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DETERMINANTS OF HEALTH CARE EXPENDITURE IN THE UNITED STATES: AN ARDL APPROACH FOCUSING ON INSURANCE COVERAGE

The rapid increase in health expenditure has become a major concern for both households and governments in the United States. This paper investigates the long-run dynamics of health care expenditure in the United States over the period 1991-2014 using the National Health Expenditure Data from the Centers for Medicare & Medicaid Services. We use an Auto Regressive Distributed Lag (ARDL) technique to estimate the long-run dynamics and short-run adjustment of health care expenditure to changes in government insurance enrollment, controlling for income, health, uninsured, and trend to account for technological changes. The results indicate that the instance and type of insurance affect per capita expenditure; in particular, increases in Medicaid enrollment lead to higher per capita expenditure levels relative to other insurance groups and uninsured, while increases in Medicare enrollment lead to lower per capita expenditure levels.

Keywords: *Health care expenditure, health insurance, Auto Regressive Distributed Lag*

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1. INTRODUCTION

With developments in medical science and health technology, better nutrition, increased health care access, and public infrastructure, average life expectancy has increased in both developed and developing countries. These developments may have affected economic growth and its steady-state rate with the influence on human capital accumulation. One of the most important determinants of human capital is health. While no one discounts the impact of good health and access to good health care on individual and national well-being, there is concern over the rising cost of health care in the United States and implications for access and public funding of health care services.

Health care spending in the United States currently accounts for approximately 17.7% of GDP, totaling $3.6 trillion, equivalent to $11,172 per person. Included in this figure are health care goods and services, public health activities, government administration, the net cost of health insurance, and investments related to health care. According to the CMS Office of the Actuary, health care spending is expected to increase at an annual rate of 5.5% over the next decade, reaching 19.4% of GDP, or just under $6 trillion. This growth is expected to outpace growth in GDP by .8 percentage points over the same period (Sisko et al., 2019).

While health care in the U.S. is relatively expensive by international standards, it is the growth in health care expenditure that is troubling. Between 1960 and 2013 nominal health care expenditure rose from $147 per person to $9,255, an average annual increase of 8.1%. In real terms, annual spending growth averaged 5.5% while real GDP growth averaged 3.1%. Over this period (1960-2013) health care expenditure rose from 5% of GDP to 17.4% of GDP and is currently projected to reach 19.4% by 2026 (Catlin and Cowan, 2015).

From an international perspective, the U.S. spends substantially more on health care than other nations of similar means. Compared to the U.S., Switzerland is the closest in spending with health expenditures comprising roughly 12% of GDP, with the average of comparably wealthy nations spending approximately 11% of GDP in 2017. The wide gap between the U.S. and other nations is attributable to the rapid growth of health expenditure in the U.S. in the 1980s, averaging nearly 3 percentage points higher than other comparable nations. That growth has since moderated but has resulted in a substantial burden on both the public and private sectors. While our public sector burden is comparable to other countries, roughly 8.5% of GDP, private spending is almost triple that of other comparable nations at roughly 8.8% of GDP (Catlin and Cowan, 2015).

This study focuses on the long-run factors affecting the growth in health care expenditures for the U.S. over the period 1991-2014. We extend the research on the

determinants of health care expenditures by looking at both the long-run dynamics and short-run adjustments using the Auto Regressive Distributed Lag (ARDL) approach as it relates to insurance coverage. In addition to income, health status, and innovation, health expenditures will be influenced by insurance coverage through moral hazard and adverse selection. This study focuses on the long-run dynamics of health care expenditures as it relates to insurance coverage through Medicaid and Medicare, controlling for income, health status, uninsured, and innovation. The next section reviews the progression of estimation techniques as they related to health expenditures. Section 3 presents the model and empirical results. Section 4 concludes with a summary and implications of results.

