Monopsony Market Structures and Primary Cost Drivers Within OECD Health Care Systems

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A B S T R A C T

This paper examines relationships between primary metrics of health care and national healthcare cost growth per capita, on the basis of: quality, access, patient behavior, effectiveness of care, and the negotiated price of pharmaceuticals—to determine which factors have the greatest influence healthcare cost growth in order to find policy recommendations for established (OECD) nation. While many studies have been done pertaining to health cost growth by country, this paper specifically looks at pharmaceutical spending per capita, per year, over time across countries of similar economic development standards as a key indicator of inequitable cost growth between nations. The result of this paper's analysis is that the United States is an outlier in regards to healthcare cost growth due to the country having an economic incentive to protect its dominant domestic biopharmaceutical industry—through its unique limitations on the price bargaining powers of private domestic insurers, and added legal limitations on government market intervention and public competition in the healthcare sector. This paper finds that the implications of foreign governments instituting price controls or bargaining as a monopsony to drive down prices within their borders, coupled with a lack of similar consumer protections in the United States, has led to U.S. consumers absorbing a majority "fixed" of health sector development costs through higher prices on consumers. The conclusive policy implications are a recommendation of easement on price bargaining restrictions for private insurers (and an ability to collude and bargain as a single entity monopsony), high export tariffs on pharmaceuticals, and aggressive tax (and other funding) incentives into the domestic pharmaceutical industry to offset tariff externalities—in order for the United States to protect its domestic industry, insulate its private citizens from healthcare prices artificially above true world market equilibrium, and force foreign governments to absorb growing healthcare prices.

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I N T R O D U C T I O N

In the United States, healthcare costs as a percent of GDP and per capita spending have been rising at what many consider to be an alarming rate. From 1960 to 2016 alone, healthcare costs have risen from 5% of total GDP to 17%, respectively (OECD Health Statistics, 2016). Further, healthcare access, quality, and spending remains at the forefront of modern U.S. political discourse. In 2010, the U.S. Congress passed and the President signed into law the *Patient Protection and Affordable Care Act* (PPACA, or ACA)—a major overhaul to healthcare regulations in an effort to expand access to care for all citizens, as well as control the increasing rate of cost growth. Through federal spending subsidies for individuals, and government insurance program expansion to insure private-sector excluded, unprofitable, adversely selected portions of the population (Medicaid, for the poor—and Medicare, for the elderly or disabled). However, while coverage was expanded and the uninsured rate plummeted, monthly insurance premiums for popular private market plans are expected to rise 25% on average in 2017 (Marte), and further, marketplace prices for insurance plans are expected to increase faster in 2017 than in previous years due to the substantial losses experienced by private insurers when absorbing new costs from increased adverse selection (Cox et al., 2016).

Despite the health sector growth in the United States, and rising costs and prices for consumers domestically—internationally, countries have been comparatively insulated from this trend. Figures 1 and 2 illustrate the story of two systems, and high disparity in yearly growth between the United States—with its unique private healthcare system, and the other OECD member states. While the OECD average (without the United States) has an average growth rate of $72 per-capita-per-year (2010 USD, PPP) from 1970 to 2015—the United States has featured

an average yearly cost growth of over $171.3 each year within that same period (OECD Health Statistics, 2016)[1].

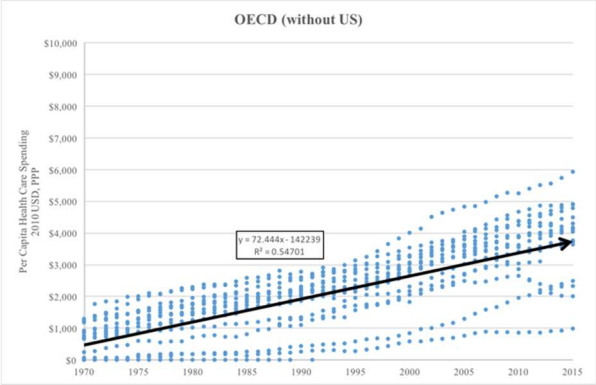

Figure 1: Regression of OECD healthcare spending growth (per capita) over 1970 to 2015.

