The Effect of Government-Run Healthcare on the Salaries of Nursing Professionals in the U.S.

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Abstract: In this paper, we investigate the relationship between the level of government-sponsored healthcare and the salaries of registered nurses (RNs) in the U.S. Specifically, we examine whether RN salaries are affected by enrollment levels in the Medicare, Medicaid, and Children's Health Insurance (CHIP) programs. Given that the regulation of these programs affects the number of individuals that are eligible for coverage as well as the reimbursement for services, it is possible that the size of these programs could influence the salaries of nurses. We find that greater numbers of enrollees in government programs are related to higher RN salaries. However, we find that RN salaries are driven down when greater portions of the states' population or total insured persons are covered by government programs. [Key words: nurses, wages, labor supply, government health insurance programs.]

INTRODUCTION

Many have commented on the challenges facing the nursing industry, particularly as it relates to the potential shortage of labor in the marketplace (Sloan and Richupan, 1975; Shields, 2004; Allen, 2008). As the baby boomer generation ages, demand for nurses will increase (Shields, 2004) and it is not clear if the supply of nurses will keep pace with the growing demand. According to the U.S. Bureau, (2013), nursing is listed among the top occupations for job growth, and the occupation is expected

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to increase from 2.71 million in 2012 to 3.24 million in 2022. In addition, the BLS expects the need for 525,000 replacement nurses (due to retiring nurses), which means the job openings for nurses due to growth and replacements will be approximately 1.05 million by 2022 (US Bureau, 2013). While the salaries of nurses have increased over time, few economists have considered the factors that affect wage rates in the labor market, especially government health insuring programs.

At the same time, the Patient Protection and Affordable Care Act of 2010 (PPACA) has substantially changed the U.S. health insurance market and mandated that all Americans be covered by some form of health insurance. To this end, the law imposes regulations designed to facilitate health insurance coverage, including the individual purchase mandate, guaranteed issuance of insurance policies, and the creation of health insurance exchanges. The PPACA also expanded the eligibility for and/or coverages of government programs. These, and other provisions of the law, represent a significant increase in the government's role in the health insurance market. As a result, there is much uncertainty regarding the potential impact of government-run healthcare on consumers, the insurance industry, and healthcare professionals.

Collectively, the enactment of the PPACA and the existence of the aging baby boomer generation suggests there is considerable economic uncertainty in the nursing industry. Our paper hopes to reduce some of the uncertainty by providing a degree of insight into the impact of government insuring programs on nurses' wages. Our research is motivated by the fact that hospitals spend over 59 percent of their expenditures on salaries and benefits (American Hospital Association, 2017) and nurses normally make up the largest portion of professionals in the healthcare workforce (US Bureau, 2015; Link, 1988; Kaestner and Guardado, 2008). In addition, due to the labor intensive nature of healthcare, the costs associated with nursing care are under scrutiny (Buchan, O'May, and Dussault, 2013). In short, nurses are a key component in meeting healthcare objectives (Buchan and Black, 2011), making it important to gather insight into how socioeconomic conditions and regulations (specifically, the PPACA) may impact this segment of the labor force.

The main research question we consider is whether the level of enrollment in government-sponsored health insurance programs in a given state affects the level of nurses' salaries in that state. Outside of the demand for services, nursing salaries can be impacted by many factors, such as the experience and education level of the nurses, the extent of unionization, and the overall health of the population. We also posit that the government's role in making health insurance available to a given population likely has an influence on their salaries, though this has not been explored

previously in the literature. To the extent that government health insurance programs impact nursing salaries, these programs may subsequently affect the supply of nurses, the cost of healthcare, and the quality of healthcare. In addition, to the extent that we do find a relation between enrollment in government programs and nursing salaries, given that these programs are impacted by the PPACA, our analysis also allows us to draw some initial conclusions on one of the potential long-term effects of the PPACA.

Our study adds to existing literature in several ways. First, though some studies do analyze the factors that impact the salaries of nurses, these studies generally use only a single year of data and the data is from the 1970s and 1980s. Given the substantial growth in nursing professionals since this time, an updated analysis of nursing salaries is warranted. Second, these studies do not generally attempt to proxy for the demand for nurses and none consider the impact of government-sponsored health insurance on nursing salaries. Given that the percent of government-insured persons increased by more than 37 percent between 2000 and 2012, this represents a significant percentage of insured persons. In addition, some of the government programs we consider in our analysis (Medicare and Medicaid) are inextricably linked with the nursing profession and will continue to grow with the baby boomer generation. As such, policymakers can turn to our analysis for insight into the potential consequences of the growth of the baby boomer generation for the wages of nurses.

The remainder of this paper is arranged as follows: The next section provides a brief overview of the government health insurance programs examined in this study and a review of the existing literature. This is followed by sections that describe the data and methods used and the results of the empirical analysis. Finally, concluding remarks are provided.

OVERVIEW OF GOVERNMENT PROGRAMS AND A REVIEW OF THE NURSING LITERATURE

There are two streams of literature that specifically relate to this study. The first focuses on the history of and utilization of Medicare, Medicaid, and the CHIP. The second addresses nursing and the level of salaries paid to nurses.

Overview of Government Health Insurance Programs

Where private markets for insurance are absent or inefficient, government-provided insurance may be needed (Arrow, 1963; Eisenhauer, 2006). As a result, several social insurance programs have developed over the years that provide a variety of coverages to those meeting specific

requirements, and many of these programs are need-based. For example, low-income families, including the elderly and the disabled, can be eligible for assistance in purchasing food through SNAP, the Supplemental Nutrition Assistance Program (formerly the Food Stamp Program). To qualify, households must have income below a certain level and very limited assets. However, other programs, such as Social Security retirement benefits, are not need-based.

With regard to health insurance coverage, three distinct government programs exist, the first of which is Medicare. Medicare is a national social health insurance program for seniors and was created through an amendment to the Social Security Act (CMS, 2015). Prior to the enactment of the PPACA, Medicare was viewed as the single largest change in health insurance coverage in U.S. history (Finkelstein, 2007). Eligible individuals are entitled to the hospitalization coverage (Part A) at no cost and the medical coverage (Part B) for a monthly fee that varies by income. Additionally, over the course of time, other options were made available to the elderly through Medicare, including Medigap policies and Medicare Advantage Plans.

While the economics literature is replete with studies considering the Medicare program, few consider the program in the context of the nursing market. We therefore draw on studies that lend general insight into the economic aspects of the program. For example, Finkelstein (2007) suggests that the initial impact of Medicare was an increase in health-related employment and an increase in spending on health services—more than six times what had been anticipated. Thus, we would expect enrollment in the Medicare program to have non-trivial implications for wages in the nursing market. We also note that other studies (e.g. Bryce, 1994) indicate that labor costs have a significant impact on the profitability of health insurance programs.

Our study also considers the Medicaid program, which provides healthcare coverage to low-income families, pregnant women, people of all ages with disabilities, and people who need long-term care (CMS, 2015). Whereas Medicare is a matter of right, and coverage and eligibility are similar across states, Medicaid varies on a state-by-state basis and is only available to those meeting specific income requirements. Again, while many studies have considered the Medicaid program, few have specifically examined it in the context of the nursing market, and we are forced to rely on studies that lend more general insights into our research question. For example, Freeman and Corey (1993) find that being covered by Medicaid is more strongly related to access to healthcare, compared to uninsured and privately insured individuals. To the extent that nurses are an integral

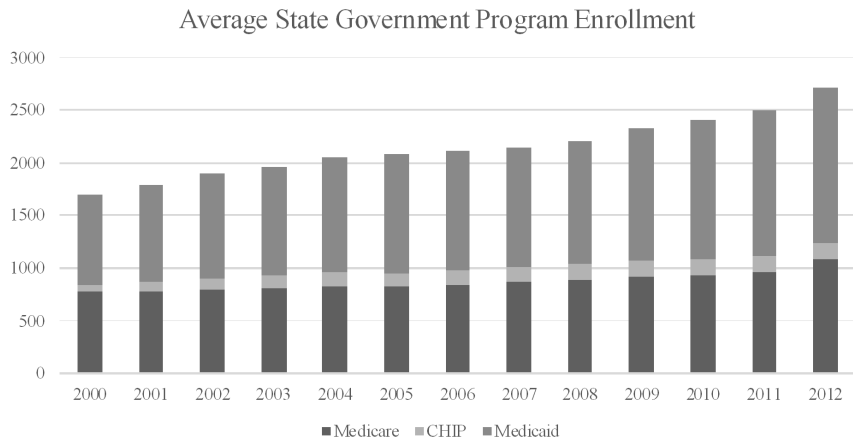

Fig. 1. Government enrollment by program.

component of healthcare access, this suggests that enrollment levels in the program may impact the wages of nurses.