2. LITERATURE

Among the initial studies dealing with the relationship between health expenditures and income are the seminal works of Newhouse (1977) and Kleiman (1974). Given the limited data, Newhouse estimates the relationship between per capita health care expenditure and GDP for 13 developed countries and concludes that the elasticity of medical care with respect to income exceeds unity.

While income is certainly a major factor in the escalation of the size of the health care sector, Fuchs (1996) considers the sources and opinions regarding the current state of health economics and the difficulty in making informed policy decisions regarding health care reform. In addition to income, experts agree that factors such as technology, insurance, and moral hazard play a significant role in the rise of health care expenditures. Much less consensus arises over policy questions on reform, most likely due to differences in values rather than differences in positive economics. While regression analysis may bring clarity to factors that affect the growth in health care expenditure, policy decisions have implications on efficiency, equity, freedom, and security. While there will never be unanimous agreement on the direction of health care reform, hopefully, the information contained in the vast literature on the determinants of health care expenditure will allow policymakers to make informed decisions.

The literature on the determinants of health care expenditure has progressed with the increase in data availability and the increase in econometric techniques. Initial studies rely on cross-sectional modeling, often with relatively small and often very heterogeneous samples. As data became more available, panel models were used to study the factors allowing both a cross-sectional and time-series approach.

Panel studies using U.S. state-level data tend toward much lower estimates of income elasticity. Di Matteo (2005) uses state-level data for the U.S. from the

Centers for Medicare & Medicaid Services (CMS) and province-level data from Canada to determine the impact of income, age, and time on real per capita health care expenditures. Using regression analysis on a linear specification with a heteroscedasticity-consistent matrix, they attribute the most important driver of increasing health care expenditures to the time variable, which accounts for technological innovation as well as policy shifts and other omitted variable effects. The various model specifications resulted in positive income effects in the inelastic range, between 0.73 and 0.50 for the U.S. and between 0.15 and 0.01 for Canada.

Herring and Trish (2015) estimate a state-level autoregressive model with state fixed effects to examine the relationship between income, insurance coverage, and provider market characteristics using CMS data from 1991-2009. Of direct relation to the current study are the results regarding insurance coverage. With marginal significance they find evidence that insurance coverage increases expenditures relative to the uninsured. The strongest finding is related to Medicaid, with Medicare only marginally significant and private insurance insignificant. Income plays a dominant role in changes in health care expenditures, with an estimated elasticity of between .51 and .61, categorizing health care as a normal good.

Using the standard set of variables from previous cross-sectional and time-series models Hansen and King (1996) consider the stationarity of the data and the implications of spurious correlation using ordinary least squares (OLS). Based on a sample of 20 OECD countries from 1960-1987, two-thirds of the variables tested were found to be non-stationary, and for 17 of the 20 countries no evidence of cointegration was found. Given the non-stationarity of the data and the lack of cointegration among the variables, conclusions based on levels using OLS may suffer from spurious correlations and may be unreliable. In addition to questions of functional form, supply-side influences, and variable limitations, long-run studies need to explicitly address the underlying stability of the data.

The variety of panel unit root and cointegration tests have led to a disagreement on the properties of the variables, with Blomqvist and Carter (1997) finding the variables cointegrated, Roberts (2000) finding no conclusive evidence of cointegration, and McCoskey and Selden (1998) rejecting the null hypothesis of unit-roots. Using new country-by-country and panel tests, Gerdtham and Lothgren (2000) reaffirm for a sample of 21 OECD countries that health expenditures and GDP are non-stationary and cointegrated. Further evidence by Gerdtham and Lothgren (2002), using a cointegration panel rank test for heterogeneous panel models proposed by Larsson et al. (2001), supports the hypothesis that in the OECD health expenditure and GDP are cointegrated around linear trends.

