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**TEMPORARY EMPLOYMENT DECISIONS
OF REGISTERED NURSES**

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ABSTRACT

The decision whether or not to work for a temporary agency was examined using a 1990 cross-section survey of Illinois registered nurses and a model which corrects for the simultaneity between agency choice and wages (and benefits). Results indicate that conditional on having decided to work, preschool children, age, and being female have significant positive effects on the decision to work for an agency, while spousal income, experience, and being white have significant negative effects. Nurses who work for agencies *value wages more* in relation to benefits than nurses who work for more traditional employers like hospitals and nursing homes.

JEL classification: J44; J22; I11; J16.

INTRODUCTION

Temporary employment of skilled workers is an issue of increasing importance as more of the United States labor force finds employment through temporary help services. The trend is expected to continue, with further increases over the next ten years¹. The rapid growth in temporary employment has been met with a recent flurry of research. Laird and Williams [1996], using time-series data from 1982-92, found the major demand-side reason for the increase was heightened foreign competition, while the major supply-side reason was the increase in participation of married women. Golden [1996] examined the 1982-92 increase to determine whether demand or supply-side factors were more responsible. In a test of competing explanations, the author found more support for demand-side than supply-side factors --- employer labor input preferences were more influential than worker preferences. Golden came up with results similar to Laird and Williams [1996] --- specifically, heightened foreign competition and increased fluctuation in industrial output on the demand-side and greater participation of married women on the supply-side.

Levenson [1996] examined *part-time* employment over 1964-93. In finding no upward trend since 1984, he concluded that the belief that there has been a fundamental shift toward part-time employment may have been due to confusion over part-time and *temporary* employment --- which has increased greatly since 1984. Lee [1996] believes the increase can be explained by the greater government regulation of labor markets, which has increased the cost of employing permanent workers relative to temporary ones. Cohaney [1996] provided a short but informative overview --- including a brief history of the industry, an explanation of typical work arrangements, a demographic breakdown of the population, and a breakdown of the industries

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and positions involved (mainly clerical and machine operator).

But despite the flurry of recent research activity, very little *econometric* research has been done on this topic. Not much is known, for example, about the similarities and differences in the characteristics of permanent and temporary workers within a labor market. This is particularly true for women. A study of the nurse labor force, which is about 97 percent female, can provide valuable information on both counts.

Over the past fifteen years, health care employers have substantially increased their use of registered nurses (RN's) who work for temporary nursing services². Over the same period, the percentage of registered nurses who have chosen to work for temporary agencies has increased significantly³. For a number of reasons, both the use of agency nurses by health care facilities and the percentage of nurses who choose to work for agencies are expected to continue increasing in the future⁴.

Agencies attract RN's who would otherwise work full-time or part-time with regular employers --- mainly hospitals and nursing homes --- or who would otherwise not work. They also hire employed nurses who desire to work more shifts than their full or part-time position allows. Temporary agencies provide nurses with more flexibility than do regular employers, which give them an advantage in attracting nurses who value flexible work arrangements. In addition, agencies offer higher wages and fewer benefits than hospitals and other nursing employers, a compensation strategy which may have been designed to give them an advantage in attracting nurses who do not need a comprehensive benefits package and are willing to

sacrifice benefits for higher wages. The provision of fewer benefits is a general characteristic of temporary agencies in most other professions [Hipple and Stewart, 1996], as it is in nursing⁵.

This paper examines the relationship between registered nurses and temporary agencies by determining factors which influence on a nurse's decision to work for an agency. In particular, the analysis measures whether nurses who work for agencies value *wages more in relation to benefits* than nurses who work for more traditional employers.

The analysis is performed using the 1990 Biennial Survey of Illinois Registered Nurses. The survey contains demographic, education, employment, wage, and benefit information on a random sample of approximately 60,000 nurses with RN licenses to practice in the state of Illinois. The RN population of Illinois is similar to the RN population of the United States as a whole⁶, so the analysis can have broader implications within the profession. Given nursing is a highly-skilled, predominantly female profession, the analysis can provide valuable information about the labor supply decisions of professional women in general with regard to temporary employment,

Using nurses who have chosen to work, the agency/non-agency choice is estimated using a probit equation. The analysis requires that wages and benefits from a regular employer be estimated for a nurse who works for an agency, and wages and benefits from an agency be estimated for a nurse who works for a regular employer. In obtaining these wage and benefit estimates, the analysis must correct for the fact that agency choice is determined simultaneously with wages and benefits. Thus to obtain consistent wage and benefit estimates for use in the probit equation, it is necessary to run not only wage and benefit equations, but also a second probit equation.

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The results indicate that conditional on having decided to work, preschool children in the household, age, and being female have significant positive effects on a nurse's decision to work for an agency, while spousal income, experience, and being white have significant negative effects. The results also indicate that nurses who work for agencies do value wages more in relation to benefits than nurses who work for regular employers like hospitals and nursing homes. In particular, the result holds for the benefit that can be provided by a spouse's employer and effects the whole family --- pension benefits. The result also holds for parking benefits.

The paper is divided into four sections. Section one provides information about the use of temporary nursing services and includes a demographic comparison of nurses who work for agencies with those who work for other employers. Section two presents the econometric model and the rationale behind it's construction, and also describes the data. Section three presents and discusses the results of the analysis. Section four is a brief summary with conclusions.

TEMPORARY NURSING AGENCIES

Use of Temporary Nursing Agencies

In addition to their full and part-time staff, nurse employers, predominantly hospitals and nursing homes, hire RN's who work for temporary services. The nurses can work for one or a number of agencies. They can work a variable number of hours per week or can choose not to

work at all for a given week (or weeks). Consequently, agency nurses have a great deal of flexibility, especially in comparison to full-time RN's who must work a set number of hours per week. Agency nurses are on call to work, indicating to the agency their preferred parts of the day or week to work. They have the option to accept or reject assignments as they are notified.