The most recent government health insurance program was created with the passage of the Balanced Budget Act of 1997. CHIP was implemented to provide health insurance and preventive care services to uninsured children who may have not been eligible for the Medicaid program (i.e., their parents' income exceeded the guidelines of eligibility for Medicaid) (CMS, 2015). Although the programs may be called by various names, all 50 states and the District of Columbia have CHIP programs. While this program is managed at the state level, like Medicaid, states are eligible to receive federal funds to provide the coverage.

Although growth has varied slightly over time, average enrollment in government programs has increased at an average of approximately four percent. Figure 1 shows the average number of enrollees across the states in each program between 2000 and 2012. The CHIP program has seen the largest increase, with an average growth in enrollment of eight percent per year since 2000. Medicaid follows, with an average increase of 4.6 percent. Medicare has experienced the slowest growth, at less than three percent.[4]

Nursing Literature

In the U.S., the nursing profession currently consists of various levels of licensing: nursing assistants, licensed practical nurses (LPNs), registered

[4]Refer to the appendix for a breakdown of average enrollment by government program, by year.

nurses (RNs), and nurse practitioners. Registered nurses make up the largest professional occupation in the healthcare industry in the U.S. (Link, 1988). Concurrently, as nursing has grown over the years, there has been considerable research investigating various aspects of the profession. This research has been extensive, and, therefore, we focus on those papers that specifically address the topic of this paper, the salaries of nurses, specifically RNs.

The shortage of nurses is most pronounced in hospitals, with approximately 14 percent indicating vacancy rates as high as 20 percent and others reporting vacancy rates of 10.2 percent to 13 percent (Spetz and Given, 2003). One proposed strategy to address the shortage of nurses in the U.S. is the hiring of foreign-born nurses. Although hospitals support this policy, the American Nurse Association indicates that it will not address the "serious workplace issues that continue to drive American nurses away from the profession" (American Nurse Association, 2008). In addition, Cortes and Pan (2014) find a displacement effect—for every foreign nurse that migrates to a specific city, there are between one and two fewer native nurses working in the same city.

In theory, this issue should be self-correcting, with the demand from hospitals increasing the salaries paid to RNs, drawing nurses away from other, lower-paying positions. However, this is not necessarily the case. Booton and Lane (1985) hypothesize that the employment of RNs by hospitals is an example of hiring-side market power (monopsony). In this case, the competition among hospitals is limited and therefore, the equilibrium wage is not driven by supply and demand (Propper and Van Reenen, 2010). In other words, the supply of nursing labor in a hospital setting is relatively wage inelastic, keeping wages lower than might otherwise prevail through supply and demand (Robinson, 1988). On the other hand, contrary to predictions from the monopsony model, Hirsch and Schumacher (1995) find that there is no positive relationship between relative nursing wages and hospital density or market size. Regardless of which theory prevails, nursing still represents the largest resource cost used by hospitals (Kaestner and Guardado, 2008).

Hospital efficiency may impact the level of salaries for healthcare workers, similar to how efficiency and profitability impact salaries and bonuses for other professions. Research has often utilized the length of patient hospital stays as a measure of efficiency and performance when analyzing individual hospitals (Fromberg, 1991; Tauble, 1990; Thomas, 1997). Brown, Sturman, and Simmering (2003) find that the salary of nurses is negatively correlated with the length of stay for patients. They equate this to improved resource efficiency, which ultimately leads to increasing patient care outcomes (i.e., shorter hospital stays). However, the utilization

of this measure as a sign of efficiency should be analyzed cautiously as it may be a sign of reduced patient care resulting from earlier than desired discharge (Brown *et al.*, 2003.

Considering specific, individual hospitals, Feldman and Scheffler (1982) find that hospitals in urban areas pay higher wages. This may occur because these hospitals find it necessary to compensate employees for negative aspects such as crime and pollution or that the level of urbanization is a proxy for increased skill levels, as larger urban hospitals may attract more skilled workers (Feldman and Scheffler, 1982).

In addition to other factors, the percentage of unionization of registered nurses may impact the level of salary received. Following a significant increase in hospital union activity from 1973 through 1977, Feldman and Scheffler (1982) investigated the impact this activity had on healthcare professionals' compensation.[5] In their analysis, they considered four employment categories: registered nurses, licensed practical nurses, secretarial staff, and housekeeping staff. They found that registered nurses that were covered by a union received a nearly four percent higher starting salary and, following the initial offer, between six and 16 percent higher salaries (depending on the age of the union). In addition, unions that had been established before 1968 showed a 16 percent higher wage for registered nurses compared to non-union nurses. Newer unions only showed a six percent higher wage than the non-union nurses. The results were consistent but less pronounced for LPNs, secretarial staff, and housekeeping staff. Given these findings, we control for factors capturing the demand for nurses as well as unionization.

There are different programs that an individual can utilize to become an RN. One is an associate degree in nursing, normally earned in two years from a community college or specialized college, and the second is a baccalaureate degree in nursing, normally earned in four years from a college or university. In addition, there are master's and doctoral programs in nursing, which are often pursued by veteran nurses as a way to further their education and/or improve their marketability.

Two existing studies investigate whether higher education levels result in increased compensation. Mennemeyer and Gaumer (1983) analyze the 1977 Sample Survey of Registered Nurses (NSRN) and find that nurses with an associate degree do not generally receive a higher salary than those with a diploma. However, baccalaureate nurses do command a

[5]From June 30, 1973 to June 30, 1974, there were only 461 representation petitions filed in the healthcare industry. By 1977, the number of collective bargaining agreements had increased to 1,635, which represented 23 percent of all U.S. hospitals (Feldman and Scheffler, 1982). This research was limited to Wisconsin, Minnesota, and Illinois.

higher salary than diploma nurses in almost all settings, though the increase is small. Finally, nurses with master's degrees receive a premium over nurses with a diploma; however, with so few holding a master's degree in nursing (less than five percent), the impact to RN salaries overall is negligible.

Link (1988) uses 1970 U.S. Census data and data from the 1977, 1980, and 1984 NSRN and finds stronger results. Specifically, Link (1988) finds that baccalaureate registered nurses receive a salary premium over nurses with an associate degree in all but the earliest year and that the premium ranges from 6.5 to seven percent. Link also finds the premium for master's degree RNs to be more substantial, at 11 to 25 percent higher than the associate degree nurses. Finally, similar to Mennemeyer and Gaumer (1983), Link (1988) does not find any substantial differences between nurses with a diploma and those with an associate degree. Collectively, these studies do provide evidence of a significant relation between the level of education and the salaries of RNs. As such, we will also control for education in the current study.

Both Mennemeyer and Gaumer (1983) and Link (1988) find that other demographic factors, such as gender, race, experience, and work responsibilities, impact salary. For instance, they find that nurses receive a premium for their number of years of experience; however, this premium is very small. Mennemeyer and Gaumer (1983) find that non-white nurses are paid premiums comparable to those of their white counterparts. The authors believe this may be a direct result of attempts by employers to practice "affirmative action" in employment. Males often choose nursing as a career because they expect good wages (Boughn, 2001). In fact, Link (1988) finds that male nurses generally receive higher wages than female nurses. Administrative duties can also impact nursing salaries by providing additional compensation for tasks beyond patient care. These duties are generally learned on the job and are firm-specific, and therefore the compensation for these additional duties is fairly limited (Mennemeyer and Gaumer, 1983). There is also evidence that the demand for services and the extent of unionization also impact nursing salaries (e.g., Feldman and Scheffler, 1982; Link, 1988). As a result of these findings, we control for these factors in our analysis.