Specifically addressing the question of stationarity and cointegration in health care expenditure, Freeman (2003) uses dynamic ordinary least squares (DOLS) to

estimate the income elasticity based on the pooled time series of US states over 1966-1998. Panel unit root tests confirm that health care expenditures and income are non-stationary and cointegrated, and that standard OLS estimates are biased. The DOLS includes leads and lags of the first differences of the independent variables and the lags of the estimated OLS residuals from the initial pooled regression of health care expenditures to control for endogeneity bias and serial correlation. Using DOLS for heterogeneous panels with fixed time effects they estimate an income elasticity of 0.844, a necessity, with technology and treatment likely causing the additional increase in health care expenditures over time.

Baltagi and Moscone (2010) study the long-run relationship between health care expenditure and income in 20 OECD countries over the period 1971-2004. To avoid the possibility of spurious correlation in their estimate of income elasticity, they test for spatial dependence and stationarity and conclude that the variables under study are non-stationary and cross-sectionally dependent. Their estimates of income elasticity using the Common Correlated Effects (CCE) method are significantly less than one. As a comparison, a fixed effects specification including only income results in an elasticity less than one when no time dummy is included, and greater than one with the addition of a time dummy.

Moscone and Tosetti (2010) focus on the long-run relationship between health care expenditures and income applied to the contiguous United States for the period 1980-2004. Applying econometric techniques for panel data that control for cross-sectional dependence and unobserved heterogeneity, they confirm that health care expenditures and income are non-stationary and co-integrated. Accounting for cross-sectional dependencies, the estimated income elasticity using the CCE Mean Groups is 0.45, and using the CCE Pooled estimator is 0.36. As a comparison, applying the fixed effects (FE) estimation to the data without controlling for cross-sectional dependence yields a significantly higher estimate (0.90). Their study supports the hypothesis that health care is a necessity, with the link between income and spending weakened by the existence of publicly funded health care programs.

Okunade and Murthy (2002) use cointegration methods to determine the long-run equilibrium relationship between health care expenditures, income, and technology. Using aggregate U.S. data over the period 1960-1997 they confirm that aggregate income on the demand side and R&D expenditures on the supply side are significant long-run drivers of the increase in health care expenditures over this period. The estimated income elasticity is significantly greater than one, categorizing health care as a luxury good.

In addition to tests for unit roots and cointegration, Wang and Rettenmaier (2007) test whether the underlying data experience structural breaks. Using U.S.

state-level panel data, they identify one major structural break in health care expenditures corresponding to the 1990-91 recession for most of the states, with the break occurring somewhere in the 1988-91 period. Although not as uniform, gross state product exhibits a structural break in most states that do align closely to the structural breaks in health care expenditures. The state-by-state test for cointegration, allowing for structural breaks, provides only weak evidence of cointegration, although the panel test does support cointegration. Using OLS they estimate the long-run relationship between health care expenditure and income for each state given the identified structural break. While the estimated income elasticity does fall after the structural break, in 32 of the states the elasticity is still greater than one.

In addition to structural breaks that affect the level of the series, Carrion-i-Silvestre (2005) tests for structural breaks in the OECD data that affect both the level and slope of the time series. Accounting for cross-sectional dependence, the OECD health expenditure, and GDP data can be characterized as stationary evolving around a broken trend.

The previous research demonstrates the influence of data and methodology on estimates of factors affecting health care expenditures. The level of aggregation, the instance of insurance coverage, and the presence of spurious correlation all influence the estimators. This study extends the research on the determinants of health care expenditures by looking at both the long-run dynamics and short-run adjustments using the Auto Regressive Distributed Lag (ARDL) approach as it relates to insurance coverage. In addition to income, health status, and innovation, health expenditures will be influenced by insurance coverage through moral hazard and adverse selection. The instance of adverse selection refers to the sorting of individuals into insurance options that provide the most net benefit, with healthier individuals opting for lower coverage (and lower premiums) and those with health issues benefiting from more comprehensive coverage. The behavioral change that occurs when individuals have comprehensive coverage (low deductibles and co-pays) is known as a moral hazard, causing an increase in usage and expenditures with little regard to income. The focus of this study is on the long-run dynamics of health care expenditures as it relates to insurance coverage grouped by Medicaid and Medicare, controlling for income, health status, uninsured, and innovation.