These nurses are used predominantly by hospitals and other employers to fill in on short notice for either unanticipated increases in demand or because nurses scheduled to work are unable to do so. Circumstances do exist where longer-range contracts have been set up between employers and agencies, generally when employers have determined their shift schedules far in advance. This can happen when regular nurses strike. Often hospitals make arrangements to bring in temps when a strike is imminent. Most recently, Long Island College Hospital threatened to hire hundreds of temporary nurses to staff the hospital if 600 of it's nurses went out on strike⁷.

Essentially, employers weigh the benefits of the flexibility that the use of agency nurses provide against the loss of control of a portion of their labor force which comes about from their use. In response to the lack of control in using agencies, employers have tried to create in-house per-diem pools when and where such arrangements are feasible. An in-house pool basically functions like an in-house temporary agency, consisting of nurses hired by an employer who are on call and available to work. It may be difficult for an employer to keep an in-house pool however, since the pool must have enough nurses to be a reliable source for contingencies.

By the early 1980s, utilization of agencies began to increase noticeably, to the point where the Division of Nursing at the Department of Health and Human Services commissioned a study to gauge the impact of agency use on the delivery of health care⁸. Hospital and other employers

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began to rely more heavily on agencies to fill shifts⁹. The increase in reliance was even referred to as an "addiction" by many alarmed critics of agencies¹⁰. Despite the alarm, the increased use of agency nurses may have been a logical response to the change by Medicare and Medicaid from a retrospective to a prospective reimbursement system.

Under retrospective payment, a hospital billed the government for all the tests and services it performed during an operation. There was little incentive to keep tests and services --- and consequently costs --- down. Under prospective payment, a hospital is paid a fixed amount per operation performed --- say \$2,000 per appendectomy --- regardless of how many tests and services are carried out.

Given this, under prospective payment it would be less likely that hospitals would keep shifts staffed with extra nurses in case contingencies occurred which caused unexpected increases in demand. The cost of the extra nurses could no longer be billed retrospectively to the government. Under prospective payment, it would make sense for the hospital to decrease the "base" number of nurses it has working on each shift and to use agency nurses to meet any increase in demand for health care services above the cost-minimizing "base" level. The situation is similar to that documented in other industries that employ a base work force for the stable portion of production and temporary workers for the unstable portion [Piore, 1974; Mangum, Mayall and Nelson, 1985].

Furthermore, the increase in preventive medical procedures and in the use of outpatient services since the early 1980s has led to shorter stays in acute care units¹¹. Shorter stays have

led to a more volatile patient census fluctuation which would cause employers to depend more on agency nurses to meet the more variable changes in demand.

Another important consideration in studying the use of temporary nurses is the impact that monopsony power has on agency use. A monopsonist will be more inclined than a facility facing competition to use an agency. Under pure competition, assuming all else equal, a firm will be indifferent between using permanent or temporary workers. A monopsonist, however, can discriminate between permanent and temporary workers, and can meet an increase in demand for nursing services by filling the additional shifts with temps rather than hiring additional full-time nurses. Hiring additional full-time nurses means having to pay all currently employed nurses a higher wage. The cost of doing so will often be greater than the cost of using temporary nurses.

This circumstance can hold true even if the fee per hour for using an agency nurse is far higher than the wage per hour they would have to pay to attract the additional nurses required¹². Given the ability of a monopsonist to discriminate between the two types of workers, we would expect to see a positive relationship between monopsony power and the use of agency nurses.

The Agency Nurse Labor Force

The tables presented below were constructed using data compiled from the 1990 Biennial Survey of Illinois Registered Nurses, with approximately 60,000 observations. A comparison of the demographic characteristics and education levels of agency and non-agency nurses is contained in Table 1. Nurses are considered to be agency nurses if their principal nursing position is with a temporary service. The most striking difference between the two groups is that 78.87 percent of agency nurses are white as opposed to 90.95 percent of nurses who work for

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regular employers. Much of the difference is because Asians/Pacific Islanders and blacks make up only 4.49 percent and 3.59 percent, respectively, of the regular employer population, but make up 12.66 percent and 6.93 percent of the agency population.

[Table 1 here]

The percentage of the agency population that is married is lower than that of the non-agency group --- 67.68 percent to 73.11 percent. A slightly lower percentage of agency nurses are female, and on average agency nurses are older. The percentage of households which have children ages 0-2, 3-5, and 6-18 are similar, as is the education level breakdown --- with agency nurses having slightly less education.

Table 2 contains information on wage and benefit compensation and a number of employment characteristics. For the sample, 87.14 percent of the RN's are employed in nursing. Of the group that is employed, 5.57 percent work for temporary nursing services in their principal position. Agency nurses on average earn more per hour, but receive far fewer benefits, than nurses who work for other employers. The percentage of agency nurses receiving pension benefits, tuition reimbursement, and daycare is less than half that of nurses who work for other employers. For health insurance and parking, the differences are almost as large.

[Table 2 here]

Agency nurses work on average about three hours less per week than other nurses, but this apparently slight difference is because the average is calculated using only those weeks that the nurse *decided to work*. The important difference between the groups is in the weeks worked

per year. The average number of weeks worked per year for a non-agency nurse is 48.36 as opposed to only 44.65 for an agency nurse. About 86 percent of the regular employer workforce but only 68 percent of the agency workforce work at least 48 weeks per year. Another indication of the different employment patterns of the two groups is a comparison of the percentages who work full-time, part-time, and part-year. Part-year is defined as working 36 weeks per year or less, and the nurses were simply asked whether they worked full-time, part-time, or part-year (no definition of part-time was given). Many more agency nurses work part-year than nurses with other employers --- 12.66 percent as opposed to 2.95 percent.