DATA

This paper utilizes data from a variety of sources. Similar to Mennemeyer and Gaumer (1983) and Link (1988), we use the NSRN database for nursing salary and demographic data. This survey was first adminis-

tered in 1977 and has been administered to registered nurses every four years since 1980. It collects detailed information from registered nurses, including demographic information, education, and work-related factors. We use the 2000, 2004, and 2008 survey years. Since this study examines the impact of U.S. government health programs on nursing salaries, we exclude all nurses currently living outside of the U.S. and those not currently working in nursing. For the purposes of this analysis, we collapse this data to the state level and impute the missing years to create a state-year panel dataset. Sample weights are used when collapsing the data to the state level. The nursing variables represent the weighted means of the individual observations. Finally, consistent with prior literature, we impute the missing data years by first regressing state and year indicator variables on each variable of interest. We then utilize the estimates in place of the missing data.[6]

The government enrollment data is obtained from the Centers for Medicare and Medicaid Services and the total number of insured persons is collected from the U.S. Census. Finally, the remaining control variables are acquired from the Statistical Abstract of the United States, the American Hospital Association Hospital Statistics, the U.S. National Center for Health Statistics, the Health Resources and Services Administration, and the CDC Behavioral Risk Factor Surveillance System. The sample period is from 2000 to 2012. All variables are converted to logs for ease of interpretation of the results.

METHOD AND ANALYSIS

We investigate state-level enrollment in existing government healthcare programs (i.e., Medicare, Medicaid, and CHIP) to determine if there is a correlation with the salaries of registered nurses. As noted earlier, we use a larger and more recent sample period than existing studies and incorporate factors that may impact salaries that were not considered in the prior literature.[7] A full variable list is provided in Table 1.

[6]Since all of the state-level data used in this study is available on an annual basis, data is imputed for the years in which the nursing survey was not conducted to create the full state-year panel dataset.

[7]It should be noted that some states require the use of staffing committees that are responsible for creating patient-to-nurse ratio plans for hospitals and others that require public reporting of these ratios; however, these states have no specific laws pertaining to set ratios. Only one state, California, requires hospitals to operate within a specific ratio. To the extent that additional states pass similar laws, this would be an area for further investigation.

Table 1. Variable List and Description

Variable	Definition
Dependent Variable	
Nurse Salary	Natural logarithm of nurse salary in real dollars
Government Demand Variables	
Government Enroll	Natural logarithm of total participants in government programs (in 1,000)
Medicare Enroll	Natural logarithm of Medicare enrollment (in 1,000)
CHIP Enroll	Natural logarithm of CHIP enrollment (in 1,000)
Medicaid Enroll	Natural logarithm of Medicaid beneficiaries (in 1,000)
Government Enrollment Per Capita	Natural logarithm of percent of population insured in government programs
Medicare Enrollment Per Capita	Natural logarithm of percent of population insured in Medicare program
CHIP Enrollment Per Capita	Natural logarithm of percent of population insured in CHIP program
Medicaid Enrollment Per Capita	Natural logarithm of percent of population insured in Medicaid program
Demographic Variables	
Female	Natural logarithm of percent of nurses that are female
White	Natural logarithm of percent of nurses that are white
Bachelors	Natural logarithm of percent of nurses with bachelor degrees
Masters/PhD	Natural logarithm of percent of nurses with masters or PhD degrees
Administrative Duties	Natural logarithm of percent of nurses that are head nurses and/or have administrative responsibilities
Work in Hospital	Natural logarithm of percent of nurses that work in hospital
Percent Union	Natural logarithm of percent of registered nurses that are unionized
One-Year RN Employment Growth	Natural logarithm of one-year growth in total RNs employed
Two-Year Employment Growth	Natural logarithm of two-year growth in total RNs employed
Health andDemand Variables	
Obese	Natural logarithm of percent obese based on BMI (between 30 and 99.8 considered obese)
Smokers	Natural logarithm of percent of adults who are current smokers
Hospital Admissions	Natural logarithm of hospital admissions per 1,000 population
Outpatient Visits	Natural logarithm of outpatient visits per 1,000 population
Emergency Room	Natural logarithm of emergency room visits per 1,000 population
Population Density	Natural logarithm of population divided by land mass
Hospitals Per Capita	Natural logarithm of hospitals per 1,000 population

Fig. 2. Nursing salary in real dollars.

The reported gross annual salary of nurses is obtained from the NSRN database. Figure 2 shows the growth in nursing salaries in the U.S. from 2000 to 2012 (in constant dollars).[8] On average, RNs have seen an average annual wage increase of three percent. The salary of RNs has steadily increased, with the exception of 2008 where a slight decrease is observed. Whether the decrease in salaries in 2008 is a direct result of the financial crisis is unclear. However, salaries rebounded in 2009.

In our empirical analysis, we model the natural logarithm of average real salaries of nurses in state j in time t as a function of government-sponsored health insurance, the characteristics of registered nurses, the health of the population, and utilization of healthcare. Our primary variables of interest are the enrollment variables. We first consider the actual number of residents of the state enrolled in the Medicare, CHIP, and Medicaid programs. As such, the model takes the general form of:

$$\ln(nursing\ \ salaries)_{jt} = \alpha + \beta_1 \ln(govenroll)_{jt} + \beta_n' \lambda_{jt} + \varepsilon_{jt}, \qquad (1)$$

where

$\ln(govenroll)$ = the natural logarithm of the number of total enrollees in government health insurance programs in state j during year t

λ_{jt} = a vector of state-level variables to control for the demographics of nurses, the health of residents, and the demand for healthcare services in state j during year t.

[8]Refer to the appendix for a summary of average nursing salaries by year.

In addition, we also examine the number of enrollees in each program in separate models. These variables are not included in a single model as they are significantly correlated. The correlations range from .8658 to .9409. Finally, since the population has increased over time, we also estimate the model in the general form of:

$$\ln(nursing\ \ salaries)_{jt} = \alpha + \beta_1 \ln(govenroll\_percapita)_{jt} + \beta_n' \lambda_{jt} + \varepsilon_{jt} \quad (2)$$

Here we have the natural logarithm of the number of individuals enrolled in the government programs as a percentage of total population. The same control variables utilized in equation 1 are included in the model described by equation 2. Note also that we estimate separate models for each of the three government programs.

Given the possibility of a reverse causal relationship between the salary of nurses and the government demand variables, we utilize two-stage least squares regression analysis.[9] Instruments vary by model but include gross state domestic product, percent of the population living in poverty, the unemployment rate, the death rate, the percent of the population that is 65 and older, and a measure of citizen ideology. These variables are selected due to their expected impact on the government health insurance variables.[10] The specific instruments used in each model are identified in the notes to each table. The F-statistic is significant in all of the two-stage models, which confirms that the additional variables (instruments) have significant explanatory power. All models include year indicators to

[9]The first-stage results are provided in the appendix.

[10]The instruments utilized vary across models and were selected due to the direct correlation between the instruments and the government health variables. In the enrollment models presented in Table 3, gross state domestic product (GSP) is used as the instrument. GSP is selected since spending by government would include spending on health insurance. The instruments used in the models in Table 4 are the percent of the population living in poverty, the unemployment rate, and the death rate. The percent of the population living in poverty and the unemployment rate are selected since these are economic indicators, and when the economy is performing poorly and a larger percentage of the population are living in poverty or are unemployed, it is likely that these individuals will need to rely on government health insurance as they are unlikely to have access to health insurance from other sources. In addition, the death rate during the sample period has remained relatively constant. As such, it is expected that there will be a greater demand for Medicare services by the aging population. Finally, in the percentage models presented in Table 5, a measure of citizen ideology is also considered. This measure reflects citizens' positions on a liberal continuum. As such, we would expect that higher ideology scores would be associated with higher levels of enrollment in government-sponsored health insurance programs. None of these variables are expected to directly impact the salary of nurses.

control for any time-specific effects. In addition, we cluster standard errors at the state level to control for serial correlation.

