMEAS	2	FREQUENCY INDEX	.5652	.7001	92
DEPMEAS	3	SHORT TERM INDEX	.5217	.6871	92

Total Cases = 292
Missing Cases = 17 OR 5.8 PCT.

Summaries of TPLUS1 May, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6911	1.0983	280
DEPMEAS	1	TOTAL TIME INDEX	.8641	1.6360	92
DEPMEAS	2	FREQUENCY INDEX	.6277	.7031	94
DEPMEAS	3	SHORT TERM INDEX	.5851	.6785	94

Total Cases = 292
Missing Cases = 12 OR 4.1 PCT.

Summaries of TPLUS2 June, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6413	1.4197	283
DEPMEAS	1	TOTAL TIME INDEX	.9301	2.2392	93
DEPMEAS	2	FREQUENCY INDEX	.5263	.7122	95
DEPMEAS	3	SHORT TERM INDEX	.4737	.7122	95

Total Cases = 292
Missing Cases = 9 OR 3.1 PCT.

Summaries of TPLUS3 July, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6661	1.8866	283
DEPMEAS	1	TOTAL TIME INDEX	1.1452	3.1091	93
DEPMEAS	2	FREQUENCY INDEX	.4737	.6971	95
DEPMEAS	3	SHORT TERM INDEX	.3895	.6239	95

Total Cases = 292
Missing Cases = 9 OR 3.1 PCT.

Summaries of TPLUS4 August, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6943	2.3023	283
DEPMEAS	1	TOTAL TIME INDEX	1.2957	3.8180	93
DEPMEAS	2	FREQUENCY INDEX	.4421	.7951	95
DEPMEAS	3	SHORT TERM INDEX	.3579	.6829	95

Total Cases = 292
Missing Cases = 9 OR 3.1 PCT.

Summaries of TPLUS5 September, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7036	1.4535	280
DEPMEAS	1	TOTAL TIME INDEX	1.0000	2.2991	92
DEPMEAS	2	FREQUENCY INDEX	.5957	.7379	94
DEPMEAS	3	SHORT TERM INDEX	.5213	.6991	94

Total Cases = 292
Missing Cases = 12 OR 4.1 PCT.

Summaries of TPLUS6 October, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7446	1.4002	280
DEPMEAS	1	TOTAL TIME INDEX	1.1359	2.1928	92
DEPMEAS	2	FREQUENCY INDEX	.6064	.7217	94
DEPMEAS	3	SHORT TERM INDEX	.5000	.6517	94

Total Cases = 292
Missing Cases = 12 OR 4.1 PCT.

Summaries of TPLUS7 November, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6304	.9991	280
DEPMEAS	1	TOTAL TIME INDEX	.8859	1.4546	92
DEPMEAS	2	FREQUENCY INDEX	.5426	.6503	94
DEPMEAS	3	SHORT TERM INDEX	.4681	.6342	94

Total Cases = 292
Missing Cases = 12 OR 4.1 PCT.

Summaries of TPLUS8 December, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5179	.8918	280
DEPMEAS	1	TOTAL TIME INDEX	.6630	1.1978	92
DEPMEAS	2	FREQUENCY INDEX	.4681	.6987	94
DEPMEAS	3	SHORT TERM INDEX	.4255	.6798	94

Total Cases = 292
Missing Cases = 12 OR 4.1 PCT.

Summaries of TPLUS9 January, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5482	1.3462	280
DEPMEAS	1	TOTAL TIME INDEX	.8533	2.1529	92
DEPMEAS	2	FREQUENCY INDEX	.4255	.6306	94
DEPMEAS	3	SHORT TERM INDEX	.3723	.6044	94

Total Cases = 292
Missing Cases = 12 OR 4.1 PCT.

Summaries of TPLUS10 February, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4589	.9852	280
DEPMEAS	1	TOTAL TIME INDEX	.7011	1.5065	92
DEPMEAS	2	FREQUENCY INDEX	.3723	.5677	94
DEPMEAS	3	SHORT TERM INDEX	.3085	.5293	94

Total Cases = 292
Missing Cases = 12 OR 4.1 PCT.

Summaries of TPLUS11 March, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6304	1.3652	280
DEPMEAS	1	TOTAL TIME INDEX	.9185	2.1678	92
DEPMEAS	2	FREQUENCY INDEX	.5213	.6677	94
DEPMEAS	3	SHORT TERM INDEX	.4574	.6503	94

Total Cases = 292
Missing Cases = 12 OR 4.1 PCT.

Summaries of TPLUS12 April, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6390	.9410	277
DEPMEAS	1	TOTAL TIME INDEX	.7033	1.1229	91
DEPMEAS	2	FREQUENCY INDEX	.6237	.8459	93
DEPMEAS	3	SHORT TERM INDEX	.5914	.8371	93

Total Cases = 289
Missing Cases = 12 OR 4.2 PCT.

Summaries of TPLUS13 May, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6375	.9587	280
DEPMEAS	1	TOTAL TIME INDEX	.8207	1.3313	92
DEPMEAS	2	FREQUENCY INDEX	.5851	.7245	94
DEPMEAS	3	SHORT TERM INDEX	.5106	.6679	94

Total Cases = 289
Missing Cases = 9 OR 3.1 PCT.

Summaries of TPLUS14 June, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6036	1.0558	280
DEPMEAS	1	TOTAL TIME INDEX	.7391	1.5397	92
DEPMEAS	2	FREQUENCY INDEX	.5532	.7276	94
DEPMEAS	3	SHORT TERM INDEX	.5213	.6836	94

Total Cases = 289
Missing Cases = 9 OR 3.1 PCT.

Summaries of TPLUS15 July, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6821	1.7757	280
DEPMEAS	1	TOTAL TIME INDEX	1.0435	2.9067	92
DEPMEAS	2	FREQUENCY INDEX	.5426	.7134	94
DEPMEAS	3	SHORT TERM INDEX	.4681	.6987	94

Total Cases = 289
Missing Cases = 9 OR 3.1 PCT.