Agency nurses work more evening, night, and weekend shifts than their non-agency counterparts. The agency population is slightly less experienced. About 10 percent of agency nurses were once licensed practical nurses (LPN's), as opposed to 7.89 percent of non-agency nurses. LPN's have less training and less responsibility than RN's. The higher percentage at agencies may be because some former LPN's may need to change employers when they make the LPN to RN switch, and consequently spend time at an agency while they search for a permanent position as a registered nurse.

MODEL CONSTRUCTION

The model is designed to determine factors which are important in a nurse's decision whether to work for an agency or a regular employer given that she has already decided to work. The model is also designed to measure whether nurses who work for agencies value wages more

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in relation to benefits than nurses who work for other employers.

Registered nurses supply labor to either temporary agencies or regular employers. The supply of labor by nurses is a function of various factors, including marital status, children, spousal income, and age. The choice between working for an agency or a regular employer is influenced by the agency wage, the regular employer wage, the agency benefits, the regular employer benefits, spousal income, and by factors such as desired flexibility and autonomy.

Regular employers obtain labor from two sources. They can either directly hire their own nurses or they can use nurses who work for agencies. Their demand for nursing labor is a function of various factors, including the total population, the population over 65, the number of hospitals and hospital beds, and the cost of nursing services such as wages, benefits, and agency fees. The demand is met by a mix of hiring their own nurses and using agency nurses. The composition is affected by wages, benefits, agency fees, census fluctuation, monopsony power, and quality assurances by agencies, such as screening and orientation meetings.

Agencies supply labor to regular employers, *and obtain labor* by hiring nurses to work for them. Agency demand is a function of factors similar to those of regular employers, some of which were listed above.

A system which is a sequence of three equations is estimated to determine factors which are important in a nurse's decision to work for a temporary agency and to measure whether nurses who work for agencies value wages more in relation to benefits than nurses who work for other employers.

Description of the Model

The equation for whether a nurse works for a temporary nursing service (TNS) or regular employer (RE) is a probit equation:

$$(1) \quad TNS = X_D\beta_D + W_{TNS}\gamma_{TNS} + W_{RE}\gamma_{RE} + BEN_{TNS}\delta_{TNS} + BEN_{RE}\delta_{RE} + \varepsilon_1 .$$

TNS is a dummy variable set equal to 1 if the nurse works for an agency in her principal position and set equal to 0 otherwise (regular employer). The vector X_D contains 11 demographic variables affecting a nurse's choice to work for an agency or a regular employer. Three dummy variables are whether children ages 0-2, 3-5, and 6-18 are in the nurse's household. Three more dummy variables are whether the nurse is married, female, and of white racial/ethnic background¹³. The other five variables are spousal income¹⁴, age, age squared, experience --- years worked for pay as a nurse --- and experience squared. W_{TNS} is the nurse's agency wage and W_{RE} is the nurse's regular employer wage. BEN_{TNS} and BEN_{RE} are vectors of five agency and regular employer benefits, respectively --- pension, health insurance, parking, tuition reimbursement, and daycare.

Because nurses who work for agencies do not have wages and benefits from regular employers and nurses who work for regular employers do not have wages and benefits from agencies, it is necessary to estimate wage and benefit equations in order to obtain fitted values to use for W_{TNS} , W_{RE} , BEN_{TNS} , and BEN_{RE} in Equation (1). The wage and benefit equations are constructed identically. All vectors in the equations are identical, and the fitted wages and fitted benefits are constructed analogously. The wage equation to obtain the fitted wage is:

$$(2a) \quad W = X_{W\&BEN}\beta_W + TNS_{W\&BEN}\lambda_W + \varepsilon_W .$$

This reduced-form equation is run OLS. The dependent variable is wage per hour. Vector

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$X_{W\&BEN}$ contains sixteen variables affecting wages (and benefits) --- twelve associated with supply and four with demand.

On the supply side are three education-related dummy variables, for whether the nurse's highest nursing degree earned is Associate's (usually a two-year program), Bachelor's (usually a four-year program), or at least a Master's. Since all nurses must have either a Diploma (usually a one-year program), Associate's, Bachelor's, or Master's or higher, Diploma was left out. The other nine supply side variables are tenure --- years the nurse has worked for her *current* employer --- tenure squared, experience, experience squared, age, age squared, the female and white racial/ethnic background dummies, and a variable measuring how much of a chance the nurse thinks she gets to do the things she's best at in her job¹⁵. The four demand side variables are hospitals, hospital beds, population density, and social security beneficiary density in the county in which the nurse is employed¹⁶.

$TNS_{W\&BEN}$ is a vector of five interaction terms which differentiate TNS wages from RE wages (and TNS benefits from RE benefits). For example, given that the return to tenure is different at an agency than at a regular employer, one variable in the vector is $(TNS*Tenure)$, where TNS is the dummy variable described above. The question of which interaction terms to include in the equation rests on which attributes or characteristics of the nurse will be valued differently by an agency as compared to a regular employer. The five interaction terms in the vector are the TNS dummy interacted with a constant, experience, experience squared, tenure, and tenure squared. Thus, the fitted TNS wage and the fitted RE wage will differ by the vector of

interaction terms, so that $\hat{W}_{TNS} = X_{W\&BEN}\hat{\beta}_W + TNS_{W\&BEN}\hat{\lambda}_W$ and $\hat{W}_{RE} = X_{W\&BEN}\hat{\beta}_W$.