3. MODEL AND DATA

3.1. Model

The model used in this study focuses on the availability of government insurance coverage, with control variables representing income, health status, uninsured, and a time trend representing technological innovation. The specification corresponds to:

Health Expenditure = f(Medicaid, Medicare, Income, Health Status, Uninsured, Innovation).

(Note: Health Expenditure and Income are specified in natural logs in the model, with the descriptive statistics presented in level form for better interpretation.)

Health Expenditure (HealthExp) is defined as real per capita health expenditure, discounted by the Personal Consumption Expenditures (PCE) Index. The PCE Index is the primary inflation index for household expenditures, comparable to the Consumer Price Index (CPI). Medicaid is defined as the percent of the population covered by Medicaid. Medicare is defined as the percent of the population covered by Medicare. Income is measured as real per capita disposable income (PCI), discounted by the PCE Index. Health Status (Health=Obesity Rates x Percent Current Smokers) is defined as the obesity rate of adults multiplied by the percent of current smokers. A higher number corresponds to a higher intersection of residents who are both overweight and smoke, an indicator of poor health. The time trend is included to account for technological innovations which improve the quality of health care delivery but may also increase health care expenditures over time.

3.2. Data

The model is estimated using panel data covering the years 1991 to 2014 for the 50 states of America and the District of Columbia.

Table 1.

DATA SOURCES

HealthExp	Center for Medicare and Medicaid Services
Medicaid	U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplements
Medicare	U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplements
PCI	Bureau of Economic Analysis
Obesity Rates of Adults[1]	National Health and Nutrition Examination Survey (NHANES) at Center for Disease Control (CDC)
Percent Current Smokers[2]	Tobacco Use Supplement to the Current Population Survey conducted every 3-4 years
Uninsured	U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplements

Table 2 denotes the descriptive statistics.

Table 2.

SUMMARY STATISTICS

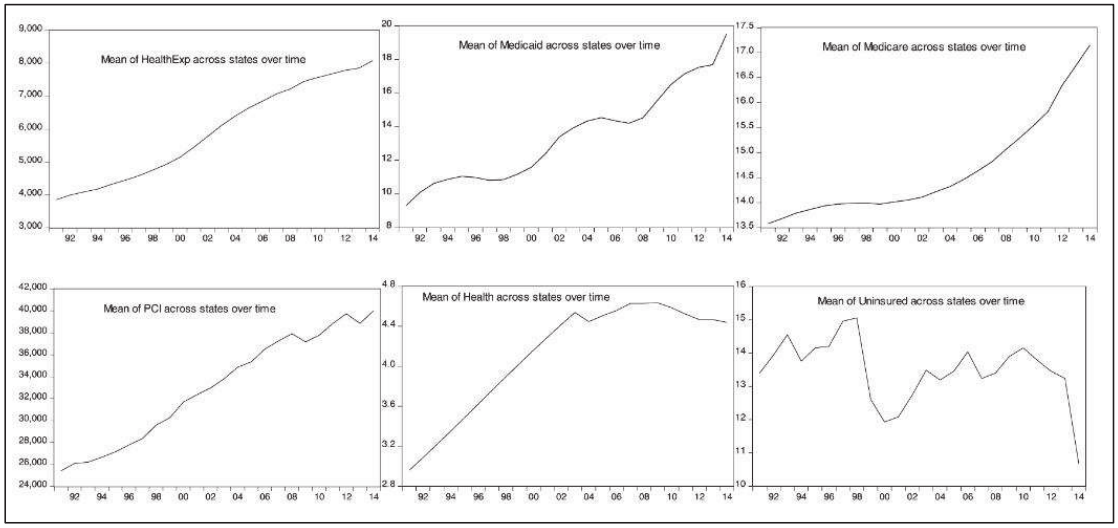
Variable	Obs	Mean	Median	Min	Max	Std.Dev.
HealthExp ($)	51	8,080	7,862	5,801	11,582	1,219
Medicaid	51	19.52	19.31	10.06	36.72	6.03
Medicare	51	17.15	17.23	10.85	22.46	2.33
PCI ($)	51	40,024	39,673	30,815	58,942	6,160
Health	51	4.44	4.36	1.83	7.17	1.23
Uninsured	51	10.68	10.20	3.30	19.10	3.48