Figure 2: The United States' healthcare spending growth over that same period.

Further, the United States has experienced little, if any, empirical return on the increased health sector spending and investment. When evaluating the most recent Life Expectancy at Birth (total, both sexes, 2014) as a metric within the evaluated OECD member states with most recent data[5], the United States falls only within the 38.8th percentile with an expectancy at birth of 78.8 years of age (OECD Health Statistics, 2016). When compared to 10 other OECD member states[2] with similar HDI, the United States' composite rank is last within all metrics (Figure 3) of Quality of Care, Efficiency, Equity, and Healthy Lives (Davis, Stremikis, Squires, & Schoen, 2014).

[1] OECD Member States United Kingdom, Switzerland, Sweden, Australia, Germany, Netherlands, New Zealand, Norway were used in the Commonwealth Fund comparison.

[2] Quality was weighted on Effectiveness, Safety, Coordination, and Patient-Centeredness. Access weighted on Cost-Related Problems, and Timeliness of Care. Efficiency was rated as a composite ranking of measures of health expenditure, administrative costs, avoidable emergency room use, and duplicative medical testing. Equity is ranked on a basis of economic inequality as an impediment to care, such as below-average incomes resulting in not visiting a physician when sick, electing not to receive care and testing due to cost, and not filling prescriptions or skipping dosages due to cost. Over one out of three lower-income citizens inside the United States were found to have gone without necessary or required care in the past year due to costs alone.

EXHIBIT ES-1. OVERALL RANKING

COUNTRY RANKINGS
Top 2*
Middle
Bottom 2*

	AUS	CAN	FRA	GER	NETH	NZ	NOR	SWE	SWIZ	UK	US
OVERALL RANKING (2013)	4	10	9	5	5	7	7	3	2	1	11
Quality Care	2	9	8	7	5	4	11	10	3	1	5
Effective Care	4	7	9	6	5	2	11	10	8	1	3
Safe Care	3	10	2	6	7	9	11	5	4	1	7
Coordinated Care	4	8	9	10	5	2	7	11	3	1	6
Patient-Centered Care	5	8	10	7	3	6	11	9	2	1	4
Access	8	9	11	2	4	7	6	4	2	1	9
Cost-Related Problem	9	5	10	4	8	6	3	1	7	1	11
Timeliness of Care	6	11	10	4	2	7	8	9	1	3	5
Efficiency	4	10	8	9	7	3	4	2	6	1	11
Equity	5	9	7	4	8	10	6	1	2	2	11
Healthy Lives	4	8	1	7	5	9	6	2	3	10	11
Health Expenditures/Capita, 2011**	$3,800	$4,522	$4,118	$4,495	$5,099	$3,182	$5,669	$3,925	$5,643	$3,405	$8,508

Notes: * Includes ties. ** Expenditures shown in $US PPP (purchasing power parity); Australian $ data are from 2010.
Source: Calculated by The Commonwealth Fund based on 2011 International Health Policy Survey of Sicker Adults; 2012 International Health Policy Survey of Primary Care Physicians; 2013 International Health Policy Survey; Commonwealth Fund *National Scorecard 2011;* World Health Organization; and Organization for Economic Cooperation and Development, *OECD Health Data, 2013* (Paris: OECD, Nov. 2013).

Figure 3: The United States, when ranked on Quality of Care, Access, Efficiency, Equity, and Healthy Lives by The Commonwealth Fund, ranked dead last when compared to similar HDI OECD countries Australia, Canada, France, Germany, Netherlands, New Zealand, Norway, Sweden, Switzerland, and the United Kingdom.
Image Source: The Commonwealth Fund, "Mirror, Mirror on the Wall, 2014 Update: How the U.S. Health Care System Compares Internationally", June 16 2014.