The benefit equations are constructed in the same manner as the wage equation to get a fitted TNS benefit and a fitted RE benefit for each benefit (pension, health insurance, parking, tuition reimbursement, and daycare). There is a benefit equation for each of the five benefits in the benefits vector:

$$(2b,c,d,e,d) \quad BEN = X_{W\&BEN}\beta_{BEN} + TNS_{W\&BEN}\lambda_{BEN} + \varepsilon_{BEN}.$$

The benefit equations are probit equations. The dependent variable *BEN* is a dummy variable set =1 if the nurse receives the particular benefit and set =0 if she does not. For example, in the pension benefits equation, *BEN* is set =1 if the nurse has pension benefits and set =0 if she does not. The fitted benefit values (one for TNS and RE) obtained are actually the predicted probabilities that the nurse will have that particular benefit.

An important consideration is that much like hours and wages are determined simultaneously in other models, whether a nurse works for an agency or a regular employer (*TNS*) is determined simultaneously with wages (*W*). Since the interaction terms in the wage equation contain the *TNS* dummy variable, and since *TNS* and *W* are endogenous, the interaction terms will be correlated with the error term ε_W in Equation (2a). Consequently, the fitted wages estimated will be incorrect. The simultaneity problem exists between *TNS* and benefits (*BEN*) as well. To correct for this problem, each nurse's *predicted probability of being an agency nurse* is used in place of the *TNS* dummy variable in these interaction terms of the wage and benefit equations.

Each nurse's predicted probability of being an agency nurse is obtained from the following probit equation:

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$$(3) \quad TNS = X_D \alpha_D + X_{W\&BEN} \alpha_{W\&BEN} + \varepsilon_2 .$$

X_D and $X_{W\&BEN}$ are defined above. The predicted probability is $\hat{PrTNS}_{W\&BEN} = \Phi(\hat{X}_D \alpha_D + \hat{X}_{W\&BEN} \alpha_{W\&BEN})$. $\hat{PrTNS}_{W\&BEN}$ is substituted in for the dummy variable in the interaction terms of the wage and benefit equations, to get consistent estimates. For example, $(TNS * Tenure)$ would be replaced with $(\hat{PrTNS} * Tenure)$.

To summarize, the model consists of three equations, (1), (2), and (3), though there are multiple (2) equations. Equation (3) is estimated to obtain predicted probabilities of working for an agency to use in the wage and benefit equations (2). The fitted wages and benefits obtained from Equation (2) are then used in Equation (1). Equation (1) is the probit equation of whether the nurse works for an agency or not. The estimated coefficients from Equation (1) are used to determine which factors impact on a nurse's decision to work for an agency and whether an agency nurse values wages more in relation to benefits than a nurse who works for a more traditional employer.

The Data

The data set used for the analysis is the 1990 Biennial Survey of Illinois Registered Nurses. The survey was conducted for the Illinois Department of Professional Regulation and its Committee on Nursing by the Department of Administrative Studies in Nursing, College of Nursing, University of Illinois at Chicago.

The eligible population consisted of all persons licensed to practice as a registered nurse

in Illinois in 1990. A four-page 55-question survey was mailed to all persons who were licensed as registered nurses in Illinois in 1990 along with biennial license renewal materials¹⁷. Nurses were asked to complete and return the survey, along with their license renewal materials. Of the 117,796 nurses who renewed their licenses, 66,005 also responded to the survey, for a response rate of 56 percent¹⁸.

All of the dependent variables and most of the independent variables used in the system of equations (1) through (3) were derived from responses to the questions in the Illinois survey¹⁹. Any observation which had a response that was *used as* a variable or *used to create* a variable that was coded as unknown or refused, was deleted from the sample. Also, any observation for which wage per hour was less than \$1 or greater than \$60 was deleted from the sample. The data set contained observations on licensed RN's whether they were employed or not. Only observations on those nurses who were employed were used in the analysis.

THE RESULTS

Table 3 contains the results of the agency choice Probit Equation (1). Table 4 presents the results for the variables in the wage and benefit equations (2) that are of most relevance in the analysis. Appendix A consists of the results for the rest of the variables in the wage and benefit equations (Table A1) and the results of Probit Equation (3) (Table A2).

[Tables 4 and 5 here]

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Variables Affecting Agency Choice, Wages, and Benefits

From Table 3, preschool children, age, and being female all have significant *positive* effects on the decision to work for an agency. *Children 0-2*, *Children 3-5*, and *Children 6-18* all have positive coefficients, and those for *Children 0-2* and *Children 3-5* are significant. Given that a nurse has decided to work, the presence of preschool children requires the more flexible work arrangements that agencies provide. The insignificance of *Children 6-18* indicates that school-age children do not have much impact on the decision.

Controlling for experience, age has a significant positive effect. All else equal, older nurses who want to remain in the workforce but not full-time would find the agency option attractive. The significant positive female coefficient indicates that either women value the flexibility of agency work more than men, or, a demand-side effect is being picked up and they are being discriminated against in finding permanent employment.

Spousal income, experience, and being white have significant *negative* effects on the decision to work for an agency. Higher spousal income means the spouse is more likely to have a permanent job, which means the nurse is more likely to have had the time necessary to find a good full-time employment match. Marriage is insignificant, probably because spousal income is picking up what is influential about marriage on agency choice. Controlling for age, the more experience a nurse has, the less likely she is to work for an agency. Experienced nurses are more likely to have settled into a permanent position.