[1] Missing values between 1990 and 2003 were estimated based on a quadratic time series forecast

[2] Missing values were estimated based on a geometric time series forecast

Figure 1:

GRAPHS OF VARIABLE MEANS ACROSS STATES OVER TIME, 1991-2014.



The summary statistics presented in Table (2) and corresponding graphs in Figure (1) of the mean values across states and over time illustrate the upward trend in all variables except the percent of the population without insurance. Utah spends the least on health care per capita, going from $2,932 to $5,801 over the period. District of Columbia spends by far the most on health care, ranging from $6,904 to $11,582 over the period. District of Columbia also has the highest per capita real income, ranging from $35,500 in 1991 to $58,900 in 2014. The increase in Medicare coverage reflects the aging population, with the highest rates in West Virginia and the lowest rates in Alaska. Changes driven by the Children's Health Insurance Program (CHIP) in 1997 led states to simplify enrollment processes and spurred enrollment and outreach efforts reducing the uninsured rate and moving adults and children to Medicaid coverage. The Affordable Care Act (ACA) also had a significant impact on Medicaid enrollment, as of 2012 allowing states to expand coverage to low-income adults, modernizing and simplifying the enrollment process, and increasing outreach and enrollment efforts. Changes in the uninsured rate reflect these changes in Medicaid coverage, while also being impacted by recessionary factors in the business cycle. Although there has been a significant decrease in the rates of smoking, this is countered by a significant increase in obesity rates over the period.

3.3. Estimation Method

The model is estimated using the Autoregressive Distributed Lag (ARDL) approach using the Akaike Information Criteria allowing a maximum of two lags for each variable. The ARDL approach can determine the existence of a long-run equilibrium relationship (cointegration) in instances where the variables are integrated of order I(1) and I(0). The ARDL approach avoids the problem of spurious correlation when variables are nonstationary, as arises in OLS when estimating the long-run relationship between variables in level form. The endogeneity problem does not arise in ARDL modeling when estimating the short-run and long-run coefficients simultaneously and with both lagged dependent and explanatory variables.

Equation (1) represents the long-run relationship (cointegration) between the variables of interest.

$$HealthExp_t = \beta_0 + \beta_1 Medicaid_t + \beta_2 Medicare_t + x'_t \gamma + \delta t + \varepsilon_t \tag{1}$$

where $x'_t = \left(PCI_t, Health_t, Uninsured_t\right)'$ is a vector of control variables and t is a time trend.

In order to estimate equation (1) by OLS, the ARDL bounds approach is applied to the short-run conditional error correction model specified in Equation (2) below:

$$\begin{aligned}\Delta HealthExp_t = \alpha_0 + \sum_{i=0}^{n1} \alpha_1 \Delta Medicaid_{t-i} + \sum_{i=0}^{n2} \alpha_2 \Delta Medicare_{t-i} + \delta_1 Medicaid_{t-1} \\ + \delta_2 Medicare_{t-1} + x'_t \gamma + \delta t + \mu_t\end{aligned} \tag{2}$$

Equation (2) is used to test whether there is a long-run cointegrating relationship among HealthExp, Medicaid, and Medicare using the F-Bounds test developed by Pesaran et al. (2001) and modified by Narayan (2006) for small samples. The null hypothesis of "no cointegration" corresponds to H_0: $\delta_1 = \delta_2 = 0$. If the null hypothesis is rejected the following unrestricted error correction model (ECM) is estimated. Equation (3) represents the underlying short-run dynamics leading to the long-run equilibrium defined in equation (1).