Summaries of TPLUS16 August, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.3893	.7395	280
DEPMEAS	1	TOTAL TIME INDEX	.4565	.9540	92
DEPMEAS	2	FREQUENCY INDEX	.3723	.6390	94
DEPMEAS	3	SHORT TERM INDEX	.3404	.5783	94

Total Cases = 289
Missing Cases = 9 OR 3.1 PCT.

Summaries of TPLUS17 September, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6516	1.0128	277
DEPMEAS	1	TOTAL TIME INDEX	.8077	1.3840	91
DEPMEAS	2	FREQUENCY INDEX	.6022	.76[illegible]	93
DEPMEAS	3	SHORT TERM INDEX	.5484	.75[illegible]	93

Total Cases = 289
Missing Cases = 12 OR 4.2 PCT.

Summaries of TPLUS18 October, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5686	1.6321	277
DEPMEAS	1	TOTAL TIME INDEX	.9066	2.6935	91
DEPMEAS	2	FREQUENCY INDEX	.4301	.6150	93
DEPMEAS	3	SHORT TERM INDEX	.3763	.5882	93

Total Cases = 289
Missing Cases = 12 OR 4.2 PCT.

Summaries of TPLUS19 November, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6911	1.7081	280
DEPMEAS	1	TOTAL TIME INDEX	1.0054	2.7809	92
DEPMEAS	2	FREQUENCY INDEX	.5638	.7267	94
DEPMEAS	3	SHORT TERM INDEX	.5106	.7146	94

Total Cases = 289
Missing Cases = 9 OR 3.1 PCT.

Summaries of TPLUS20 December, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6821	1.4807	280
DEPMEAS	1	TOTAL TIME INDEX	.8804	2.3410	92
DEPMEAS	2	FREQUENCY INDEX	.5957	.7665	94
DEPMEAS	3	SHORT TERM INDEX	.5745	.7548	94

Total Cases = 289
Missing Cases = 9 OR 3.1 PCT.

Summaries of TPLUS21 January, 1993

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6982	1.1659	280
DEPMEAS	1	TOTAL TIME INDEX	1.0272	1.7718	92
DEPMEAS	2	FREQUENCY INDEX	.5745	.6638	94
DEPMEAS	3	SHORT TERM INDEX	.5000	.6350	94

Total Cases = 289
Missing Cases = 9 OR 3.1 PCT.

Summaries of TPLUS22 February, 1993

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5571	1.3083	280
DEPMEAS	1	TOTAL TIME INDEX	.8804	2.0654	92
DEPMEAS	2	FREQUENCY INDEX	.4574	.6666	94
DEPMEAS	3	SHORT TERM INDEX	.3404	.5966	94

Total Cases = 289
Missing Cases = 9 OR 3.1 PCT.

Summaries of TPLUS23 March, 1993

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7000	1.4184	280
DEPMEAS	1	TOTAL TIME INDEX	.9130	2.1884	92
DEPMEAS	2	FREQUENCY INDEX	.6170	.8179	94
DEPMEAS	3	SHORT TERM INDEX	.5745	.7827	94

Total Cases = 289
Missing Cases = 9 OR 3.1 PCT.

Appendix D

TTI, FI and STI measures for The Department of Employment and Labour Relations

SPSS/PC PRINTOUT OF TOTAL TIME, FREQUENCY AND SHORT TERM INDICES
FOR THE DEPARTMENT OF EMPLOYMENT AND LABOUR RELATION

Summaries of TMINUS24 April, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6193	1.3288	176
DEPMEAS	1	TOTAL TIME INDEX	.8448	2.0989	58
DEPMEAS	2	FREQUENCY INDEX	.5333	.7003	60
DEPMEAS	3	SHORT TERM INDEX	.4828	.6554	58

Total Cases = 239
Missing Cases = 63 OR 26.4 PCT.

Summaries of TMINUS23 May, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5540	.7319	176
DEPMEAS	1	TOTAL TIME INDEX	.5948	.8607	58
DEPMEAS	2	FREQUENCY INDEX	.5333	.6756	60
DEPMEAS	3	SHORT TERM INDEX	.5345	.6547	58

Total Cases = 239
Missing Cases = 63 OR 26.4 PCT.

Summaries of TMINUS22 June, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7626	.8419	179
DEPMEAS	1	TOTAL TIME INDEX	.9576	1.1306	59
DEPMEAS	2	FREQUENCY INDEX	.6885	.6466	61
DEPMEAS	3	SHORT TERM INDEX	.6441	.6369	59

Total Cases = 239
Missing Cases = 60 OR 25.1 PCT.

Summaries of TMINUS21 July, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4886	.7873	176
DEPMEAS	1	TOTAL TIME INDEX	.5690	1.0490	58
DEPMEAS	2	FREQUENCY INDEX	.4500	.6223	60
DEPMEAS	3	SHORT TERM INDEX	.4483	.6261	58

Total Cases = 239
Missing Cases = 63 OR 26.4 PCT.

Summaries of TMINUS20 August, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7291	1.3167	179
DEPMEAS	1	TOTAL TIME INDEX	1.0085	1.9859	59
DEPMEAS	2	FREQUENCY INDEX	.6129	.7758	62
DEPMEAS	3	SHORT TERM INDEX	.5690	.7972	58

Total Cases = 239
Missing Cases = 60 OR 25.1 PCT.

Summaries of TMINUS19 September, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5615	.9768	179
DEPMEAS	1	TOTAL TIME INDEX	.7881	1.3747	59
DEPMEAS	2	FREQUENCY INDEX	.5000	.7186	62
DEPMEAS	3	SHORT TERM INDEX	.3966	.6473	58

Total Cases = 239
Missing Cases = 60 OR 25.1 PCT.