While the United States spending more per capita than any other country in the world on healthcare, the lack of positive returns on quality in comparison to other rich (HDI) countries indicates that the underlying problem may be systematic. In comparison to OECD member states, the U.S. is alone in not allowing its government to price bargain for the price of pharmaceuticals (Whalen). While countries of divergent and more market-interventionist economic philosophy, such as Norway, set price caps on state-run health care systems and bargain as a monopsony-buyer, driving down domestic health expenditure price increases—the United States government maintains a more laissez faire approach in its highly-fragmented, private health care system. In contrast to other OECD nation states, the U.S. system has dozens of private insurers fighting for market share amongst the country's 32.1% population not covered

by publicly-run Medicare and Medicaid (United States Census Bureau). Further, the largest state-run health care system—Medicare, which focuses on seniors and the disabled—is actually legally barred from negotiating pricing all together. "The arrangement means Medicare is essentially forfeiting its buying power, leaving bargaining to doctors' offices that have little negotiating heft," and few healthcare payers—public or private— "cite cost as a reason to deny drug coverage, partly owing to a traditional emphasis in the U.S. on doctor and patient autonomy" (Whalen). Due to U.S. domestic policy, the country's consumers essentially become an artificially created "price taker" in the healthcare sector—unable to negotiate prices, with end users (the consumers) insulated from much of the direct "out-of-pocket" costs, as insurers private and public bear most of the cost burden.

As private insurers are unable—through Anti-Trust collusion laws—and public insurers and institutions are unwilling to negotiate these prices down to international levels, it is this paper's hypothesis that biopharmaceutical manufacturers are able to institute third-degree price discrimination on U.S. consumers, allocating a majority of "fixed" research and development costs into the United States healthcare market—while still finding it marginally profitable internationally to sell manufactures for any price above their variable costs of production. In this way, the hypothesis is that U.S. consumers unintentionally subsidize international health care prices, and the world's largest economy essentially absorbs health sector cost growth without impediment.

Unlike pharmaceutical goods, other aspects of health sector expenditure and consumption cannot be easily normalized on a per-unit basis; while other service-based OECD gathered metrics such as physician salaries may seem like a well-reasoned metrics to use in order to illustrate cost growth across countries, it cannot be assumed that the marginal production of labor

from one physician to be equal across all nation states—fewer doctors of higher caliber could be providing better, more efficient care than a larger number of lesser trained physicians in another country in order to receive higher salaries. Further, it is difficult to discern how price bargaining plays a role across countries in regards to allocated health care spending on service-based metrics; other externalities such as labor markets and costs for education would be uncontrolled and could cause incorrect assumptions to be found should we compare the United States healthcare cost growth to its monopsony bargained price controlling OECD partners in such service-based metrics. Lastly, pharmaceutical goods such as drugs, pace makers, and prosthetics are directly negotiated by various world governments, tracked, and trends can be directly observed.

The distinguishing feature of this paper is singular. Because the consumer utility gained from consumption of pharmaceuticals can be controlled—and assumed to be the same regardless of which country it is consumed in—the focus of this paper's research will be specifically on the spending growth on pharmaceuticals per capita among 17 comparable OECD member states, and how that growth contributes to overall health spending growth in our OECD countries of focus. Pharmaceuticals therefore works as our illustrative instrumental variable in the case of how price controls—specifically, state-actor monopsony bargaining and a lack-thereof within the United States—has limited health spending growth in those countries.

Pharmaceutical spending in this way is focused, as it can also be assumed that market conditions that allow for per capita pharmaceutical spending growth to increase should have the same affect across other aspects of the health sector—such as services or facilities—should pharmaceutical spending as a percent of healthcare spending remain relatively stable—and as

observed in Figure 4, health spending on pharmaceuticals as a percent of overall health spending within the United States has made up a relatively stable level of around 10% since 1970.