$$\begin{aligned}\Delta HealthExp_t = \alpha_0 + \sum_{i=0}^{n1} \alpha_1 \Delta Medicaid_{t-i} + \sum_{i=0}^{n2} \alpha_2 \Delta Medicare_{t-i} + x'_t \gamma + \delta t \\ + \lambda ECT_{t-1} + \omega_t\end{aligned} \tag{3}$$

In equation (3), λ represents the speed of adjustment parameter and ECT (Error Correction Term) is the vector of residuals from equation (2). Note that

a negative and significant coefficient estimate of λ also is a confirmation of the cointegration in equation (1). The ARDL model is estimated based on the Akaike Information Criterion (AIC), setting a maximum of two lags for each variable.

3.4. Empirical Results

To be certain the variables of interest are integrated of order I(1) or I(0), as is required in the ARDL models, unit root tests were performed on ln(HealthExp), Medicaid, and Medicare with the results presented in Table (3).

Table 3.

PANEL UNIT ROOT TESTS

	Levin, Lin & Chu t-stat	**Breitung t-stat**	**Im, Pesaran and Shin W-stat**	**ADF – Fisher Chi-square**	**PP – Fisher Chi-square**
ln(HealthExp)	4.36 (1,00)	1.85 (0,97)	5.10 (1,00)	71.20 (0,99)	10.40 (1,00)
D(lnHealthExp)	-9.01 (0.00)	-6.02 (0.00)	-7.25 (0.00)	210.91 (0.00)	218.45 (0.00)
Medicaid	0.83 (0.80)	6.43 (1,00)	0.15 (0,56)	172.54 (0.00)	53.67 (1,00)
D(Medicaid)	-0.84 (0.20)	4.09 (1,00)	-8.22 (0.00)	243.27 (0.00)	222.74 (0.00)
Medicare	22.55 (1,00)	27.32 (1,00)	31.82 (1,00)	16.81 (1,00)	1.48 (1,00)
D(Medicare)	-9.35 (0.00)	5.24 (1,00)	-4.78 (0.00)	172.53 (0.00)	187.16 (0.00)

Note: The first values give the probability values, and the values in the parentheses give the t-statistics in the table.

The tests confirm that ln(HealthExp), Medicaid, and Medicare are integrated I(1). The Pedroni Residual Cointegration Test results in Table (4) are supportive of cointegration, with 6 of the 11 tests rejecting the null hypothesis of "no cointegration."

Table 4.

PEDRONI COINTEGRATION TEST

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	1.018	0.154	1.065	0.143
Panel rho-Statistic	3.105	0.999	2.827	0.998
Panel PP-Statistic	-2.869	0.002	-4.013	0.000
Panel ADF-Statistic	-3.670	0.000	-4.340	0.000
Group rho-Statistic	5.195	1.000		
Group PP-Statistic	-5.153	0.000		
Group ADF-Statistic	-5.424	0.000		

The long run regression results of the Pooled Mean Group ARDL estimation are presented in Table (5) below. The model assumes a linear trend with the lag structure determined by the AIC with a maximum of two lags given the relatively short time frame of the panel. The results using the Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) are also presented in Table (5) for comparison purposes,.

Table 5.

ARDL, FMOLS, DOLS LONG RUN REGRESSION RESULTS

Variable	ARDL (Long Run Equation)	FMOLS (With Linear Trend)	DOLS (With Linear Trend)
Medicaid	0,015* (0,001)	0,006* (0,001)	0,005* (0,002)
Medicare	-0,063* (0,006)	-0,063* (0,007)	-0,100* (0,007)

Note: *Significant at 1%, **Significant at 5%, ***Significant at 10%. The first values give the coefficients, and the values in parentheses give the standard error values in the table.