Summaries of TMINUS18 October, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5754	.9605	179
DEPMEAS	1	TOTAL TIME INDEX	.7458	1.3370	59
DEPMEAS	2	FREQUENCY INDEX	.5161	.7184	62
DEPMEAS	3	SHORT TERM INDEX	.4655	.6810	58

Total Cases = 239
Missing Cases = 60 OR 25.1 PCT.

Summaries of TMINUS17 November, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7363	1.2165	182
DEPMEAS	1	TOTAL TIME INDEX	1.0333	1.8614	60
DEPMEAS	2	FREQUENCY INDEX	.6190	.7055	63
DEPMEAS	3	SHORT TERM INDEX	.5593	.6505	59

Total Cases = 239
Missing Cases = 57 OR 23.8 PCT.

Summaries of TMINUS16 December, 1989

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6099	1.0063	182
DEPMEAS	1	TOTAL TIME INDEX	.8000	1.4238	60
DEPMEAS	2	FREQUENCY INDEX	.5397	.7145	63
DEPMEAS	3	SHORT TERM INDEX	.4915	.7040	59

Total Cases = 239
Missing Cases = 57 OR 23.8 PCT.

Summaries of TMINUS15 January, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7713	1.4998	188
DEPMEAS	1	TOTAL TIME INDEX	1.2742	2.3253	62
DEPMEAS	2	FREQUENCY INDEX	.5846	.7684	65
DEPMEAS	3	SHORT TERM INDEX	.4590	.6970	61

Total Cases = 239
Missing Cases = 51 OR 21.3 PCT.

Summaries of TMINUS14 February, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6990	1.6701	191
DEPMEAS	1	TOTAL TIME INDEX	1.0873	2.7113	63
DEPMEAS	2	FREQUENCY INDEX	.5606	.7045	66
DEPMEAS	3	SHORT TERM INDEX	.4516	.6697	62

Total Cases = 239
Missing Cases = 48 OR 20.1 PCT.

Summaries of TMINUS13 March, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7513	1.8201	191
DEPMEAS	1	TOTAL TIME INDEX	1.1190	2.9713	63
DEPMEAS	2	FREQUENCY INDEX	.6061	.7417	66
DEPMEAS	3	SHORT TERM INDEX	.5323	.7404	62

Total Cases = 239
Missing Cases = 48 OR 20.1 PCT.

Summaries of TMINUS12 April, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4864	1.1250	221
DEPMEAS	1	TOTAL TIME INDEX	.6554	1.6797	74
DEPMEAS	2	FREQUENCY INDEX	.4384	.7262	73
DEPMEAS	3	SHORT TERM INDEX	.3649	.6532	74

Total Cases = 229
Missing Cases = 8 OR 3.5 PCT.

Summaries of TMINUS11 May, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6516	1.0173	221
DEPMEAS	1	TOTAL TIME INDEX	.8784	1.4870	74
DEPMEAS	2	FREQUENCY INDEX	.5616	.6452	73
DEPMEAS	3	SHORT TERM INDEX	.5135	.6462	74

Total Cases = 229
Missing Cases = 8 OR 3.5 PCT.

Summaries of TMINUS10 June, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4932	1.4736	221
DEPMEAS	1	TOTAL TIME INDEX	.6757	2.3950	74
DEPMEAS	2	FREQUENCY INDEX	.4384	.6452	73
DEPMEAS	3	SHORT TERM INDEX	.3649	.5869	74

Total Cases = 229
Missing Cases = 8 OR 3.5 PCT.

Summaries of TMINUS9 July, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5893	1.7102	224
DEPMEAS	1	TOTAL TIME INDEX	.9467	2.7700	75
DEPMEAS	2	FREQUENCY INDEX	.4459	.7050	74
DEPMEAS	3	SHORT TERM INDEX	.3733	.6733	75

Total Cases = 229
Missing Cases = 5 OR 2.2 PCT.

Summaries of TMINUS8 August, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7768	1.7614	224
DEPMEAS	1	TOTAL TIME INDEX	1.1733	2.8182	75
DEPMEAS	2	FREQUENCY INDEX	.6216	.7887	74
DEPMEAS	3	SHORT TERM INDEX	.5333	.7413	75

Total Cases = 229
Missing Cases = 5 OR 2.2 PCT.

Summaries of TMINUS7 September, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			1.0045	1.9983	224
DEPMEAS	1	TOTAL TIME INDEX	1.6933	3.2162	75
DEPMEAS	2	FREQUENCY INDEX	.7297	.7271	74
DEPMEAS	3	SHORT TERM INDEX	.5867	.6595	75

Total Cases = 229
Missing Cases = 5 OR 2.2 PCT.

Summaries of TMINUS6 October, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.9129	2.6091	224
DEPMEAS	1	TOTAL TIME INDEX	1.7800	4.2966	75
DEPMEAS	2	FREQUENCY INDEX	.5541	.6853	74
DEPMEAS	3	SHORT TERM INDEX	.4000	.6576	75

Total Cases = 229
Missing Cases = 5 OR 2.2 PCT.

Summaries of TMINUS5 November, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7969	2.1766	224
DEPMEAS	1	TOTAL TIME INDEX	1.3800	3.5998	75
DEPMEAS	2	FREQUENCY INDEX	.5541	.6650	74
DEPMEAS	3	SHORT TERM INDEX	.4533	.5994	75

Total Cases = 229
Missing Cases = 5 OR 2.2 PCT.

Summaries of TMINUS4 December, 1990

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6205	.9077	224
DEPMEAS	1	TOTAL TIME INDEX	.8000	1.1912	75
DEPMEAS	2	FREQUENCY INDEX	.5676	.7230	74
DEPMEAS	3	SHORT TERM INDEX	.4933	.7047	75

Total Cases = 229
Missing Cases = 5 OR 2.2 PCT.

Summaries of TMINUS3 January, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.8259	1.0237	224
DEPMEAS	1	TOTAL TIME INDEX	1.0800	1.3706	75
DEPMEAS	2	FREQUENCY INDEX	.7432	.7774	74
DEPMEAS	3	SHORT TERM INDEX	.6533	.7622	75

Total Cases = 229
Missing Cases = 5 OR 2.2 PCT.