With the exception of the Medicare Per Capita and Percent Medicare models, the Wu-Hausman test is significant, indicating the presence of endogeneity and supporting the use of the instrumental variable approach. In the cases in which the test does not indicate that endogeneity is present, we employ fixed effect regression models. These models also include year indicators, and standard errors are clustered at the state level.

As it relates to the enrollment variables, there are two competing hypotheses. As discussed earlier, there exists a nursing shortage. Economic theory proposes that the market is self-correcting. Shortages should result in higher wages, which will lead to an increased supply as more workers are drawn to the field. A study in early 2000 suggests that wages would need to increase by more than three percent per year and collectively increase by close to 69 percent between 2002 and 2016 to erase the shortage (Spetz and Given, 2003). In the context of the current study, we propose that the existence of government programs increases the demand for nurses as more individuals have access to services that they would not otherwise. This increase in demand, in combination with the growth in enrollments in these programs as shown in Figure 1 and the already existing nursing shortage, should lead to increasing salaries for nurses.

Alternatively, because of the specific reimbursement rules that apply to the government programs, hospitals and medical providers may receive less for services than they would providing these same services to patients with group and/or individual health insurance. For instance, in order to curb what was seen as inefficient hospital operations resulting from a reimbursement of incurred cost system, Medicare changed to a system whereby it reimburses physicians based on a Prospective Payment System (PPS) in the 1980s. PPS pays physicians a determined rate based on the patient's diagnosis (or DRG), regardless of the actual cost of treatment. The goal of the PPS is to moderate growth in federal expenditures by promoting efficiency in hospital operations (Pope, 1989). To further control the cost of government expenditures related to Medicare, following the passage of the Balanced Budget Act of 1997, the Medicare physician and hospital payment rates saw a substantial decline (Ginsburg, 2003).

Unlike Medicare, which is funded by the federal government, Medicaid is jointly funded by the federal government and the states.[11] In order

[11]The federal government pays the states for a specified percentage of Medicaid expenses. The percentage varies by state based on the per capita income. The percentage ranges from 50 percent in wealthier states to 75 percent in states with lower per capita income (Medicaid, 2016).

to control costs, each state can establish its own Medicaid provider payment rates within federal guidelines. In setting their rates, states can utilize a managed care arrangement whereby providers are paid a monthly capitation rate per enrollee or they can pay based on a fee-for-service arrangement (Medicaid, 2016). When establishing a fee-for-service system, states may base their rates on the costs of providing the service, a review of what individuals pay in the private market, or a percentage of what Medicare pays for equivalent services (Medicaid, 2016). Regardless of the method, the decline in state revenues has increased concern regarding the reduction in Medicaid payment rates to hospitals, physicians, and other providers (Ginsburg, 2003). In combination, the Medicare and Medicaid reimbursement rules could lead to lower salaries for nurses and other healthcare professionals.

We draw upon existing literature to identify other factors that may impact the salary of nurses. Specifically, we include measures of gender, race, work environment, education, and percent unionized. Mennemeyer and Gaumer (1983) find that nonwhites and those with administrative responsibilities have higher salaries. A similar result for the impact of administrative responsibilities is found by Link (1988). In addition, Link (1988) includes measures for place of employment and finds that for the earliest year in the sample, nurses who worked in hospitals received lower wages, but in the later year in the sample, the author finds the opposite result. In the current study, we use the percent white to control for differences in salary between whites and minorities and another variable capturing the percentage of the nurses that are head nurses and/or that have administrative responsibilities, since it is likely that these additional responsibilities will translate to higher levels of income.

Both of the prior studies cited above also include measures of education and find that higher levels of education are associated with higher salaries. The two education variables included in the current study are the percentage of nurses in the state with bachelor's degrees and the percentage of nurses in the state with master's degrees/doctorate degrees. Since prior literature found little to no difference between nurses with diplomas and associate degrees, we consider these degrees collectively as the comparison group.

As previously discussed, the percentage of unionization may impact the level of salary received by registered nurses (Feldman and Scheffler, 1982; Link, 1988). Therefore, we include the percentage of nurses covered by a union in each state. We predict a positive correlation between salaries and the level of unionization.

To control for the overall health of residents in the state, we include the percent of the state population that is obese (those with a BMI between

30 and 99.8) and those that are current smokers. Given that obesity and smoking can lead to a host of health issues, it is likely that states that have a higher percentage of the population in these categories will have a higher demand for services, which should translate to higher salaries for nurses.

We also include several measures that serve as proxies for the demand for services. These are the number of hospital admissions, the number of outpatient visits, and the number of emergency room visits.[12] It is expected that these variables will be positively associated with nursing salaries. In addition, we include population density as a measure of urbanization. Feldman and Scheffler (1982) find that nurses in urban areas have higher wages. As such, we expect population density to be significant and positive. Finally, we include a measure of hospital density, measured as the number of hospitals per capita, to examine the impact of market concentration on the wages of nurses.[13] While early studies (for example, Booton and Lane, 1985; Robinson, 1988; Propper and Van Reenen, 1988) predict that higher levels of market concentration will keep wages low, Hirsch and Schumacher (1995) do not find this to be the case. As a result, we have no *a priori* expectations regarding this variable. Table 2 provides summary statistics for the variables in the model.

RESULTS[14]

The results of the enrollment models are presented in Table 3,[15] and these results indicate a positive and statistically significant relation between government programs and nursing salaries. In particular, when we consider the natural logarithm of enrollment in all programs as our

[12]Link (1988) used physicians per 100 population as a proxy for the demand for health services. This variable is not used in the current study as it is significantly correlated with the government enrollment variables.

[13]This variable is significantly and highly correlated with population density. As such, all models are run twice, alternately including population density and hospital density. The models presented in Tables 3 through 5 include population density. Footnotes are provided in the results section that indicate the results when hospital density is included.

[14]The results discussed here are for the second stage. Refer to the appendix for the first-stage model results.

[15]When Hospital Density is included in the models (dropping Population Density), it is significant and negative in all but the Medicare model, suggesting that higher levels of market concentration do negatively impact the wages of nurses. The other results are fairly consistent. However, the Medicare enrollment variable is not significant and the emergency room variable is no longer significant in the Medicaid model. Finally, the Bachelors and Administrative Duties variables are significant and positive in both the Medicare and Medicaid models.

Table 2. Summary Statistics

	Natural Logarithm				Un-Logarithmized			
Variable	Mean	SD	Min	Max	Mean	SD	Min	Max
Dependent Variable								
Salary of Nurses	10.98	0.11	10.6	11.26	58844.55	6589.1	40180.8	77719.87
Independent Variables of Interest								
Government Enroll	14.03	1.06	11.65	16.83	2143.85	2712.44	114.43	20398.03
CHIP Enroll	10.9	1.35	6.68	14.39	130.85	233.53	0.8	1784.03
Medicare Enroll	13.2	1.02	10.65	15.53	865.58	890.43	42.02	5535
Medicaid Enroll	13.35	1.11	10.75	16.39	1147.42	1650.58	46.45	13079
Gov Enrollment Per Capita	–7.99	0.2	–8.53	–7.46	3.46E–04	6.88E–05	1.97E–04	5.73E–04
CHIP Enrollment Per Capita	–11.12	0.76	–15.05	–9.96	1.50E–04	2.38E–05	6.70E–05	2.32E–04
Medicare Enrollment Per Capita	–8.82	0.17	–9.61	–8.37	1.80E–05	9.20E–06	3.00E–07	4.73E–05
Medicaid Enrollment Per Capita	–8.68	0.31	–10.59	–7.75	1.79E–04	5.42E–05	2.52E–05	4.31E–04
Control Variables	–0.07	0.02	–0.14	–0.03	0.93	0.02	0.87	0.97
Female	–0.12	0.11	–0.77	–0.01	0.89	0.08	0.46	0.99
White	–0.99	0.14	–1.44	–0.58	0.38	0.05	0.24	0.56
Bachelors	–2.09	0.21	–3.16	–1.57	0.13	0.02	0.04	0.21
Masters/PhD	–0.52	0.07	–0.81	–0.38	0.59	0.04	0.45	0.69
Work in Hospital	–0.07	0.02	–0.14	–0.03	0.93	0.02	0.87	0.97
Administrative Duties	–2.13	0.14	–2.68	–1.73	0.12	0.02	0.07	0.18
Percent Union	–2.39	1.05	–5.29	–0.52	0.15	0.14	0.01	0.59
Obese	–1.41	0.17	–1.95	–0.97	24.81	4.02	14.2	37.8
Smokers	–1.6	0.22	–2.85	–1.12	20.69	3.95	5.8	32.6
Hospital Admissions	4.73	0.18	4.23	5.11	115.11	20.43	68.96	164.89
Outpatient Visits	7.65	0.33	6.85	8.59	2206.45	740.89	942	5397
Emergency Room	5.97	0.22	5.05	6.7	401.26	86.66	155.6	811.84
Population Density	4.45	1.41	0.09	7.08	190.19	255.45	1.1	1185.38
Hospitals Per Capita	–10.83	0.54	–11.98	–9.61	2.30E–05	1.39E–05	6.30E–06	6.71E–05
Number of Observations	643							