Of interest and unique to this study is the impact of government insurance on health care expenditures in an ARDL framework. The model focuses on the long-

run impact of Medicaid and Medicare coverage, controlling for income, health status, uninsured, and technology. Relative to private or no insurance, increases in Medicaid coverage of 1% tend to increase health care expenditures by 1.5% in the long-run. For Medicare coverage, an increase of 1% has a long-term negative impact on health care expenditures of 6.3%. The negative impact of Medicare coverage was unexpected but consistent with Herring and Trish (2015) who find that Medicare only marginally impacts spending compared to the uninsured. Medicare implemented the Prospective Payment System (PPS) in 1983 specifically to address expensive hospital care. By setting an established fee, it encourages hospitals to lower their prices for hospital care. In 2000, a PPS was also initiated for outpatient care, again with the goal of reducing costs. The Affordable Care Act (ACA) may also play a role by providing tools to reduce fraud, waste, and abuse of the program. The ACA promotes primary care and preventive care, pay-for-performance programs, and sets target growth rates for Medicare. While the sample includes only four years since the passage of the ACA, perhaps some of these initiatives are showing a positive impact by lowering costs.

The results using the Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) are also presented in Table (5). The FMOLS is a non-parametric approach and DOLS is a parametric approach that introduces leads and lags of the first difference regressors to deal with problems of endogeneity bias. The results are fairly consistent across the three models. All three models estimate a positive and significant impact of the percent of Medicaid enrollment on per capita health care expenditures. Similarly, all three models estimate a negative and significant impact of the percent of Medicare enrollment on per capita health care expenditures.

The short run regression results of the Pooled Mean Group ARDL estimation are presented in Table (6) below. The model assumes a linear trend with the lag structure determined by the AIC with a maximum of two lags.

Table 6.

ARDL SHORT RUN REGRESSION RESULTS

Variable	Coefficient	Prob.
C	-0,009*	0,001
D(Medicaid)	0,001	0,001
D(Medicaid(-1))	-0,002**	0,001
D(Medicare)	0,030*	0,008
D(Medicare(-1))	0,029*	0,008
PCI	0,125*	0,039
Health	0,040*	0,005
Uninsured	-0,0008***	0,0004
Trend	0,009*	0,001
ECT	-0,396*	0,033

Note: *Significant at 1%, **Significant at 5%, ***Significant at 10%

Of particular interest in the short-run results is the coefficient on the error correction term (ECT). The coefficient on ECT in the short-run equation is negative and significant, confirming the existence of a long-run relationship between the variables. The estimated adjustment to shocks from this disequilibria is roughly 40% per period, with a speed of adjustment of roughly 2.5 years. The negative signs for two of the variables in the short-run model (lagged Medicaid changes and uninsured) indicate a potentially dampening effect on the errors in the short-run. The remaining variables (current and lagged changes in Medicare, income, health status, and technology) have a positive impact on the errors rather than a dampening effect, although the size of most of the coefficients is relatively small.

The results have implications about the incentive structures that may be embedded in the various types of insurance coverage, but should also recognize that individuals in each group may have significantly different characteristics. Cuckler et al. (2011) describe the variation in the Medicaid enrollee population and per-enrollee spending at the state level based on the share of aged, blind, and disabled enrollees. Similarly for variations in Medicare enrolees and per enrolee expenditures across the states; a small number of states contain a high concentration of elderly residents in the population of Medicare enrollees and have corresponding higher costs of Medicare spending per enrollee. Individuals will sort into states that are most advantageous to their circumstances and finances, and enrollees in insurance plans may vary substantially within and across states. In addition to adverse selection that occurs in insurance markets, the incentives to use and supply

health care are impacted by copays, deductibles, and reimbursement rates defined as the moral hazard of insurance markets. If insurance is causing health care expenditures to increase, then care should be taken to design an insurance plan that promotes necessary and preventive care and not one that leads to emergency care and/or excessive tests based on the type of coverage. Particularly when considering the effect of Medicaid on health care expenditure, the impact is likely a mix of policy, economic, and demographic factors that make the analysis very complex.