Summaries of TMINUS2 February, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.8705	1.1671	224
DEPMEAS	1	TOTAL TIME INDEX	1.2267	1.6507	75
DEPMEAS	2	FREQUENCY INDEX	.7703	.8032	74
DEPMEAS	3	SHORT TERM INDEX	.6133	.7333	75

Total Cases = 229
Missing Cases = 5 OR 2.2 PCT.

Summaries of TMINUS1 March, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7165	1.5701	224
DEPMEAS	1	TOTAL TIME INDEX	1.1133	2.4736	75
DEPMEAS	2	FREQUENCY INDEX	.5811	.7586	74
DEPMEAS	3	SHORT TERM INDEX	.4533	.7031	75

Total Cases = 229
Missing Cases = 5 OR 2.2 PCT.

Summaries of TOPOLICY April, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7634	1.5474	224
DEPMEAS	1	TOTAL TIME INDEX	1.1216	2.4534	74
DEPMEAS	2	FREQUENCY INDEX	.6133	.7333	75
DEPMEAS	3	SHORT TERM INDEX	.5600	.7396	75

Total Cases = 250
Missing Cases = 26 OR 10.4 PCT.

Summaries of TPLUS1 May, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.9236	1.9961	229
DEPMEAS	1	TOTAL TIME INDEX	1.4145	3.1785	76
DEPMEAS	2	FREQUENCY INDEX	.7368	.9433	76
DEPMEAS	3	SHORT TERM INDEX	.6234	.8590	77

Total Cases = 250
Missing Cases = 21 OR 8.4 PCT.

Summaries of TPLUS2 June, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7751	1.7449	229
DEPMEAS	1	TOTAL TIME INDEX	1.3224	2.8044	76
DEPMEAS	2	FREQUENCY INDEX	.5526	.6811	76
DEPMEAS	3	SHORT TERM INDEX	.4545	.6795	77

Total Cases = 250
Missing Cases = 21 OR 8.4 PCT.

Summaries of TPLUS3 July, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6441	2.2383	229
DEPMEAS	1	TOTAL TIME INDEX	1.1908	3.7354	76
DEPMEAS	2	FREQUENCY INDEX	.3947	.6548	76
DEPMEAS	3	SHORT TERM INDEX	.3506	.6234	77

Total Cases = 250
Missing Cases = 21 OR 8.4 PCT.

Summaries of TPLUS4 August, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6659	1.8139	229
DEPMEAS	1	TOTAL TIME INDEX	1.0855	2.9079	76
DEPMEAS	2	FREQUENCY INDEX	.5000	.8246	76
DEPMEAS	3	SHORT TERM INDEX	.4156	.7669	77

Total Cases = 250
Missing Cases = 21 OR 8.4 PCT.

Summaries of TPLUS5 September, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.9105	2.0963	229
DEPMEAS	1	TOTAL TIME INDEX	1.5987	3.3794	76
DEPMEAS	2	FREQUENCY INDEX	.6447	.7951	76
DEPMEAS	3	SHORT TERM INDEX	.4935	.7543	77

Total Cases = 250
Missing Cases = 21 OR 8.4 PCT.

Summaries of TPLUS6 October, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7638	1.9927	235
DEPMEAS	1	TOTAL TIME INDEX	1.3141	3.2485	78
DEPMEAS	2	FREQUENCY INDEX	.5513	.7498	78
DEPMEAS	3	SHORT TERM INDEX	.4304	.6921	79

Total Cases = 250
Missing Cases = 15 OR 6.0 PCT.

Summaries of TPLUS7 November, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6765	1.9504	238
DEPMEAS	1	TOTAL TIME INDEX	1.0886	3.2063	79
DEPMEAS	2	FREQUENCY INDEX	.4937	.7138	79
DEPMEAS	3	SHORT TERM INDEX	.4500	.7098	80

Total Cases = 250
Missing Cases = 12 OR 4.8 PCT.

Summaries of TPLUS8 December, 1991

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7584	2.2589	238
DEPMEAS	1	TOTAL TIME INDEX	1.2975	3.7813	79
DEPMEAS	2	FREQUENCY INDEX	.5190	.6173	79
DEPMEAS	3	SHORT TERM INDEX	.4625	.6151	80

Total Cases = 250
Missing Cases = 12 OR 4.8 PCT.

Summaries of TPLUS9 January, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.9606	2.7714	241
DEPMEAS	1	TOTAL TIME INDEX	1.7813	4.6100	80
DEPMEAS	2	FREQUENCY INDEX	.5875	.7238	80
DEPMEAS	3	SHORT TERM INDEX	.5185	.7265	81

Total Cases = 250
Missing Cases = 9 OR 3.6 PCT.

Summaries of TPLUS10 February, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7344	1.8591	241
DEPMEAS	1	TOTAL TIME INDEX	1.2125	2.9977	80
DEPMEAS	2	FREQUENCY INDEX	.5375	.7786	80
DEPMEAS	3	SHORT TERM INDEX	.4568	.7425	81

Total Cases = 250
Missing Cases = 9 OR 3.6 PCT.

Summaries of TPLUS11 March, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.8921	2.1146	241
DEPMEAS	1	TOTAL TIME INDEX	1.4625	3.4492	80
DEPMEAS	2	FREQUENCY INDEX	.6625	.7786	80
DEPMEAS	3	SHORT TERM INDEX	.5556	.7583	81

Total Cases = 250
Missing Cases = 9 OR 3.6 PCT.

Summaries of TPLUS12 April, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7350	2.1620	234
DEPMEAS	1	TOTAL TIME INDEX	1.2436	3.5123	78
DEPMEAS	2	FREQUENCY INDEX	.5128	.8489	78
DEPMEAS	3	SHORT TERM INDEX	.4487	.8320	78

Total Cases = 252
Missing Cases = 18 OR 7.1 PCT.