The significant negative coefficient on *White* means that racial/ethnic background does

factor into agency choice. It could be that whites value flexibility less than hispanics, Asians, and blacks, but it is more likely that racial/ethnic discrimination is occurring in the search for permanent employment. If anything, because there is no urban/rural variable in the equation, the discrimination possibility is even more likely. Given minorities are more likely to live in urban areas, *White* should pick up part of the rural/urban --- albeit demand-side --- effect. But one would think *White* would be more likely *positive* because monopsony power --- and consequently greater temp use --- is more likely to occur in rural areas.

Wages, pension benefits, and parking benefits from both agencies and regular employers have significant effects on agency choice --- with the appropriate signs. The effects of health insurance, tuition reimbursement, and daycare from both agencies and regular employers are insignificant --- a result which is surprising, certainly for daycare, which provides flexibility.

Table 4 contains the wage and benefit differences between agencies and regular employers. The coefficients on the intercept interaction terms on wages and benefits (*PrTNS*Constant*) indicate that a nurse has a significantly higher wage, but a significantly lower probability of receiving benefits, if she works for an agency as opposed to a regular employer. The return to tenure in wages from an agency over regular employers is significantly positive (*PrTNS*Tenure*), so tenure adds substantially more to wages for a nurse at an agency than at a regular employer. Tenure does not significantly effect the probability of getting benefits at an agency in relation to a regular employer. The negative experience interaction terms on wages (*PrTNS*Experience*) indicates that the return to experience in wages is greater if the nurse works at a regular employer rather than at an agency.

The effects that the number of hospitals and hospital beds have on wages and benefits for

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either type of nurse is to a degree a measure of monopsony power. Monopsony implies that wages and benefits will be greater in counties with many nursing employers. As the number of hospitals and beds increase, so should wages and benefits. From Table 4, *Hospitals* have a significant positive effect on wages, but little effect on benefits, *Hospital Beds* have a strong positive effect on both wages and benefits. The results are broadly consistent with what monopsony would imply.

Monopsony power would also suggest that a monopsonist would be more likely than a competitive firm to use agency nurses. The regression results for Equation (3), the reduced-form probit equation on whether or not the nurse works for an agency, are consistent with what monopsony would suggest (Appendix A, Table A2). The coefficients estimated for demand-side variables *Hospitals* and *Hospital Beds* are negative, and imply that hospitals will be less likely to use agency nurses as their number increase and as their number of beds increase. With fewer hospitals and beds, more opportunity to exercise monopsony power exists, and consequently more agency use.

Comparison of the Value Put on Wages and Benefits

The results from Table 4 indicate that a given nurse will earn a higher wage per hour but receive fewer benefits working for an agency. But an important question is whether nurses who choose to work for agencies value wages more in relation to benefits than nurses who choose to work for regular employers. The results of Equation (1) are used to examine the issue.

The coefficients for the agency wage (*Fitted Wage TNS*) and the regular employer wage (*Fitted Wage RE*) indicate the strength each effect has on the choice to work for an agency, as do each of the coefficients for the benefits. Increasing the TNS wage will make a nurse more likely to work for an agency and increasing the RE wage will make her less likely. Increasing the TNS benefit probability will make her more likely to work for an agency and increasing the RE benefit probability will make her less likely.

Consider a comparison of the ratio of the fitted TNS wage coefficient to a fitted TNS benefit coefficient with the ratio of the fitted RE wage coefficient to a fitted RE benefit coefficient. For instance, consider the comparison of (1) the coefficient of *Fitted Wage TNS* divided by the coefficient of *Fitted Pension TNS* with (2) the coefficient of *Fitted Wage RE* divided by the coefficient of *Fitted Pension RE*.

The comparison of ratios informs as to whether a nurse is more likely to work for an agency as her desire for wages increases in relation to her desire for benefits. If the TNS wage-benefit ratio is greater than the RE wage-benefit ratio, then this means that the more a nurse values wages in relation to benefits, the more inclined she will be to work for an agency rather than work for a regular employer. Table 5 presents the ratios of wage and benefit coefficient estimates from Probit Equation (1).

[Table 5 here]

A wage-pension ratio comparison indicates that agency nurses value wages much more in relation to pension benefits than nurses who work for regular employers. Thus, the result holds for the benefit that can be provided by a spouse's employer and effects the whole family rather than only the nurse. The wage-parking ratios suggest a similar result for parking benefits,

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so that agency nurses value wages more in relation to parking benefits than nurses who work for regular employers.

The ratio comparisons for health insurance, tuition reimbursement, and daycare do not indicate that agency nurses value wages in relation to these benefits any differently than do other nurses. However, none of the six estimated coefficients for these benefits (*Fitted TNS* and *Fitted RE* for each of health insurance, tuition reimbursement, and daycare) have a significant effect on agency choice. The ratios are derived from insignificant coefficients. Consequently, they do not inform much about the value of wages in relation to benefits.

The results imply that in addition to addressing flexibility concerns, agencies can attract nurses who put a high valuation on wages in relation to benefits by offering higher wages than hospitals and other employers at the sacrifice of fewer benefits. Agencies can attract nurses by providing a compensation alternative that is more attractive to some nurses than any wage-benefit package offered by hospitals and other employers. The implication is that agencies may have the ability to offer compensation packages to nurses that hospitals find too costly to provide. If the costs required to provide packages similar to agencies is too high, then the hospital will not offer the package. The tradeoff is essentially between (1) the cost of having to provide a larger number of wage-benefit choices to attract more nurses or retain their nurses and (2) the loss of control at having to hire agency nurses in place of the nurses that a greater number of wage-benefit choices would have attracted.

SUMMARY

The analysis has provided a number of insights into temporary employment issues. In addition to providing specific information about a particular labor market, we can learn several things about the employment of professional women in general.