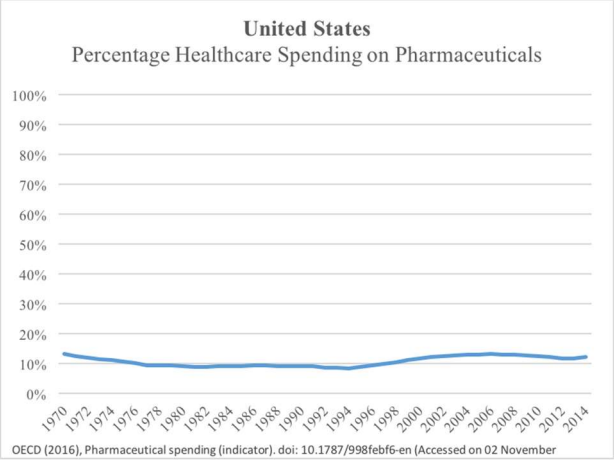

Figure 4: Healthcare spending, as a percent of overall expenditure, has remained relatively stable since 1970.

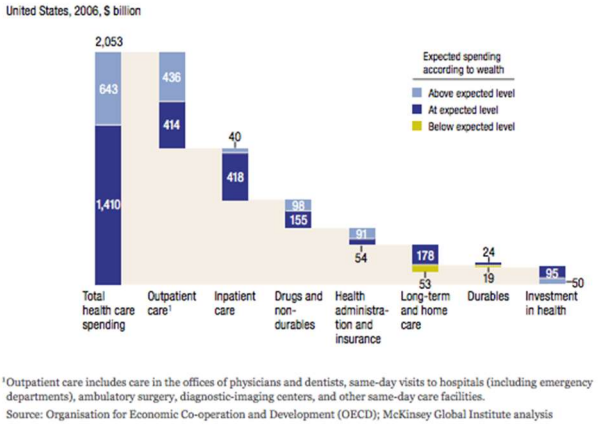

Figure 5: Pharmaceutical spending as a percent makes up 13% of domestic U.S. health expenditure in 2006.

This analysis should present a clear picture on how and if the United States is absorbing increased health costs at a higher rate due to a the lack of monopsony bargaining structures found in other OECD nations, allowing us the ability to infer the existence of third degree discriminatory pricing techniques taken by biopharmaceutical goods manufacturers that offsets lower international prices through protected price discrimination in the U.S. market.

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METHODOLOGY AND DATA

In this paper, panel data was collected from the OECD member databank for 17 different countries[3] over an interval of 45 years, ranging from 1970 to 2015 on metrics of Health Spending Per Capita (2010 USD PPP)[4], Pharmaceutical Spending Per Capita (2010 USD PPP)[5], Doctor Consultations[6], Average Length of Hospital Stay (ALOS)[7], and Life Expectancy at Birth. Each variable was selected as an indicator for differing sectors of comparison against Health Spending Per Capita cost growth—Pharmaceutical Spending Per Capita was chosen as an instrumental variable to reflect the effects health sector goods (and in turn, monopsony price bargaining) has upon health spending growth; Doctor Consultations as an indicator of healthcare access for patients; Length of Hospital Stay as an indicator of healthcare efficiency, and Life Expectancy at

[3] Observed OECD member states were: Australia, Belgium, Canada, Denmark, Finalnd, France, Germany, Greece, Iceland, Netherlands, Norway, Portugal, South Korea, Sweden, Turkey, the United Kingdom, and the United States.

[4] Health spending measures the final consumption of health care goods and services (i.e. current health expenditure) including personal health care (curative care, rehabilitative care, long-term care, ancillary services and medical goods) and collective services (prevention and public health services as well as health administration), but excluding spending on investments. Health care is financed through a mix of financing arrangements including government spending and compulsory health insurance ("public") as well as voluntary health insurance and private funds such as households' out-of-pocket payments, NGOs and private corporations ("private"). This indicator is presented as a total and by type of financing ("public", "private", "out-of-pocket") and is measured as a share of GDP, as a share of total health spending and in USD per capita (using economy-wide PPPs). (From OECD Data)

[5] Pharmaceutical spending covers expenditure on prescription medicines and self-medication, often referred to as over-the-counter products. In some countries, other medical non-durable goods are also included. Pharmaceuticals consumed in hospitals and other health care settings are excluded. Final expenditure on pharmaceuticals includes wholesale and retail margins and value-added tax. Total pharmaceutical spending refers in most countries to "net" spending, i.e. adjusted for possible rebates payable by manufacturers, wholesalers or pharmacies. This indicator is measured as a share of total health spending, in USD per capita (using economy-wide PPPs). (From OECD Data)