Summaries of TPLUS13 May, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6474	1.5282	234
DEPMEAS	1	TOTAL TIME INDEX	.9423	2.4574	78
DEPMEAS	2	FREQUENCY INDEX	.5256	.6785	78
DEPMEAS	3	SHORT TERM INDEX	.4744	.6591	78

Total Cases = 252
Missing Cases = 18 OR 7.1 PCT.

Summaries of TPLUS14 June, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5321	1.5469	234
DEPMEAS	1	TOTAL TIME INDEX	.8141	2.5356	78
DEPMEAS	2	FREQUENCY INDEX	.4103	.5907	78
DEPMEAS	3	SHORT TERM INDEX	.3718	.5835	78

Total Cases = 252
Missing Cases = 18 OR 7.1 PCT.

Summaries of TPLUS15 July, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7089	1.9888	237
DEPMEAS	1	TOTAL TIME INDEX	1.2785	3.2863	79
DEPMEAS	2	FREQUENCY INDEX	.4810	.6173	79
DEPMEAS	3	SHORT TERM INDEX	.3671	.5353	79

Total Cases = 252
Missing Cases = 15 OR 6.0 PCT.

Summaries of TPLUS16 August, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7125	1.9733	240
DEPMEAS	1	TOTAL TIME INDEX	1.2250	3.2364	80
DEPMEAS	2	FREQUENCY INDEX	.5000	.6936	80
DEPMEAS	3	SHORT TERM INDEX	.4125	.6501	80

Total Cases = 252
Missing Cases = 12 OR 4.8 PCT.

Summaries of TPLUS17 September, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7500	1.4113	240
DEPMEAS	1	TOTAL TIME INDEX	1.1500	2.2082	80
DEPMEAS	2	FREQUENCY INDEX	.6000	.7044	80
DEPMEAS	3	SHORT TERM INDEX	.5000	.6364	80

Total Cases = 252
Missing Cases = 12 OR 4.8 PCT.

Summaries of TPLUS18 October, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7604	1.5949	240
DEPMEAS	1	TOTAL TIME INDEX	1.2063	2.5417	80
DEPMEAS	2	FREQUENCY INDEX	.5750	.6894	80
DEPMEAS	3	SHORT TERM INDEX	.5000	.6751	80

Total Cases = 252
Missing Cases = 12 OR 4.8 PCT.

Summaries of TPLUS19 November, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.8104	1.4602	240
DEPMEAS	1	TOTAL TIME INDEX	1.0938	2.1657	80
DEPMEAS	2	FREQUENCY INDEX	.6875	.9084	80
DEPMEAS	3	SHORT TERM INDEX	.6500	.9015	80

Total Cases = 252
Missing Cases = 12 OR 4.8%

Summaries of TPLUS20 December, 1992

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.9250	1.4130	240
DEPMEAS	1	TOTAL TIME INDEX	1.3625	2.2190	80
DEPMEAS	2	FREQUENCY INDEX	.7625	.6413	80
DEPMEAS	3	SHORT TERM INDEX	.6500	.6384	80

Total Cases = 252
Missing Cases = 12 OR 4.8 PCT.

Summaries of TPLUS21 January, 1993

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7500	1.6886	240
DEPMEAS	1	TOTAL TIME INDEX	1.2125	2.6906	80
DEPMEAS	2	FREQUENCY INDEX	.5750	.7425	80
DEPMEAS	3	SHORT TERM INDEX	.4625	.7106	80

Total Cases = 252
Missing Cases = 12 OR 4.8 PCT.

Summaries of TPLUS22 February, 1993

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7542	1.1471	240
DEPMEAS	1	TOTAL TIME INDEX	1.0375	1.7021	80
DEPMEAS	2	FREQUENCY INDEX	.6625	.6925	80
DEPMEAS	3	SHORT TERM INDEX	.5625	.6907	80

Total Cases = 252
Missing Cases = 12 OR 4.8 PCT.

Summaries of TPLUS23 March, 1993

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7417	1.7163	240
DEPMEAS	1	TOTAL TIME INDEX	1.1625	2.6835	80
DEPMEAS	2	FREQUENCY INDEX	.5750	.8535	80
DEPMEAS	3	SHORT TERM INDEX	.4875	.8418	80

Total Cases = 252
Missing Cases = 12 OR 4.8 PCT.

Appendix E

TTI, FI and STI measures for All Departments Combined

SPSS/PC PRINTOUTS OF TOTAL TIME, FREQUENCY AND SHORT TERM INDICES
FOR ALL DEPARTMENTS COMBINED

NOTE: "*" SIGNIFIES THE LOCATION OF THE MEANS

Summaries of **TMINUS24**

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5141	.9982	531
DEPMEAS	1	TOTAL TIME INDEX	* .6158	1.4329	177
DEPMEAS	2	FREQUENCY INDEX	* .4746	.6996	177
DEPMEAS	3	SHORT TERM INDEX	* .4520	.6650	177

Total Cases = 907
Missing Cases = 376 OR 41.5 PCT.

Summaries of **TMINUS23**

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4961	.9538	646
DEPMEAS	1	TOTAL TIME INDEX	* .5810	1.3431	216
DEPMEAS	2	FREQUENCY INDEX	* .4673	.6895	214
DEPMEAS	3	SHORT TERM INDEX	* .4398	.6655	216

Total Cases = 907
Missing Cases = 261 OR 28.8 PCT.

Summaries of **TMINUS22**

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5675	1.0932	652
DEPMEAS	1	TOTAL TIME INDEX	* .7202	1.6600	218
DEPMEAS	2	FREQUENCY INDEX	* .5185	.6395	216
DEPMEAS	3	SHORT TERM INDEX	* .4633	.6229	218

Total Cases = 907
Missing Cases = 255 OR 28.1 PCT.