First, preschool children make temporary employment more likely, while school-age children have no significant effect on the decision. Second, the older a worker is, the more likely it is that she works for an agency, while the more experienced she is, the less likely it is that she does. Third, both women and minorities are more likely to work at an agency, which may be due to discrimination in the search for permanent employment.

Fourth, a worker has a significantly higher wage, but a significantly lower probability of receiving benefits, if she works for an agency as opposed to a more traditional employer. Fifth, the return to tenure in wages is significantly greater at an agency than at a regular employer, while the return to experience in wages is significantly greater at a regular employer than at an agency. The return to tenure and experience in *benefits* is not significantly different between the two employment choices.

Sixth, in two respects, evidence suggests that monopsony power may exist in this particular labor market. The number of hospitals and hospital beds in a county --- two demand-side variables --- have significant positive effects on wages. In addition, the variables are significantly negatively related to agency choice/use --- implying the more hospitals and beds, the less likely temps will be used.

Finally, temporary nurses value wages much more in relation to benefits than nurses who

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work for more traditional employers. The result holds for pension benefits --- the benefit that can be provided by a spouse's employer and effects the whole family --- and also for parking benefits, while results for health insurance, tuition reimbursement, and daycare are inconclusive. A general implication of this finding is that temporary agencies can potentially attract workers who value wages much more in relation to benefits by offering wage-benefit compensation packages that regular employers are unable to offer due to costs or constraints. Consequently, permanent employer costs or constraints may be allowing temporary agencies to exploit a labor supply niche to some degree.

NOTES

I wish to thank Jerry Hausman, Tom Lemieux, and Jim Poterba for their comments, suggestions, and time.

1. The U.S. Department of Labor reports that in 1983 there were 0.62 million temporary jobs in the U.S., but by 1994 the number had shot up to 2.25 million. They project a 60 percent increase in temporary jobs over the next ten years. The total number of temporary workers is to this point still only about 2 percent of all jobs. The fastest-growing segment of temporary jobs is in technical and professional fields, which now make up 15 percent of the temporary workforce. "A Temporary Force To Be Reckoned With," Timothy Egan, *New York Times*, 20 May 1996, p. D1. Also, from January 1982 to July 1992, employment in the temporary help industry increased from 0.4 million to 1.5 million --- or 254 percent [Lee, 1996, 543].

2. For example, from 1985 to 1987 alone, hospitals increased their use of nurses who work for temporary nursing services by 31 percent. "Nurses Again Lost Some Economic Ground in 1987," Patricia McKnight, *American Journal of Nursing*, January 1988.

3. For example, in 1980 about one and a half percent of employed nurses worked for an agency in their principal position, but by 1988 the percentage had doubled to around three percent. National Sample Survey of Registered Nurses, 1988.

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4. Interviews with Wendy Young at the College of Nursing at the University of Illinois-Chicago in April 1992 and Doris Polito of Kimberly Quality Care in San Antonio, TX in March 1991. "The Nursing Shortage and Its Relationship to Part-time and Temporary Employment Growth: How Should Unions Respond?" Ann Claire Grenier, Master's Thesis for degree of Master of City Planning at the Massachusetts Institute of Technology, May 1988, p. 77, discusses Bureau of Labor Statistics projections.
5. "Part-time Hirings Bring Deep Changes in U.S. Workplaces," Peter Kilborn, *New York Times*, 7 June 1991, p. A1.
6. Interviews with Wendy Young at the College of Nursing at the University of Illinois-Chicago, April 1992.
7. "At Brooklyn Hospital, Nurses Vote to Strike After Wages Are Cut," Steven Greenhouse, *New York Times*, 20 July 1997, p 21.
8. "Temporary Nursing Services: Size, Scope, Significance," Barbara Kehrner and Natan Szapiro, *Medical Care*, June 1984.
9. *The Great White Lie: How America's Hospitals Betray Our Trust and Endanger Our*

Lives, Walt Bogdanich, 1991.

10. Bogdanich, 1991 and "Danger in White: The Shadowy World of 'Temp' Nurses," Walt Bogdanich, *Wall Street Journal*, 1 November 1991. Also, "Solid Gains Behind, Leaner Times Ahead," Patricia Brider, *American Journal of Nursing*, February 1991 mentions " 'licking the agency addiction' that's costing us \$42-\$60 an hour," as the aim of hospitals.
11. Grenier, 1988, pp. 29, 40-42. The information was obtained from Monthly Labor Review in August 1986 and American Hospital Association 1986 Survey.
12. For example, suppose the facility must raise the wage \$1/hr, from \$16/hr to \$17/hr, to attract the additional nurse necessary to meet demand. If 40 nurses work at any one time and that number will be raised to 41, the increase in cost per hour to staff the shifts will be \$17/hr for the new nurse plus $(\$17 - \$16) \times 40 = \$57/\text{hr}$. It would make more sense for the facility to hire a temp nurse at a whopping \$35/hr, where the increase in cost per hour is only the \$35/hr fee paid to the agency for use of the nurse.
13. The dummy variable is set =1 if the nurse's racial/ethnic background is "White", and set =0 otherwise (Hispanic, American Indian or Alaskan Native, Asian or Pacific Islander, Black).
14. The total household income was available only in bracketed amounts. Spousal income was calculated by taking the midpoint of the nurse's bracketed response and subtracting out the

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nurse's total earnings from the principal and all secondary positions. Total earnings from the principal position were calculated by multiplying the wage per hour by the hours worked per week by the weeks worked per year. Total earnings from any secondary positions, if there were any, were given exactly. The variable was set =0 if the nurse was not married and set =0 if the amount calculated was <0. An amount <0 was possible because for the purposes of derivation, the bracketed response "Less than \$3,000" was set =\$1,500 and the bracketed response "\$100,000 or above" was set =\$150,000. All other bracketed amounts were set equal to their midpoint. Obviously, there exist potential endogeneity problems with this variable.