[6] Doctor's consultations as an indicator presents data on the number of consultations patients have with doctors in a given year. Consultations with doctors can take place in doctors' offices or clinics, in hospital outpatient departments or, in some cases, in patients' own homes. Consultations with doctors refer to the number of contacts with physicians, both generalists and specialists. There are variations across countries in the coverage of different types of consultations, notably in outpatient departments of hospitals. The data come from administrative sources or surveys, depending on the country. This indicator is measured per capita. (From OECD Data)

[7] The average length of stay in hospitals (ALOS) is often used as an indicator of efficiency. All other things being equal, a shorter stay will reduce the cost per discharge and shift care from inpatient to less expensive post-acute settings. The ALOS refers to the average number of days that patients spend in hospital. It is generally measured by dividing the total number of days stayed by all inpatients during a year by the number of admissions or discharges. Day cases are excluded. The indicator is presented both for all acute care cases and for childbirth without complications, and observed in this paper only on the basis of acute care cases. (From OECD Data)

birth as a metric for overall quality of care and health within the population. They were denoted by variable names “healthexp,” “pharmaspend,” “docconsult,” “hospstay,” and “lifeexp,” respectively. The analysis assumes these 4 metrics regressed against Health Spending allows us to observe the effect goods prices, access, efficiency of care, and quality has upon spending growth within these 17 OECD country health care systems over time.

It is assumed that a Fixed-effects model, given the various countries experiencing differing market conditions, and at diverging stages of development within our observed database would be the best model to find underlying relationships within our data. To test this, the data set will be analyzed for significance within the variables through OLS regression, as well as multicollinearity with a Variation Inflation Factor test. Further, given acceptable and statistically significant results, a GLS Random-effects regression will be run on the time series panel data and compared to a Fixed-effects model with a Hausman test. With statistically significant evidence of non-systematic data within the Hausman results, the Fixed-effects model will be analyzed and interpreted to discern possible causal relationships that each metric has upon healthcare cost growth by time demeaning the data variables. The fixed effects equation model will be represented as follows, where $\boldsymbol{Y}$ is healthcare expenditure, $\boldsymbol{X}$ is pharmaceutical spending, $\boldsymbol{C}$ is doctors consultations, $\boldsymbol{H}$ is hospital stay, and $\boldsymbol{L}$ is life expectancy, for all non-US countries:

$$(Y_{it} - Y_i) = \beta_1(X_{it} - X_i) + \beta_2(\mathrm{C}_{it} - \mathrm{C}_i) + \beta_3(\mathrm{H}_{it} - \mathrm{H}_i) + \beta_4(\mathrm{L}_{it} - \mathrm{L}_i) + (\varepsilon_{it} - \varepsilon_i)$$

From this model, I look to compare the panel results to a standard time series OLS regression run with just the United States, and make a comparative analysis of the differing costs of care between models.

$$Y = \beta_1 X + \beta_2 \mathrm{C} + \beta_3(\mathrm{H}_{it} - \mathrm{H}_i) + \beta_4 \mathrm{L} + \varepsilon$$

R E S U L T S A N D D I S C U S S I O N

An initial OLS regression and ANOVA was run amongst these variables to test for initial significance between variables by observing the F-value within the dataset. As pictured in Figure 6, the F-statistic of 64.54 gives a Prob(F) value of 0.000, signifying that the observed variables are individually significant. Second, a Variation Inflation Factor (VIF) test was run to test multicollinearity between the time series variables. As observed in Figure 7, the mean VIF of 1.61 and range of 1.39 to 1.82 between the variables signifies that no statistically significant multicollinearity exists between the observations with the data set.