Summaries of **TMINUS21**

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4411	1.0823	679
DEPMEAS	1	TOTAL TIME INDEX	* .6278	1.6587	227
DEPMEAS	2	FREQUENCY INDEX	* .3556	.5960	225
DEPMEAS	3	SHORT TERM INDEX	* .3392	.5982	227

Total Cases = 907
Missing Cases = 228 OR 25.1 PCT.

Summaries of TMINUS20

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.5547	1.0687	685
DEPMEAS	1	TOTAL TIME INDEX	*	.7162	1.5708	229
DEPMEAS	2	FREQUENCY INDEX	*	.5000	.7055	228
DEPMEAS	3	SHORT TERM INDEX	*	.4474	.6516	228

Total Cases = 907
Missing Cases = 222 OR 24.5 PCT.

Summaries of TMINUS19

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.5583	1.4339	688
DEPMEAS	1	TOTAL TIME INDEX	*	.8848	2.2731	230
DEPMEAS	2	FREQUENCY INDEX	*	.4336	.6617	229
DEPMEAS	3	SHORT TERM INDEX	*	.3550	.6353	229

Total Cases = 907
Missing Cases = 219 OR 24.1 PCT.

Summaries of TMINUS18

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.6088	1.6671	694
DEPMEAS	1	TOTAL TIME INDEX	*	.9375	2.6810	232
DEPMEAS	2	FREQUENCY INDEX	*	.4805	.7333	231
DEPMEAS	3	SHORT TERM INDEX	*	.4069	.6716	231

Total Cases = 907
Missing Cases = 213 OR 23.5 PCT.

Summaries of TMINUS17

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.5199	.8969	703
DEPMEAS	1	TOTAL TIME INDEX	*	.6404	1.2297	235
DEPMEAS	2	FREQUENCY INDEX	*	.4765	.6780	234
DEPMEAS	3	SHORT TERM INDEX	*	.4423	.6501	234

Total Cases = 907
Missing Cases = 204 OR 22.5 PCT.

Summaries of **TMINUS16**

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.4431	1.0178	703
DEPMEAS	1	TOTAL TIME INDEX	* .6064	1.5048	235
DEPMEAS	2	FREQUENCY INDEX	* .3889	.6538	234
DEPMEAS	3	SHORT TERM INDEX	* .3333	.6146	234

Total Cases = 907
Missing Cases = 204 OR 22.5 PCT.

Summaries of **TMINUS15**

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7152	1.6632	711
DEPMEAS	1	TOTAL TIME INDEX	* 1.1498	2.6684	237
DEPMEAS	2	FREQUENCY INDEX	* .5485	.7092	237
DEPMEAS	3	SHORT TERM INDEX	* .4473	.6398	237

Total Cases = 907
Missing Cases = 196 OR 21.6 PCT.

Summaries of **TMINUS14**

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7026	1.4891	723
DEPMEAS	1	TOTAL TIME INDEX	* .9876	2.3067	241
DEPMEAS	2	FREQUENCY INDEX	* .5975	.8113	241
DEPMEAS	3	SHORT TERM INDEX	* .5228	.7531	241

Total Cases = 907
Missing Cases = 184 OR 20.3 PCT.

Summaries of **TMINUS13**

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6833	1.5240	723
DEPMEAS	1	TOTAL TIME INDEX	* .9710	2.4112	241
DEPMEAS	2	FREQUENCY INDEX	* .5809	.7379	241
DEPMEAS	3	SHORT TERM INDEX	* .4979	.7078	241

Total Cases = 907
Missing Cases = 184 OR 20.3 PCT.

Summaries of TMINUS12

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5300	1.1065	767
DEPMEAS	1	TOTAL TIME INDEX	* .7129	1.6793	256
DEPMEAS	2	FREQUENCY INDEX	* .4667	.6565	255
DEPMEAS	3	SHORT TERM INDEX	* .4102	.6134	256

Total Cases = 834
Missing Cases = 67 OR 8.0 PCT.

Summaries of TMINUS11

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6744	1.3776	777
DEPMEAS	1	TOTAL TIME INDEX	* .8992	2.1294	258
DEPMEAS	2	FREQUENCY INDEX	* .5907	.7741	259
DEPMEAS	3	SHORT TERM INDEX	* .5346	.7158	260

Total Cases = 834
Missing Cases = 57 OR 6.8 PCT.

Summaries of TMINUS10

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6429	1.5082	777
DEPMEAS	1	TOTAL TIME INDEX	* .9128	2.4024	258
DEPMEAS	2	FREQUENCY INDEX	* .5444	.7159	259
DEPMEAS	3	SHORT TERM INDEX	* .4731	.6830	260

Total Cases = 834
Missing Cases = 57 OR 6.8 PCT.

Summaries of TMINUS9

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.5659	1.5128	774
DEPMEAS	1	TOTAL TIME INDEX	*.8521	2.4104	257
DEPMEAS	2	FREQUENCY INDEX	*.4574	.7275	258
DEPMEAS	3	SHORT TERM INDEX	*.3900	.6636	259

Total Cases = 834
Missing Cases = 60 OR 7.2 PCT.

Summaries of TMINUS8

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6718	1.5423	774
DEPMEAS	1	TOTAL TIME INDEX	* 1.0156	2.4578	257
DEPMEAS	2	FREQUENCY INDEX	* .5368	.7164	258
DEPMEAS	3	SHORT TERM INDEX	* .4653	.6653	259

Total Cases = 834
Missing Cases = 60 OR 7.2 PCT.

Summaries of TMINUS7

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6899	1.3267	774
DEPMEAS	1	TOTAL TIME INDEX	* .9922	2.0700	257
DEPMEAS	2	FREQUENCY INDEX	* .5853	.6964	258
DEPMEAS	3	SHORT TERM INDEX	* .4942	.6310	259

Total Cases = 834
Missing Cases = 60 OR 7.2 PCT.