Table 3. Enrollment Model Results

	(1)	(2)	(3)	(4)
Government Enroll	0.0165**			
	[0.007]			
CHIP Enroll		0.0134**		
		[0.006]		
Medicare Enroll			0.0182**	
			[0.008]	
Medicaid Enroll				0.0158**
				[0.007]
Female	–0.9251***	–1.0468***	–0.9783***	–0.8778***
	[0.306]	[0.299]	[0.311]	[0.307]
White	–0.1697***	–0.1560***	–0.1741***	–0.1674***
	[0.039]	[0.037]	[0.041]	[0.039]
Bachelors	0.0595	0.0493	0.0597	0.0604
	[0.038]	[0.037]	[0.038]	[0.037]
Masters/PhD	0.1385***	0.1334***	0.1428***	0.1361***
	[0.026]	[0.024]	[0.027]	[0.026]
Work in Hospital	0.0481	0.0108	0.0508	0.0471
	[0.072]	[0.075]	[0.071]	[0.072]
Administrative Duties	0.0382	0.0114	0.0402	0.0397
	[0.027]	[0.027]	[0.028]	[0.027]
Percent Union	0.0179***	0.0192***	0.0181***	0.0179***
	[0.005]	[0.005]	[0.005]	[0.005]
Obese	–0.0241	–0.0064	–0.0241	–0.0248
	[0.042]	[0.038]	[0.044]	[0.042]
Smokers	0.0327*	0.0319**	0.0342**	0.0313*
	[0.017]	[0.016]	[0.016]	[0.018]
Hospital Admissions	–0.0315	–0.0225	–0.0376	–0.0284
	[0.034]	[0.032]	[0.035]	[0.034]
Outpatient Visits	–0.0621***	–0.0668***	–0.0614***	–0.0624***
	[0.016]	[0.015]	[0.016]	[0.016]
Emergency Room	0.0394*	0.0361*	0.0434*	0.0366*
	[0.022]	[0.021]	[0.024]	[0.022]
Population Density	0.0054	0.0074	0.0048	0.0055
	[0.007]	[0.006]	[0.007]	[0.007]
Constant	11.4166***	11.4328***	11.4245***	11.4399***
	[0.273]	[0.259]	[0.278]	[0.268]
Observations	643	643	643	643
R-squared	0.9055	0.9088	0.9034	0.9050

Robust standard errors in brackets; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
All models include year indicator variables; government demand variables instrumented using total gross state domestic product. Wu-Hausman tests for all models are significant, indicating that the government demand variables are endogenous.

independent variable of interest (column 1), our results suggest that a one percent increase in enrollment in government programs results in a .0165 percent increase in state-wide nursing salaries. This estimated relationship is statistically significant at the five percent level. We also find positive and statistically meaningful relations between both CHIP, Medicare, and Medicaid enrollment and nursing salaries when each program is considered individually (columns 2 – 4). The magnitude of the coefficients suggests that Medicare enrollment has a greater impact than CHIP and Medicaid. Overall, our point estimates on the individual programs suggest that a one percent increase in Medicare (Medicaid) enrollment is associated with a .0182 percent (.0158 percent) increase in nursing salaries. The results also suggest that a one percent increase in CHIP enrollment is associated with a .0134 percent increase in salaries. If we consider the percent increases relative to the mean of the nursing salaries, this would lead to an increase in salaries ranging from a low of $7.89 (for CHIP) to a high of $10.71 (Medicare), all else constant. While this may seem negligible, as noted earlier, enrollment in government programs has experienced fairly consistent growth. Total government enrollment has grown an average of approximately four percent per year, with growth rates ranging from a low of 2.85 percent (for Medicare) to around eight percent (for CHIP). In addition, if you consider the entire sample period, growth in total government enrollment was nearly 60 percent. As such, the continued rise in government enrollment could lead to substantial increases in nursing salaries over time.

As shown in the table, several of our control variables are also statistically significant at conventional levels. Education, union membership, hospital admissions, and emergency room visits are all positively related with nursing salaries, a finding that is consistent with our *a priori* expectations and prior literature. We also find that gender and race are negatively related to nursing salaries in statistically meaningful ways.

Next we turn to Table 4,[16] which presents our per capita model results. These models examine how the number of enrollees in government programs influences nursing salaries, controlling for population growth. Here we find evidence that, when we consider enrollment relative to the size of the population, government enrollment is negatively related to nursing salaries. The statistically significant coefficient on the government enrollment per capita variable indicates that a one percent increase in the relative

[16]When Hospital Density is included (dropping Population Density), it is negative and significant in all four models. The results on all other variables are consistent with what is reported in Table 4, with two exceptions: the White variable is significant and negative in the CHIP model and the Smokers variable is no longer significant in the Medicare model.

Table 4. Enrollment Per Capita Model Results

	(1)	(2)	(3)	(4)
Gov Enrollment Per Capita	–0.1301**			
	[0.057]			
CHIP Enrollment Per Capita		–0.1100		
		[0.129]		
Medicare Enrollment Per Capita			–0.1708***	
			[0.039]	
Medicaid Enrollment Per Capita				–0.0859*
				[0.044]
Female	–1.5318***	–0.6292	–1.0792***	–1.6460***
	[0.373]	[0.606]	[0.249]	[0.456]
White	–0.2036***	–0.2982	–0.1814***	–0.2004***
	[0.068]	[0.188]	[0.039]	[0.074]
Bachelors	0.0081	0.0858	0.0007	0.0159
	[0.037]	[0.101]	[0.030]	[0.040]
Masters/PhD	0.1593***	0.2132**	0.1143***	0.1705***
	[0.024]	[0.105]	[0.021]	[0.029]
Work in Hospital	0.0736	0.4683	–0.0135	0.1019
	[0.070]	[0.432]	[0.070]	[0.069]
Administrative Duties	0.0429*	0.2702	0.0191	0.0356
	[0.025]	[0.278]	[0.021]	[0.026]
Percent Union	0.0212***	0.0127	0.0192***	0.0211***
	[0.005]	[0.012]	[0.004]	[0.005]
Obese	0.0202	–0.0783	–0.0077	0.0269
	[0.039]	[0.131]	[0.032]	[0.042]
Smokers	0.0544**	0.0563	0.0472*	0.0544**
	[0.024]	[0.045]	[0.026]	[0.025]
Hospital Admissions	0.0048	–0.0593	0.0621**	–0.0193
	[0.027]	[0.087]	[0.026]	[0.033]
Outpatient Visits	–0.0502***	–0.0192	–0.0482***	–0.0546***
	[0.013]	[0.052]	[0.015]	[0.013]
Emergency Room	0.0295	0.0242	0.0138	0.0367
	[0.024]	[0.052]	[0.017]	[0.029]
Population Density	0.0163***	0.0120	0.0158***	0.0166***
	[0.004]	[0.011]	[0.003]	[0.004]
Constant	10.4211***	11.1096***	9.5275***	10.8581***
	[0.635]	[0.939]	[0.531]	[0.519]
Observations	643	643	643	643
R-squared	0.9008	0.4674	0.9276	0.8869

Robust standard errors in brackets; *** p < 0.01, ** p < 0.05, * p < 0.1
All models include year indicator variables. Instruments are as follows: Model 1 and Model 4—percent of population living in poverty and unemployment rate; Model 2—percent of population living in poverty and percent of population that is obese; and Model 3—percent of population that is obese and death rate. Wu-Hausman tests for all models are significant for all government demand variables except Medicare, indicating the presence of endogeneity. For Medicare, results reported are from a fixed-effects regression model.

enrollment in government programs results in an approximately .1301 percent reduction in state-wide nursing salaries. We also find that per-capita enrollment in Medicare (Medicaid) has the greatest (least) statistically relevant impact on nursing salaries while per-capita enrollment in the CHIP program has no meaningful impact on state-wide nursing salaries. Again, these percent changes are not negligible. In addition, the results of our control variables are similar to those described in the previous model, with two notable differences. The Emergency Room variable is not significant. However, Population Density is significant and positive in all but the CHIP models, suggesting that higher levels of urbanization are associated with higher salaries.