15. The variable, which I call *Use Skill* in that its a response to the question "How much of a chance does your job give you to do the things you are best at?", is set =5 if the response was "a very good chance", set =4 if it was "a fairly good chance", set =3 if it was "some chance", set =2 if it was "very little chance", and set =1 if it was "no chance".

16. The data for the four variables are for 1985 and were obtained from the *County and City Data Book, 1988*. Population density is the population divided by the area of the county and social security beneficiary density is the number of social security beneficiaries divided by the area of the county.

17. "Recruitment, Retention, and Compensation of Agency and Hospital Nurses," Katherine

Kostbade Hughes and Richard J. Marcantonio, *Journal of Nursing Administration*, October 1991.

18. *Executive Summary, 1990 Biennial Survey of Illinois Registered Nurses*, Wendy Young, Richard Marcantonio, Kathy Kostbade Hughes, and Nancy Chornick, May 1991.

19. As noted, the other variables were derived from the *County and City Data Book, 1988*.

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TABLE 1
Percentage Of Employed Registered Nurses In
Various Demographic And Educational Categories,
By Whether They Work For An Agency Or Not,
Illinois 1990

DEMOGRAPHIC CATEGORIES:	WORK FOR AGENCY	WORK FOR OTHER EMPLOYER
Female	95.15	97.12
White	78.87	90.95
Married	67.68	73.11
With Children Ages 0-2	13.08	14.49
With Children Ages 3-5	22.30	23.74
With Children Ages 6-18	48.84	52.55
Average Age	41.70	40.55

EDUCATION CATEGORIES (HIGHEST DEGREE EARNED):	WORK FOR AGENCY	WORK FOR OTHER EMPLOYER
Diploma Degree	33.51	33.19
Associate's Degree	28.47	25.64
Bachelor's Degree	34.79	35.77
Master's Degree or Higher	3.22	5.30
	100.00	100.00

TABLE 2
Percentages and Averages In Various Compensation and
Employment Categories For Employed Registered Nurses,
By Whether They Work For an Agency or Not,
Illinois 1990

COMPENSATION CATEGORIES:	WORK FOR AGENCY	WORK FOR OTHER EMPLOYER
Average Wage Per Hour	19.08	15.78
Percent Receiving Pension Plan	30.24	69.20
Percent Receiving Health Insurance	46.15	75.94
Percent Receiving Parking	28.11	51.82
Percent Receiving Tuition Reimbursement	27.34	61.94
Percent Receiving Daycare	3.36	8.45
EMPLOYMENT CATEGORIES:	WORK FOR AGENCY	WORK FOR OTHER EMPLOYER
Average Years of Work Experience	13.63	13.69
Average Hours Worked Per Week	31.83	34.06
Average Weeks Worked Per Year	44.65	48.36
Percent Working at Least 48 Weeks Per Year	68.30	86.10
Percent Working Full-Time	54.13	65.99
Percent Working Part-Time	33.22	31.06
Percent Working Part-Year	12.66	2.95
	100.00	100.00
Average Percent of Time on Day Shifts	72.72	82.37
Average Percent of Time on Evening Shifts	16.53	11.53
Average Percent of Time on Night Shifts	10.75	6.09
	100.00	100.00
Average Number of Weekend Shifts Per Month	2.02	1.72
Percent Who Were Licensed Practical Nurses	10.06	7.89

TABLE 3
Results of Probit Equation (1),
Whether a Nurse Works For an Agency or Not

Dependent Variable: TNS --- Work for Agency/Work for Non-Agency
Number of Observations: 33,810
Standard Errors in Parentheses

Constant	-2.557 (1.534)	Fitted Wage TNS	0.106 (0.026)
Children 0-2	0.060 (0.031)	Fitted Wage RE	-0.057 (0.028)
Children 3-5	0.064 (0.027)	Fitted Pension TNS	2.643 (0.660)
Children 6-18	0.005 (0.013)	Fitted Pension RE	-2.866 (0.232)
Married	-0.012 (0.033)	Fitted Parking TNS	0.108 (0.050)
Spousal Income	-0.011 (0.005)	Fitted Parking RE	-0.625 (0.286)
White	-0.490 (0.048)	Fitted Health TNS	2.636 (2.842)
Female	0.341 (0.070)	Fitted Health RE	-1.305 (1.324)
Age	0.038 (0.008)	Fitted Tuition TNS	0.992 (1.613)
Age Squared	-0.0003 (0.0001)	Fitted Tuition RE	-0.507 (0.337)
Experience	-0.020 (0.006)	Fitted Daycare TNS	5.764 (4.397)
Experience Squared	0.0003 (0.0001)	Fitted Daycare RE	-2.957 (2.657)

TABLE 4
Wage (OLS) and Benefit (Probit) Equations (2)