Source	SS	df	MS	Number of obs =	313
				F(4, 308) =	64.54
Model	263073255	4	65768313.7	Prob > F =	0.0000
Residual	313858432	308	1019020.88	R-squared =	0.4560
				Adj R-squared =	0.4489
Total	576931687	312	1849140.02	Root MSE =	1009.5

healthexp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
docconsult	-49.90701	37.56489	-1.33	0.185	-123.8233	24.00927
hospstay	-111.8085	33.35439	-3.35	0.001	-177.4398	-46.17724
lifeexp	198.3296	20.83341	9.52	0.000	157.3358	239.3234
pharmspend	.4903579	.136394	3.60	0.000	.2219759	.7587399
_cons	-11667.68	1608.075	-7.26	0.000	-14831.88	-8503.472

Figure 6: First OCS regression analysis of variance

Variable	VIF	1/VIF
lifeexp	1.82	0.548364
docconsult	1.82	0.549904
hospstay	1.41	0.706717
pharmspend	1.39	0.721758
Mean VIF	1.61	

Figure 7: Variation Inflation Factor Results

A fixed-effects regression model was chosen to properly illustrate relationships within the model, after a Hausman test concluded with strong evidence that we can reject the null hypothesis assumption that the random-effects GLS regression model in comparison to a fixed effects model to be conclusively not systematic, with a Prob>chi2 of 0.9799 as observed in Figure 8. These results are to be expected, as we are already aware of the existence of various nation-states within our model, and it is to be expected that policies by country could result in divergent trends within their observations.

	Coefficients (b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
docconsult	-155.3463	-149.525	-5.821295	14.45304
hospstay	-144.6575	-143.6713	-.986128	3.7041
lifeexp	183.1471	183.2905	-.1434054	3.173631
pharmspend	1.114751	1.100506	.0142448	.0249634

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 0.43
Prob>chi2 = 0.9799

Figure 8: Hausman Test result comparison between Random-effects GLS and a Fixed-effects model.

The results of the Fixed-effects regression are now able to be analyzed. As seen in Figure 9, all variables are statistically significant with P>| t | values of under 1% significance. Further, the R-Squared (R^2) of the within (fixed-effects) model is high at 0.814, signifying the model has an exceedingly high goodness-of-fit at 0.8. The F-statistic in this model is conclusive with a high F-statistic of 320.49, resulting in significance at the 1% level.

Fixed-effects (within) regression — Number of obs = 313
Group variable: id — Number of groups = 16

R-sq: within = 0.8140 — Obs per group: min = 5
between = 0.3565 — avg = 19.6
overall = 0.4126 — max = 45

F(4,293) = 320.49
corr(u_i, Xb) = -0.1943 — Prob > F = 0.0000

healthexp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
docconsult	-155.3463	42.86343	-3.62	0.000	-239.7055	-70.98703
hospstay	-144.6575	19.9449	-7.25	0.000	-183.9109	-105.404
lifeexp	183.1471	15.77132	11.61	0.000	152.1077	214.1866
pharmspend	1.114751	.1320071	8.44	0.000	.8549488	1.374554
_cons	-9972.964	1192.538	-8.36	0.000	-12319.99	-7625.937
sigma_u	1084.7097					
sigma_e	337.57886					
rho	.91169727	(fraction of variance due to u_i)				

F test that all u_i=0: F(15, 293) = 164.07 — Prob > F = 0.0000

Figure 8: Fixed-effect Regression Results

Because the variables of Healthcare Expenditure Per Capita (healthexp) and Pharmaceutical Spending Per Capita (pharmaspend) are both in real 2010 adjusted United States Dollars, the relationship can be inferred on a 1-to-1 ratio: with a coefficient of 1.11, it can be

inferred that within our statistical sample, that every adjusted US Dollar spent per capita on pharmaceuticals, that total health expenditure will rise by $1.11 per capita—a surprising result, signifying that a multiplying effect can be observed, with a higher return per dollar spent possibly signifying high transaction costs within the pharmaceutical market, asymmetry of information to consumers, or price discrimination as hypothesized before—underlying the importance of price negotiation for pharmaceutical goods.