4. CONCLUSION

The objective of this study is to use a dynamic modeling approach to understand the long-run trends in health care expenditure in the United States. Of particular interest is the impact of insurance coverage on expenditures, focusing on the broad categories of Medicaid and Medicare. Included as control variables are income, health status, uninsured, and a time trend to account for technological innovation. The model is estimated using ARDL, with results from DOLS and FMOLS included for comparison purposes.

The results indicate the type and instance of insurance coverage have a significant impact on health care expenditure. An increase in Medicaid coverage tends to increase expenditures in the long run while an increase in Medicare coverage tends to decrease expenditures. While the results imply that Medicaid is the most expensive type of coverage, there is still much to be learned about why and how insurance coverage is impacting costs.

Given the expansion of Medicaid eligibility under the ACA, the higher cost of Medicaid is of major concern. Medicaid patients are more likely to suffer from chronic conditions, being the costliest to treat and manage. Fee-for-service reimbursement currently drives Medicaid spending, based on rates that are significantly lower than Medicare reimbursement rates for similar services. While this is intended to lower costs, it has the unintended consequence of denying access of Medicaid recipients to primary care doctors. Lack of access to primary and preventive care leads to higher emergency room usage, higher child mortality rates, and a lack of improvement in health outcomes of Medicaid patients.

The changing demographics of the U.S. population highlight the importance of Medicare in the health care delivery system. The number of Americans ages 65 and older is 12.4% as of 2020, projected to reach 20.4% by 2040 and 23.4% by 2060 (U.S. Census Bureau, 2020). Medicare does use a prospective payment system to limit costs, but under ACA is looking at additional measures to limit

growth. The ACA provides tools for reducing fraud, waste, and abuse. The ACA promotes primary and preventive care, pay-for-performance rather than pay-for-service reimbursement, and sets target growth rates. Given the financing structure of Medicare and the changing demographics, these policy changes are necessary to keep the program financially viable.

In looking at expanding the role of government insurance programs in the U.S. these estimates may help estimate the cost of moving individuals from uninsured into Medicaid, the aging population placing greater reliance on Medicare, and with subsidies moving uninsured into private coverage. Cost estimates are one element of the political decision, but cannot answer the deeper questions of reform related to equity, security, and freedom. The U.S. health care system offers the highest quality of care to those who can afford it. Making quality health care available to all is a difficult task that requires a comprehensive analysis of program design, incentive structure, and cost containment.

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DETERMINANTE IZDATAKA ZA ZDRAVSTVENU NJEGU U SAD-U: ARDL PRISTUP KOJI SE USREDOTOČUJE NA VRSTU OSIGURANJA

Sažetak

Rapidni rast izdataka u zdravstvu postao je glavna briga i za kućanstvo i za vlade u SAD-u. Ovaj rad istražuje dugoročnu dinamiku izdataka za zdravstvenu skrb u SAD-u razdoblju od 1991. do 2014. koristeći podatke o nacionalnim zdravstvenim rashodima iz Centra za medicinsku zaštitu (Medicare) i usluge medicinske pomoći (Medicaid). Koristi se ARDL tehnika za procjenu dugoročne dinamike i kratkoročne prilagodbe izdataka za zdravstvenu njegu u sklopu vladinih promjena u upisima unutar državnog osiguranja zatim kroz kontrolu prihoda, zdravlja, neosiguranih osoba te kroz trendove kako bi se u obzir uzele i tehnološke promjene. Rezultati ukazuju da slučaj i vrsta osiguranja utječu na izdatke po glavi stanovnika: izričito se ističe povećanje upisa unutar centra Medicaid čiji rast upisanih dovodi do viših razina rashoda po glavi stanovnika u odnosu na neosigurane i drugih grupa osiguranih pojedinaca dok s druge strane povećanje upisa unutar Medicare centra dovodi do nižih razina izdataka po glavi stanovnika.

Ključne riječi: izdaci za zdravstvenu zaštitu, zdravstveno osiguranje, autoregresijski model s distribuiranim pomacima (ARDL)