Taken together, our analysis suggests that enrollment in government programs has a statistically meaningful effect on nurses' salaries, though the effect appears to be somewhat complex. We find a positive relation between total enrollment levels and nursing salaries, which suggests that nurses' wage rates are driven higher by more demand for services. However, our analysis also indicates that nurses' salaries are driven down when greater portions of states' populations are enrolled in government programs.

To determine if this effect holds when considering the portion of the population that is insured, we repeat the prior analysis using the number of insured persons instead of total population. The results are consistent. However, as shown in Table 5,[17] the magnitude of the impact is slightly less. Here, we find that a one percent increase in the percentage of insured persons covered by government programs results in a .1031 percent decrease in the salaries of registered nurses. When we consider the programs separately, we find that the impact on salaries of Medicare-covered enrollees is more substantial than Medicaid, at –.1528 percent compared to –.0644 percent. This suggests that enrollees in private insurers, relative to government enrollees, may allow nurses to extract larger rents due to differences in the marketplaces (e.g., reimbursement rates, generosity of plan benefits). Thus, while nurses benefit from the increased demand associated with higher government enrollment levels, nurses' salaries appear to benefit more from the demand from enrollees in private insurance programs rather than government enrollees.

[17]When Hospital Density is included (dropping Population Density), it is negative and significant in all four models. The results on all other variables are consistent with what is reported in Table 5, with two exceptions: the Administrative variable is significant and positive in the Medicare and Medicaid models and the Hospital Admissions variable is significant and positive in the Medicare model.

Table 5. Percent Enrollment Model Results

	(1)	(2)	(3)	(4)
Percent Government	–0.1031*			
	[0.053]			
Percent CHIP		–0.0711		
		[0.115]		
Percent Medicare			–0.1528***	
			[0.040]	
Percent Medicaid				–0.0644*
				[0.037]
Female	–1.4754***	–0.8052	–1.1434***	–1.5224***
	[0.370]	[0.501]	[0.265]	[0.437]
White	–0.1870**	–0.2447	–0.1675***	–0.1859**
	[0.074]	[0.163]	[0.052]	[0.075]
Bachelors	0.0204	0.0759	0.0110	0.0268
	[0.035]	[0.082]	[0.030]	[0.037]
Masters/PhD	0.1567***	0.1898**	0.1177***	0.1646***
	[0.025]	[0.083]	[0.021]	[0.028]
Work in Hospital	0.0914	0.3472	0.0160	0.1094*
	[0.066]	[0.394]	[0.072]	[0.065]
Administrative Duties	0.0500*	0.1948	0.0321	0.0419
	[0.026]	[0.246]	[0.022]	[0.026]
Percent Union	0.0202***	0.0146	0.0183***	0.0203***
	[0.005]	[0.010]	[0.004]	[0.005]
Obese	0.0106	–0.0527	–0.0165	0.0178
	[0.038]	[0.123]	[0.033]	[0.040]
Smokers	0.0524**	0.0496	0.0494*	0.0505**
	[0.024]	[0.041]	[0.025]	[0.023]
Hospital Admissions	–0.0073	–0.0507	0.0437	–0.0241
	[0.027]	[0.068]	[0.026]	[0.032]
Outpatient Visits	–0.0594***	–0.0397	–0.0589***	–0.0611***
	[0.013]	[0.041]	[0.015]	[0.013]
Emergency Room	0.0264	0.0219	0.0130	0.0318
	[0.022]	[0.038]	[0.016]	[0.026]
Population Density	0.0156***	0.0124	0.0155***	0.0157***
	[0.004]	[0.009]	[0.004]	[0.004]
Constant	11.5090***	11.9095***	10.9521***	11.5962***
	[0.271]	[0.424]	[0.285]	[0.264]
Observations	643	643	643	643
R-squared	0.9058	0.7086	0.9228	0.8984

Robust standard errors in brackets; *** p < 0.01, ** p < 0.05, * p < 0.1

All models include year indicator variables. Instruments are as follows: Model 1—percent of population living in poverty; Model 2—percent of population living in poverty and unemployment rate; Model 3—percent of population that is 65 and older; and Model 4—percent of population living in poverty and city ideology measure. Wu-Hausman tests for all models are significant for all government demand variables except Medicare, indicating the presence of endogeneity. For Medicare, results reported are from a fixed-effects regression model.

ROBUSTNESS ANALYSIS

One issue not considered in the prior literature is the potential impact of the supply of nurses on wages. It is possible that even if there is a greater demand for nurses, if there is sufficient supply, then it is unlikely that the demand will translate into greater salaries. To capture the impact of the supply of nurses on nursing salaries, we utilize information on the total number of registered nurses to construct growth measures. If significant, we would expect this variable to be negatively related to the salary of nurses, suggesting that as the supply of nurses increases, wages are reduced.

Given that the construction of the lags reduces the sample period, this analysis is provided as a robust test. We include both the one- and two-year growth rates in total registered nurses employed as a measure of the adequacy of the supply of nurses. In both the enrollment and per-capita models (Tables 6 and 7), we find that none of these lagged employment growth variables are statistically significant. Further, even with the variables included, we find that the results of our main analysis of the government programs remain largely unchanged.

CONCLUSION

In this paper, we examine the relation between the wages earned by nurses and the level of enrollment in three government health insurance programs. Our research is motivated by the fact that the nursing industry is beset by uncertainty stemming from various sources, most notably the PPACA and the aging of the baby boomers. It is our hope that, by examining the extent to which enrollment in government programs influences nursing salaries, we will provide insight into one of the potential economic consequences of the PPACA and the increasing dependence of the baby boomers on government health insurance programs.

Our results suggest that, all else equal, greater numbers of enrollees in government programs result in higher levels of nursing salaries, suggesting that nurses' wages benefit from higher levels of demand for the services they provide to these programs. However, our analysis also indicates that when more individuals depend on government programs, relative to private programs, nursing salaries are reduced. This is likely due to the fact that, relative to other types of health insurance programs, government programs are more limited in their ability to respond to market forces and compensate nurses (and other healthcare professionals).