Summaries of TMINUS6

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6693	1.6241	774
DEPMEAS	1	TOTAL TIME INDEX	* 1.0117	2.6119	257
DEPMEAS	2	FREQUENCY INDEX	* .5465	.7111	258
DEPMEAS	3	SHORT TERM INDEX	* .4517	.6710	259

Total Cases = 834
Missing Cases = 60 OR 7.2 PCT.

Summaries of TMINUS5

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6327	1.4609	780
DEPMEAS	1	TOTAL TIME INDEX	* .9556	2.3429	259
DEPMEAS	2	FREQUENCY INDEX	* .5115	.6546	260
DEPMEAS	3	SHORT TERM INDEX	* .4330	.6015	261

Total Cases = 834
Missing Cases = 54 OR 6.5 PCT.

Summaries of **TMINUS4**

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.6586	1.2150	782
DEPMEAS	1	TOTAL TIME INDEX	*	.8467	1.7812	261
DEPMEAS	2	FREQUENCY INDEX	*	.5923	.7879	260
DEPMEAS	3	SHORT TERM INDEX	*	.5364	.7669	261

Total Cases = 834
Missing Cases = 52 OR 6.2 PCT.

Summaries of TMINUS3

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.7526	1.3886	782
DEPMEAS	1	TOTAL TIME INDEX	*	1.0479	2.1133	261
DEPMEAS	2	FREQUENCY INDEX	*	.6462	.7895	260
DEPMEAS	3	SHORT TERM INDEX	*	.5632	.7550	261

Total Cases = 834
Missing Cases = 52 OR 6 2 PCT.

Summaries of **TMINUS2**

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.7434	1.2809	785
DEPMEAS	1	TOTAL TIME INDEX	*	1.0833	1.9300	264
DEPMEAS	2	FREQUENCY INDEX	*	.6242	.7208	260
DEPMEAS	3	SHORT TERM INDEX	*	.5184	.6927	261

Total Cases = 834
Missing Cases = 49 OR 5.9 PCT.

Summaries of **TMINUS1**

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.6361	1.4173	786
DEPMEAS	1	TOTAL TIME INDEX	*	.9547	2.2023	265
DEPMEAS	2	FREQUENCY INDEX	*	.5192	.7270	260
DEPMEAS	3	SHORT TERM INDEX	*	.4291	.6735	261

Total Cases = 834
Missing Cases = 48 OR 5.8 PCT.

Summaries of TOPOLICY (Policy introduced)

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.7177	1.3500	790
DEPMEAS	1	TOTAL TIME INDEX	*	.9767	2.0762	258
DEPMEAS	2	FREQUENCY INDEX	*	.6. 3	.7737	266
DEPMEAS	3	SHORT TERM INDEX	*	.5639	.7408	266

Total Cases = 918
Missing Cases = 128 OR 13.9 PCT.

Summaries of TPLUS1

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.6819	1.5479	819
DEPMEAS	1	TOTAL TIME INDEX	*	.9869	2.4781	268
DEPMEAS	2	FREQUENCY INDEX	*	.5673	.7436	275
DEPMEAS	3	SHORT TERM INDEX	*	.5000	.6902	276

Total Cases = 918
Missing Cases = 99 OR 10.8 PCT.

Summaries of TPLUS2

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.7178	1.5881	822
DEPMEAS	1	TOTAL TIME INDEX	*	1.1078	2.5200	269
DEPMEAS	2	FREQUENCY INDEX	*	.5652	.7576	276
DEPMEAS	3	SHORT TERM INDEX	*	.4910	.7353	277

Total Cases = 918
Missing Cases = 96 OR 10.5 PCT.

Summaries of TPLUS3

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.6067	1.8063	839
DEPMEAS	1	TOTAL TIME INDEX	*	1.0474	2.9898	274
DEPMEAS	2	FREQUENCY INDEX	*	.4220	.6447	282
DEPMEAS	3	SHORT TERM INDEX	*	.3640	.5880	283

Total Cases = 918
Missing Cases = 79 OR 8.6%

Summaries of **TPLUS4**

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.6412	1.9147	839
DEPMEAS	1	TOTAL TIME INDEX	*	1.0985	3.1541	274
DEPMEAS	2	FREQUENCY INDEX	*	.4557	.7250	282
DEPMEAS	3	SHORT TERM INDEX	*	.3834	.6595	283

Total Cases = 918
Missing Cases = 79 OR 8.6 PCT.

Summaries of **TPLUS5**

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.7010	1.6416	836
DEPMEAS	1	TOTAL TIME INDEX	*	1.0549	2.6228	273
DEPMEAS	2	FREQUENCY INDEX	*	.5658	.7770	281
DEPMEAS	3	SHORT TERM INDEX	*	.4929	.7510	282

Total Cases = 918
Missing Cases = 82 OR 8.9 PCT.2

Summaries of **TPLUS6**

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.6609	1.4993	842
DEPMEAS	1	TOTAL TIME INDEX	*	1.0200	2.4030	275
DEPMEAS	2	FREQUENCY INDEX	*	.5300	.6957	283
DEPMEAS	3	SHORT TERM INDEX	*	.4437	.6460	284

Total Cases = 918
Missing Cases = 76 OR 8.3 PCT.

Summaries of **TPLUS7**

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.6167	1.5190	848
DEPMEAS	1	TOTAL TIME INDEX	*	.9134	2.4524	277
DEPMEAS	2	FREQUENCY INDEX	*	.5018	.6952	285
DEPMEAS	3	SHORT TERM INDEX	*	.4441	.6505	286

Total Cases = 918
Missing Cases = 70 OR 7.6 PCT.

Summaries of TPLUS8

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6049	1.4160	853
DEPMEAS	1	TOTAL TIME INDEX	* .8669	2.2694	278
DEPMEAS	2	FREQUENCY INDEX	* .5017	.6787	287
DEPMEAS	3	SHORT TERM INDEX	* .4549	.6504	288

Total Cases = 918
Missing Cases = 65 OR 7.1 PCT.