Doctor consultations, our indicator of healthcare *access*, has a coefficient of -155.35, which is also a curious return. This result signifies that for every extra doctors consultation achieved per capita per country, the expected change in Health Expenditure is *less* $155.35 per capita per year—signifying that increased access, for potentially cheaper, more cost effective preventative care such as general practice doctors and clinics, reduces health costs considerably. Likewise, Average Length of Hospital Stay with observed OECD countries also had a negative coefficient—at -144.66, signifying that as the average length of hospital stay for acute illness per 1000 patients goes up by 1 day, the cost per capita of overall health expenditure can be estimated to also decrease by $144.66 a year—signifying that as patients stay in the hospital and heal, they possibly cause less strain on health systems down the line with later costly emergency room visits or medical relapse causing a return to admission. Life expectancy can be forecasted to increase one year for every extra $183.15 spent per capita on health care, a return which is within expectations of this paper.

The most interesting results found, however, come when doing a comparative analysis between the United States, and the Fixed-effects regression model of the other 16 observed OECD member states in order to delve deeper into how the United States is an outlier when it comes to inputs and their return on health expenditure. Figures 9 and 10 show the same OECD Fixed-

effect regression analysis above without the United States included, and a time-series ordinary-least-squares regression of just the United States, for comparison.

Fixed-effects (within) regression — Number of obs = 298
Group variable: id — Number of groups = 15

R-sq: within = 0.8346 — Obs per group: min = 5
between = 0.4759 — avg = 19.9
overall = 0.5231 — max = 45

F(4,279) = 352.08
corr(u_i, Xb) = -0.3074 — Prob > F = 0.0000

healthexp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
docconsult	-138.9598	39.7711	-3.49	0.001	-217.2493	-60.67022
hospstay	-156.81	18.48558	-8.48	0.000	-193.1989	-120.421
lifeexp	186.5161	14.59468	12.78	0.000	157.7865	215.2458
pharmaspend	.8345009	.1268997	6.58	0.000	.5846984	1.084303
_cons	-10257.35	1103.379	-9.30	0.000	-12429.35	-8085.341
sigma_u	756.68605					
sigma_e	311.73956					
rho	.85489992	(fraction of variance due to u_i)				

F test that all u_i=0: F(14, 279) = 67.56 — Prob > F = 0.0000

Figure 9: Fixed Effect Panel Analysis, 1970-2015 (No US)

Source	SS	df	MS
Model	15423119.8	4	3855779.95
Residual	83121.7075	10	8312.17075
Total	15506241.5	14	1107588.68

Number of obs = 15
F(4, 10) = 463.87
Prob > F = 0.0000
R-squared = 0.9946
Adj R-squared = 0.9925
Root MSE = 91.171

healthexp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
docconsult	109.0345	175.9864	0.62	0.549	-283.0875	501.1566
hosstay	393.9212	303.5009	1.30	0.223	-282.321	1070.163
lifeexp	116.162	104.887	1.11	0.294	-117.5408	349.8648
pharmspend	4.52987	.3801198	11.92	0.000	3.68291	5.37683
_cons	-8357.875	8980.506	-0.93	0.374	-28367.69	11651.94

Figure 10: OLS Regression, United States 1970-

When taken out of the sample and analyzed individually, the contrast is striking—and the affect the US had on previously analyzed panel data is pinpointed. While the 16-member state Fixed-effect panel shows an expected diminishing return-to-scale on their price-bargained pharmaceutical goods spending—at only a total $0.834 increase to total healthcare expenditure per extra pharmaceutical dollar spent—the United States is at a sharp contrast. Based on the OLS forecasts of U.S. spending from 1975 to 2015, each dollar spent on pharmaceuticals resulted in a total increase of $4.5 per capita, per year on total health expenditure—indicating clear market inefficiencies, and a high likelihood of price discrimination in the form of higher domestic prices to offset less profitable international drug sales.