Table 6. Enrollment Model with Employment Growth

	(1)	(2)	(3)	(4)
Government Enroll	0.0181**			
	[0.009]			
CHIP Enroll		0.0146**		
		[0.007]		
Medicare Enroll			0.0200*	
			[0.010]	
Medicaid Enroll				0.0174**
				[0.008]
Female	–0.8524***	–1.0063***	–0.9126***	–0.7992***
	[0.271]	[0.256]	[0.272]	[0.277]
White	–0.1653***	–0.1460***	–0.1717***	–0.1628***
	[0.038]	[0.033]	[0.041]	[0.038]
Bachelors	0.0213	0.0097	0.0210	0.0224
	[0.036]	[0.037]	[0.037]	[0.036]
Masters/PhD	0.1662***	0.1610***	0.1698***	0.1640***
	[0.025]	[0.023]	[0.026]	[0.025]
Work in Hospital	0.0312	–0.0087	0.0341	0.0310
	[0.077]	[0.080]	[0.076]	[0.078]
Administrative Duties	0.0599**	0.0328	0.0609**	0.0623**
	[0.029]	[0.032]	[0.029]	[0.029]
Percent Union	0.0178***	0.0194***	0.0177***	0.0178***
	[0.005]	[0.004]	[0.005]	[0.005]
Obese	–0.0559	–0.0426	–0.0571	–0.0563
	[0.043]	[0.037]	[0.045]	[0.043]
One-Year RN	–0.0008	–0.0012	–0.0007	–0.0008
Employment Growth	[0.001]	[0.001]	[0.001]	[0.001]
Two-Year RN	–0.0011	–0.0004	–0.0009	–0.0011
Employment Growth	[0.002]	[0.002]	[0.002]	[0.002]
Smokers	0.0235*	0.0234*	0.0255**	0.0213
	[0.014]	[0.013]	[0.013]	[0.015]
Hospital Admissions	–0.0062	0.0024	–0.0119	–0.0033
	[0.032]	[0.030]	[0.032]	[0.032]
Outpatient Visits	–0.0647***	–0.0706***	–0.0641***	–0.0648***
	[0.015]	[0.014]	[0.014]	[0.015]
Emergency Room	0.0351	0.0348	0.0396	0.0325
	[0.025]	[0.023]	[0.026]	[0.024]
Population Density	0.0006	0.0031	–0.0000	0.0005
	[0.008]	[0.006]	[0.008]	[0.008]
Constant	11.5537***	11.5667***	11.5486***	11.5801***
	[0.329]	[0.307]	[0.328]	[0.329]

Table continues

Table 6. (*continued*)

	(1)	(2)	(3)	(4)
Observations	371	371	371	371
R-squared	0.8849	0.8883	0.8826	0.8836

Robust standard errors in brackets; *** p < 0.01, ** p < 0.05, * p < 0.1.
All models include year indicator variables. Instruments are as follows: Model 1—percent of population living in poverty; Model 2—percent of population living in poverty and unemployment rate; Model 3—percent of population that is 65 and older; and Model 4—percent of population living in poverty and city ideology measure. Wu-Hausman tests for all models are significant for all government demand variables except Medicare, indicating the presence of endogeneity. For Medicare, results reported are from a fixed-effects regression model.

Our results also suggest that any measures of the PPACA that increase enrollment in any government health insurance program will impact nurses' salaries, though the true impact of the PPACA is uncertain due to the complex relation between government enrollment and the salaries of nurses. Specifically, there are reports of a reduction in the number of uninsured persons since the passage of the PPACA. Given that this was one of the goals of the legislation, this can be considered a desirable outcome. However, some of the reduction is related to the expansion of government programs. For example, a recent report indicates that the number of individuals covered by Medicaid and CHIP has increased from 55 million before the PPACA to approximately 70 million as of January 2016 (NCSL, 2016).[18] It has also been reported that nearly 10 million people bought health insurance coverage through the insurance marketplace since October 2015 (NAIC, 2016). As such, it is possible that the individual health insurance mandate in combination with the creation of the health insurance marketplaces has increased the number of individuals covered by private health insurance as well. If the increase in the number of individuals participating in government health insurance programs grows at a rate greater than the growth rate of those with private insurance, our results suggest that nurses' salaries will be adversely affected. The impact could be further exacerbated by a substantial increase in participants in the Medicare program as more of the baby boomer generation reach

[18]Eligibility for Medicaid and CHIP were expanded as part of the PPACA; however, the U.S. Supreme Court allowed states to choose whether or not to expand their eligibility. As of February 2016, 31 states and the District of Columbia elected to expand Medicaid as outlined in the PPACA (NCSL, 2016).

Table 7. Enrollment Per Capita Model with Employment Growth

	(1)	(2)	(3)	(4)
Gov Enrollment Per Capita	–0.1106**			
	[0.054]			
CHIP Enrollment Per Capita		–0.0766		
		[0.064]		
Medicare Enrollment Per Capita			–0.1492***	
			[0.039]	
Medicaid Enrollment Per Capita				–0.0685*
				[0.038]
Female	–1.3992***	–0.5832	–1.0072***	–1.4633***
	[0.322]	[0.378]	[0.221]	[0.376]
White	–0.2070***	–0.2935**	–0.1749***	–0.2002***
	[0.074]	[0.146]	[0.045]	[0.077]
Bachelors	–0.0153	0.0586	–0.0279	–0.0050
	[0.036]	[0.076]	[0.031]	[0.037]
Masters/PhD	0.1834***	0.2179***	0.1517***	0.1906***
	[0.026]	[0.068]	[0.021]	[0.028]
Work in Hospital	0.0688	0.3566	–0.0153	0.0912
	[0.069]	[0.236]	[0.073]	[0.067]
Administrative Duties	0.0638***	0.2131	0.0502**	0.0562**
	[0.024]	[0.131]	[0.024]	[0.026]
Percent Union	0.0202***	0.0126	0.0200***	0.0196***
	[0.004]	[0.010]	[0.004]	[0.004]
Obese	–0.0048	–0.0439	–0.0169	–0.0040
	[0.039]	[0.085]	[0.033]	[0.042]
One-Year RN Employment Growth	–0.0016	–0.0003	–0.0014	–0.0017
	[0.001]	[0.002]	[0.001]	[0.001]
Two-Year RN Employment Growth	–0.0023	–0.0080	–0.0018	–0.0024
	[0.002]	[0.005]	[0.002]	[0.002]
Smokers	0.0488***	0.0478*	0.0373**	0.0501***
	[0.018]	[0.027]	[0.018]	[0.019]
Hospital Admissions	0.0209	–0.0273	0.0691**	0.0013
	[0.026]	[0.063]	[0.030]	[0.029]
Outpatient Visits	–0.0533***	–0.0280	–0.0521***	–0.0582***
	[0.012]	[0.034]	[0.013]	[0.012]
Emergency Room	0.0219	–0.0000	0.0069	0.0260
	[0.027]	[0.038]	[0.021]	[0.030]
Population Density	0.0129***	0.0085	0.0112***	0.0135***
	[0.004]	[0.009]	[0.003]	[0.004]
Constant	10.8517***	11.5947***	9.9273***	11.2540***
	[0.617]	[0.550]	[0.552]	[0.477]

Table continues

Table 7. (*continued*)

	(1)	(2)	(3)	(4)
Observations	371	371	371	371
R-squared	0.8841	0.5974	0.9086	0.8772

Robust standard errors in brackets; *** p < 0.01, ** p < 0.05, * p < 0.1.
All models include year indicator variables. Instruments are as follows: Model 1—percent of population living in poverty; Model 2—percent of population living in poverty and unemployment rate; Model 3—percent of population that is 65 and older; and Model 4—percent of population living in poverty and city ideology measure. Wu-Hausman tests for all models are significant for all government demand variables except Medicare, indicating the presence of endogeneity. For Medicare, results reported are from a fixed-effects regression model.

retirement. As a result, only time will allow us to determine the ultimate impact of the changes occurring in the health insurance marketplace on the salaries of nursing professionals in the U.S.