Summaries of TPLUS9

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6455	1.7829	859
DEPMEAS	1	TOTAL TIME INDEX	* 1.0518	2.9436	280
DEPMEAS	2	FREQUENCY INDEX	* .4740	.6510	289
DEPMEAS	3	SHORT TERM INDEX	* .4241	.6412	290

Total Cases = 918
Missing Cases = 59 OR 6.4 PCT.

Summaries of TPLUS10

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6211	1.3557	859
DEPMEAS	1	TOTAL TIME INDEX	* .9339	2.1218	280
DEPMEAS	2	FREQUENCY INDEX	* .5087	.7318	289
DEPMEAS	3	SHORT TERM INDEX	* .4310	.6580	290

Total Cases = 918
Missing Cases = 59 OR 6.4 PCT.

Summaries of TPLUS11

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6816	1.5447	859
DEPMEAS	1	TOTAL TIME INDEX	* 1.0339	2.4706	280
DEPMEAS	2	FREQUENCY INDEX	* .5467	.7303	289
DEPMEAS	3	SHORT TERM INDEX	* .4759	.6918	290

Total Cases = 918
Missing Cases = 59 OR 6.4 PCT.

Summaries of TPLUS12

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.7043	1.4676	864
DEPMEAS	1	TOTAL TIME INDEX	*	.9739	2.2345	287
DEPMEAS	2	FREQUENCY INDEX	*	.6055	.8437	289
DEPMEAS	3	SHORT TERM INDEX	*	.5347	.8214	288

Total Cases = 932
Missing Cases = 68 OR 7.3 PCT.

Summaries of TPLUS13

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.5578	1.1141	873
DEPMEAS	1	TOTAL TIME INDEX	*	.7414	1.6727	290
DEPMEAS	2	FREQUENCY INDEX	*	.4897	.6810	292
DEPMEAS	3	SHORT TERM INDEX	*	.4433	.6534	291

Total Cases = 932
Missing Cases = 59 OR 6.3 PCT.

Summaries of TPLUS14

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.5569	1.1897	879
DEPMEAS	1	TOTAL TIME INDEX	*	.7277	1.8348	292
DEPMEAS	2	FREQUENCY INDEX	*	.4864	.6698	294
DEPMEAS	3	SHORT TERM INDEX	*	.4573	.6376	293

Total Cases = 932
Missing Cases = 53 OR 5.7 PCT.

Summaries of TPLUS15

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.6063	1.5957	894
DEPMEAS	1	TOTAL TIME INDEX	*	.9663	2.5878	297
DEPMEAS	2	FREQUENCY INDEX	*	.4649	.6461	299
DEPMEAS	3	SHORT TERM INDEX	*	.3893	.6054	298

Total Cases = 932
Missing Cases = 38 OR 4.1 PCT.

Summaries of **TPLUS16**

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.5150	1.2612	900
DEPMEAS	1	TOTAL TIME INDEX	*	.7341	1.9879	299
DEPMEAS	2	FREQUENCY INDEX	*	.4352	.6480	301
DEPMEAS	3	SHORT TERM INDEX	*	.3767	.5910	300

Total Cases = 932
Missing Cases = 32 OR 3.4 PCT.

Summaries of **TPLUS17**

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.5981	1.0965	897
DEPMEAS	1	TOTAL TIME INDEX	*	.8003	1.6116	298
DEPMEAS	2	FREQUENCY INDEX	*	.5233	.7055	300
DEPMEAS	3	SHORT TERM INDEX	*	.4716	.6818	299

Total Cases = 932
Missing Cases = 35 OR 3.8 PCT.

Summaries of **TPLUS18**

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.5661	1.3578	900
DEPMEAS	1	TOTAL TIME INDEX	*	.8311	2.1400	299
DEPMEAS	2	FREQUENCY INDEX	*	.4568	.6694	301
DEPMEAS	3	SHORT TERM INDEX	*	.4117	.6502	300

Total Cases = 932
Missing Cases = 32 OR 3.4 PCT.

Summaries of **TPLUS19**

Variable	Value	Label		Mean	Std Dev	Cases
For Entire Population				.7353	1.6032	903
DEPMEAS	1	TOTAL TIME INDEX	*	1.0500	2.5213	300
DEPMEAS	2	FREQUENCY INDEX	*	.6093	.7943	302
DEPMEAS	3	SHORT TERM INDEX	*	.5482	.7801	301

Total Cases = 932
Missing Cases = 29 OR 3.1 PCT.

Summaries of TPLUS20

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7016	1.4346	903
DEPMEAS	1	TOTAL TIME INDEX	* .9883	2.1844	300
DEPMEAS	2	FREQUENCY INDEX	* .5927	.8210	302
DEPMEAS	3	SHORT TERM INDEX	* .5249	.7939	301

Total Cases = 932
Missing Cases = 29 OR 3.1 PCT.

Summaries of TPLUS21

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6157	1.2024	903
DEPMEAS	1	TOTAL TIME INDEX	* .8767	1.8515	300
DEPMEAS	2	FREQUENCY INDEX	* .5199	.6607	302
DEPMEAS	3	SHORT TERM INDEX	* .4518	.6233	301

Total Cases = 932
Missing Cases = 29 OR 3.1 PCT.

Summaries of TPLUS22

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.7323	1.5330	906
DEPMEAS	1	TOTAL TIME INDEX	* 1.1179	2.4369	301
DEPMEAS	2	FREQUENCY INDEX	* .5941	.6931	303
DEPMEAS	3	SHORT TERM INDEX	* .4868	.6608	302

Total Cases = 932
Missing Cases = 26 OR 2.8 PCT.

Summaries of TPLUS23

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			.6578	1.7614	906
DEPMEAS	1	TOTAL TIME INDEX	* 1.0066	2.8390	301
DEPMEAS	2	FREQUENCY INDEX	* .5149	.7627	303
DEPMEAS	3	SHORT TERM INDEX	* .4536	.7265	302

Total Cases = 932
Missing Cases = 26 OR 2.8 PCT.

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