Further, while Doctors Consultations per Capita and Average Length of Hospital Stay in the observed 16-member OECD panel can be found to have negative coefficients (as also observed in the entire, 17 member U.S.-included fixed effect panel in Figure 8), there is not a single coefficient within the U.S. model that results in a negative or marginally decreasing return in increased utilization or spending. Only Life Expectancy at Birth—at $116.16 for each

additional added year of expected life, had a lesser coefficient than the 16-member panel at $183.15 per added year—which is understandable, and falls within the economic assumption of diminishing marginal returns to scale (the mean Life Expectancy of the 16-member panel was 81.46 in most the recent year 2014, the US was 78.8).

The discrepancy in nearly all metrics indicates that severe comparative inefficiencies exist within the US health sector that aren't found in comparable OECD member states, the most glaring being an opposite relationship in regards to doctor consultations and hospital stay resulting in higher healthcare costs per capita, and observed changes pharmaceutical spending resulting in a multiplier within overall healthcare spending—as opposed to the mere fractional increase to overall spending observed by the panel. These radical contrasts in spending growth compared to utilization metrics imply gross inefficiencies within the United States system.

Due to these findings, instead of attempting to fix the healthcare problem on a symptomatic basis—through focused attempts on questioning individual pharmaceutical prices on the market, reducing limited access to preventative care causing expensive adversely-selected emergency room visits, and tax penalties to encourage healthy uninsured individuals elect to buy private insurance coverage and utilize the existing system—the answer might be in a complete restructuring and rethinking of United States medicine as a whole, in a way to emulate the positive features of OECD member healthcare systems.

The United States might also elect to price negotiate as a government entity as well—or allow for private insurer collusion in order to reduce health expenditures—in an effort to reduce the rapidly increasing and exceptionally high cost of healthcare per capita. If such a policy is not feasible politically or economically due to a globally dominant biopharmaceutical industry it wishes to protect—the U.S., as 5% of world population, accounted for over 46% in global life

sciences research and development (OECD, McKinsey Global Institute)—other policies, such as high biopharmaceutical export tariffs to other countries, offset by aggressive tax cuts and subsidies on domestic industry, might be an answer to forcing international prices up while bringing domestic prices back down to hypothetical free-market equilibrium.

Monopsony Market Structures and Primary Cost Drivers Within OECD Health Care Systems

A p p e n d i x

List of countries, arranged in alphabetical order

Australia, Belgium, Canada, Denmark, Finalnd, France, Germany, Greece, Iceland, Netherlands, Norway, Portugal, South Korea, Sweden, Turkey, the United Kingdom, and the United States.

References

Cox, C., Long, M., Semanskee, A., Kamal, R., Claxton, G., & Levitt, L. (2016). 2017 premium changes and insurer participation in the affordable care act's health insurance marketplaces. Retrieved December 12, 2016, from KFF.org, http://kff.org/health-reform/issue-brief/2017-premium-changes-and-insurer-participation-in-the-affordable-care-acts-health-insurance-marketplaces/

Davis, K., Stremikis, K., Squires, D., & Schoen, C. (2014, June 16). Mirror, mirror on the wall, 2014 update: How the U.S. Health care system compares internationally. Retrieved December 12, 2016, from The Commonwealth Fund, http://www.commonwealthfund.org/publications/fund-reports/2014/jun/mirror-mirror

Marte, J. (2016, November 1). Here's where health care prices are rising dramatically. Retrieved December 12, 2016, from The Chicago Tribune, http://www.chicagotribune.com/business/ct-rising-health-care-prices-obamacare-20161101-story.html

Medicare and Medicaid, age and income. (2013, September 17). Retrieved December 12, 2016, from United States Census Bureau, http://blogs.census.gov/2013/09/17/medicare-and-medicaid-age-and-income-2/

OECD. (2016). OECD Health Statistics 2016. Retrieved December 12, 2016, from http://www.oecd.org/els/health-systems/health-data.htm

Whalen, J. (2015, December 2). Why the U.S. Pays more than other countries for drugs. The Wall Street Journal. Retrieved from http://www.wsj.com/articles/why-the-u-s-pays-more-than-other-countries-for-drugs-1448939481