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APPENDIX

Average Government Enrollment by Program
(Average state enrollment in thousands)

Year	Medicare	CHIP	Medicaid	Total
2000	773.4711	67.49576	854.9664	1695.933
2001	781.2437	92.08638	920.4611	1793.791
2002	790.1666	107.1746	991.2225	1888.564
2003	807.5552	124.5604	1028.778	1960.893
2004	826.0488	126.5709	1103.571	2056.191
2005	816.8996	125.3976	1140.48	2082.777
2006	836.9165	137.5466	1142.941	2117.404
2007	864.1769	142.5879	1135.51	2142.275
2008	886.1966	147.196	1172.058	2205.451
2009	907.8061	153.7004	1260.055	2321.561
2010	926.66	154.2077	1315.52	2396.388
2011	952.84	159.4908	1378.86	2491.191
2012	1077.14	162.8221	1465.12	2705.082

Nursing Salary in Real Dollars and Nominal

Year	Real Dollars	Nominal Dollars
2000	$49,533	$39,626
2001	$53,374	$44,354
2002	$54,610	$45,970
2003	$55,862	$47,610
2004	$55,250	$48,465
2005	$58,312	$50,820
2006	$59,549	$52,436
2007	$60,768	$54,028
2008	$57,011	$57,011
2009	$63,267	$57,281
2010	$64,504	$58,897
2011	$65,741	$60,513
2012	$66,978	$62,129

First-Stage Regression Results—Enrollment Models

	Government Enroll	CHIP Enroll	Medicare Enroll	Medicaid Enroll
Female	–2.3922	6.1249***	0.7523	–5.4878***
	[1.548]	[2.214]	[1.560]	[1.649]
White	0.9909***	0.2018	1.1431***	0.8901***
	[0.179]	[0.304]	[0.178]	[0.192]
Bachelors	–0.3350*	0.3477	–0.3142*	–0.4080*
	[0.191]	[0.370]	[0.180]	[0.212]
Masters/PhD	0.1426	0.5606**	–0.1069	0.3035*
	[0.155]	[0.274]	[0.149]	[0.172]
Work in Hospital	2.5911***	5.9704***	2.2027***	2.7723***
	[0.406]	[0.527]	[0.396]	[0.437]
Administrative Duties	–0.4081**	1.4975***	–0.4821**	–0.5240**
	[0.193]	[0.315]	[0.198]	[0.207]
Percent Union	–0.0390*	–0.1415***	–0.0423*	–0.0374*
	[0.021]	[0.037]	[0.022]	[0.022]
Obese	1.1972***	0.1469	1.0815***	1.2907***
	[0.256]	[0.364]	[0.269]	[0.269]
Smokers	0.5142***	0.6853***	0.3813***	0.6249***
	[0.102]	[0.148]	[0.115]	[0.102]
Hospital Admissions	0.2215	–0.3969	0.5379***	0.0352
	[0.143]	[0.270]	[0.145]	[0.156]
Outpatient Visits	–0.1930***	0.1171	–0.2118***	–0.1818**
	[0.069]	[0.119]	[0.066]	[0.078]
Emergency Room	–0.3692**	–0.2109	–0.5577***	–0.209
	[0.156]	[0.212]	[0.156]	[0.182]
Population Density	0.2926***	0.2174***	0.3002***	0.3010***
	[0.028]	[0.034]	[0.028]	[0.029]
Gross State Domestic Product	0.0000***	0.0000***	0.0000***	0.0000***
	[0.000]	[0.000]	[0.000]	[0.000]
Constant	17.6799***	20.5383***	15.5865***	16.9848***
	[1.289]	[1.991]	[1.224]	[1.621]
Observations	643	643	643	643
R-squared	0.8318	0.7241	0.8122	0.8227
Robust standard errors in brackets; *** p < 0.01, ** p < 0.05, * p < 0.1.				
Prob > F	0.0000	0.0000	0.0000	0.0000

First-Stage Regression Results—Per Capita Models

	Gov Enrollment Per Capita	CHIP Enrollment Per Capita	Medicare Enrollment Per Capita	Medicaid Enrollment Per Capita
Female	–1.6063***	5.0540**	–0.2723	–3.8373***
	[0.422]	[2.128]	[0.193]	[0.751]
White	–0.1684***	–1.1842***	–0.1161***	–0.2469***
	[0.047]	[0.313]	[0.041]	[0.078]
Bachelors	–0.2434***	0.3725	–0.2454***	–0.2781***
	[0.045]	[0.300]	[0.070]	[0.080]
Masters/PhD	0.0999***	0.5910**	–0.0994**	0.2739***
	[0.037]	[0.237]	[0.040]	[0.072]
Work in Hospital	–0.4613***	3.1226***	–0.4385***	–0.3929**
	[0.095]	[0.440]	[0.100]	[0.185]
Administrative Duties	–0.0610	2.0303***	–0.1102***	–0.1742**
	[0.041]	[0.299]	[0.030]	[0.082]
Percent Union	0.0370***	–0.0521	–0.0006	0.0516***
	[0.006]	[0.036]	[0.004]	[0.010]
Obese	0.0444	–0.8307**	–0.1632***	0.1376
	[0.054]	[0.323]	[0.036]	[0.110]
Smokers	0.0927***	0.1549	0.0114	0.1335**
	[0.027]	[0.118]	[0.041]	[0.058]
Hospital Admissions	0.0580	–0.4007*	0.2751**	–0.1715**
	[0.044]	[0.242]	[0.126]	[0.083]
Outpatient Visits	0.1191***	0.4375***	0.0857***	0.1376***
	[0.018]	[0.114]	[0.017]	[0.033]
Emergency Room	0.0438	0.0177	–0.0462**	0.1484
	[0.042]	[0.181]	[0.023]	[0.102]
Population Density	0.0327***	–0.0090	0.0068*	0.0507***
	[0.005]	[0.026]	[0.004]	[0.009]
Percent in Poverty	0.0388***	0.0219*		0.0564***
	[0.002]	[0.013]		[0.005]
Unemployment Rate	–0.0202***			–0.0228***
	[0.005]			[0.008]
Death Rate			0.4787*	
			[0.246]	
Constant	–10.3371***	–6.5024***	–12.8810***	–10.7740***
	[0.393]	[1.711]	[0.394]	[0.935]
Observations	643	643	643	643
R-squared	0.6980	0.2863	0.8250	0.5566
Robust standard errors in brackets; *** p < 0.01, ** p < 0.05, * p < 0.1.				
Prob > F	0.0000	0.0000	0.0000	0.0000

First-Stage Regression Results—Percentage Models

	Percent Government	Percent CHIP	Percent Medicare	Percent Medicaid
Female	–1.8932***	4.7416**	–0.0126	–4.1325***
	[0.353]	[2.134]	[0.252]	[0.676]
White	–0.1515***	–1.1929***	0.1064***	–0.1656**
	[0.038]	[0.345]	[0.033]	[0.078]
Bachelors	–0.1964***	0.4212	–0.1183***	–0.2539***
	[0.034]	[0.301]	[0.035]	[0.070]
Masters/PhD	0.0779***	0.5616**	–0.0935***	0.2233***
	[0.030]	[0.236]	[0.028]	[0.066]
Work in Hospital	–0.4600***	3.0957***	–0.1538**	–0.2654
	[0.073]	[0.442]	[0.075]	[0.165]
Administrative Duties	0.0069	2.1001***	0.0019	–0.0754
	[0.033]	[0.303]	[0.033]	[0.073]
Percent Union	0.0220***	–0.0709*	–0.0089**	0.0178*
	[0.004]	[0.040]	[0.004]	[0.009]
Obese	–0.0554	–0.9390***	–0.0411	0.1107
	[0.045]	[0.321]	[0.046]	[0.103]
Smokers	0.0838***	0.1377	0.0755***	0.1276**
	[0.022]	[0.119]	[0.020]	[0.055]
Hospital Admissions	0.031	–0.4106*	0.1550***	–0.2183***
	[0.034]	[0.235]	[0.048]	[0.067]
Outpatient Visits	0.0867***	0.4135***	0.0048	0.0664**
	[0.015]	[0.124]	[0.014]	[0.034]
Emergency Room	0.0232	–0.0055	0.0157	0.1022
	[0.033]	[0.178]	[0.030]	[0.093]
Population Density	0.0268***	–0.0169	0.0080*	0.0329***
	[0.004]	[0.027]	[0.004]	[0.009]
Unemployment Rate		0.0276		
		[0.024]		
Percent in Poverty	0.0383***	0.0199		0.0544***
	[0.002]	[0.014]		[0.004]
Population 65 and Older			4.4088***	
			[0.571]	
City Ideology				0.0034***
				[0.001]
Constant	–3.1424***	0.4961	–3.9052***	–3.0015***
	[0.302]	[1.712]	[0.401]	[0.910]
Observations	643	643	593	643
R-squared	0.7769	0.2925	0.8082	0.6206
Robust standard errors in brackets; *** p < 0.01, ** p < 0.05, * p < 0.1.				
Prob > F	0.0000	0.0000	0.0000	0.0000