Number of Observations in All Equations: 33,810
Standard Errors in Parentheses

	Wage	Pension	Health
Pr(TNS)*Constant	31.837 (3.651)	-2.324 (0.824)	-4.096 (0.864)
Pr(TNS)*Experience	-0.799 (0.316)	0.186 (0.071)	0.401 (0.075)
Pr(TNS)*Experience Squared	0.014 (0.008)	-0.002 (0.002)	-0.007 (0.002)
Pr(TNS)*Tenure	2.088 (0.554)	0.123 (0.127)	-0.135 (0.134)
Pr(TNS)*Tenure Squared	-0.049 (0.014)	-0.003 (0.003)	0.003 (0.003)
Hospitals	0.033 (0.012)	-0.007 (0.012)	-0.007 (0.012)
Hospital Beds (000's)	0.070 (0.010)	0.100 (0.030)	0.100 (0.030)
	Parking	Tuition	Daycare
Pr(TNS)*Constant	-0.475 (0.774)	-3.289 (0.798)	-0.419 (1.242)
Pr(TNS)*Experience	0.038 (0.067)	0.261 (0.069)	0.114 (0.110)
Pr(TNS)*Experience Squared	0.001 (0.002)	-0.003 (0.002)	-0.001 (0.003)
Pr(TNS)*Tenure	0.055 (0.118)	-0.325 (0.123)	-0.158 (0.194)
Pr(TNS)*Tenure Squared	-0.003 (0.003)	0.004 (0.003)	0.002 (0.005)
Hospitals	-0.028 (0.021)	-0.049 (0.041)	-0.015 (0.017)
Hospital Beds (000's)	0.040 (0.030)	0.300 (0.030)	1.120 (0.040)

TABLE 5
Comparison of the
Wage Coefficient - Benefit Coefficient Ratios,
For Agency and Regular Employer,
For Each of the Five Benefits

Ratio	Agency	Regular Employer	% Agency > Regular Employer
Wage-Pension	0.0401	0.0199	102%
Wage-Parking	0.9815	0.0912	976%
Wage-Health Insurance	0.0402	0.0437	-8%
Wage-Tuition	0.1069	0.1124	-5%
Wage-Daycare	0.0184	0.0193	-5%

APPENDIX A: RESULTS OF EQUATIONS (2) AND (3)

TABLE A1
Wage (OLS) and Benefit (Probit) Equations (2)

	Standard Errors in Parentheses					
	Wage	Pension	Health	Parking	Tuition	Daycare
Constant	7.393 (0.622)	0.480 (0.139)	1.468 (0.147)	-0.809 (0.132)	0.597 (0.137)	-1.192 (0.205)
White	1.572 (0.283)	-0.119 (0.065)	-0.354 (0.070)	-0.036 (0.060)	-0.256 (0.063)	0.034 (0.093)
Female	1.259 (0.217)	0.326 (0.052)	0.539 (0.060)	0.065 (0.046)	0.354 (0.050)	0.200 (0.063)
Age	-0.017 (0.024)	0.014 (0.005)	-0.027 (0.005)	0.022 (0.005)	-0.020 (0.005)	-0.030 (0.008)
Age Squared	-0.0002 (0.0003)	-0.0002 (0.0001)	0.0002 (0.0001)	-0.0002 (0.0001)	0.0001 (0.0001)	0.0002 (0.0001)
Experience	0.1015 (0.024)	-0.032 (0.006)	-0.050 (0.006)	-0.016 (0.005)	-0.051 (0.005)	-0.012 (0.008)
Experience Squared	-0.0013 (0.0006)	0.0007 (0.0001)	0.0012 (0.0001)	0.0002 (0.0001)	0.0010 (0.0001)	0.0002 (0.0002)
Tenure	0.313 (0.028)	0.108 (0.007)	0.050 (0.007)	0.020 (0.006)	0.068 (0.006)	0.040 (0.009)
Tenure Squared	-0.006 (0.001)	-0.0021 (0.0002)	-0.0008 (0.0002)	-0.0001 (0.0002)	-0.0012 (0.0002)	-0.0006 (0.0003)
Associate	0.292 (0.097)	0.059 (0.022)	0.152 (0.022)	0.028 (0.021)	0.171 (0.021)	0.019 (0.031)
Bachelor	1.212 (0.091)	0.119 (0.021)	0.176 (0.021)	0.012 (0.019)	0.124 (0.020)	0.059 (0.029)
Masters	3.398 (0.191)	0.362 (0.045)	0.423 (0.047)	-0.023 (0.041)	0.220 (0.042)	0.175 (0.059)
Use Skill	0.382 (0.039)	0.099 (0.009)	0.097 (0.009)	0.073 (0.008)	0.125 (0.008)	0.099 (0.013)
Population Density	0.0015 (0.0001)	-0.0002 (0.0001)	-0.0002 (0.0001)	0.00020 (0.00002)	0.00004 (0.00002)	-0.00020 (0.00004)
Soc Sec Density	-0.009 (0.001)	0.0005 (0.0001)	0.0015 (0.0001)	-0.0007 (0.0001)	-0.0003 (0.0001)	0.0014 (0.0002)

TABLE A2
Results of Reduced-Form Probit Equation (3),
Whether a Nurse Works
For an Agency or Not

Dependent Variable: TNS --- Work for Agency/Work for Non-Agency
Number of Observations: 33,810
Standard Errors in Parentheses

Constant	-1.748 (0.191)	Tenure	-0.097 (0.005)
Children 0-2	0.067 (0.031)	Tenure Squared	0.0023 (0.0002)
Children 3-5	0.060 (0.027)	Associate	0.063 (0.034)
Children 6-18	0.004 (0.013)	Bachelor's	-0.094 (0.031)
Married	-0.006 (0.033)	Master's	-0.287 (0.066)
Spousal Income	-0.011 (0.005)	Use Skill	-0.018 (0.014)
White	-0.433 (0.037)	Hospitals	-0.302 (0.127)
Female	0.154 (0.070)	Hospital Beds	-0.020 (0.007)
Age	0.020 (0.008)	Population Density	0.0006 (0.0004)
Age Squared	-0.0001 (0.0001)	Social Security Beneficiary Density	-0.0002 (0.0002)
Experience	-0.018 (0.005)		
Experience Squared	0.0004 (0.0001)		