Analysing the Effects of National Income on Health Expenditures and Infant Mortality in Developed, Developing and In Transition Nations, 2005-2015

Group 5

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Outline

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Introduction

- People with higher levels of income tend to have overall better levels of health.
- Access to quality health increases the chances of survival for newborns
- We wanted to see how the level of a nation's wealth affect their health expenditures, especially in regards to the infant mortality rate

Literature Review

- **Gbesemete and Jonsson (1993):**
  - *A comparison of empirical models on determinants of infant mortality: a cross-national study on Africa*
  - Inverse relationship between GNI & Infant mortality
  - Inverse relationship between Health care spending and Infant mortality
- **Selma Mushkin (1962); Bloom and Canning (2000)**
  - Health As An Investment
  - Spillover effects of a healthy labour force

More Background

- **Dorling, Mitchell and Pearce (2007); Ward and Viner (2017)**
  - The global impact of income inequality on health by age: an observational study
  - The impact of income inequality and national wealth on child and adolescent mortality in low and middle-income countries
- **Newhouse (1992) and Fuchs (1996):**
  - Accounts for technological advancement in rapid growth of health care expenditure

Data

What data are we analyzing from these countries?
2005 - 2015

- GNI per capita (US dollar)
- Health Expenditure per Capita (US dollar)
- Infant Mortality
  - probability of infant death per 1000 deaths

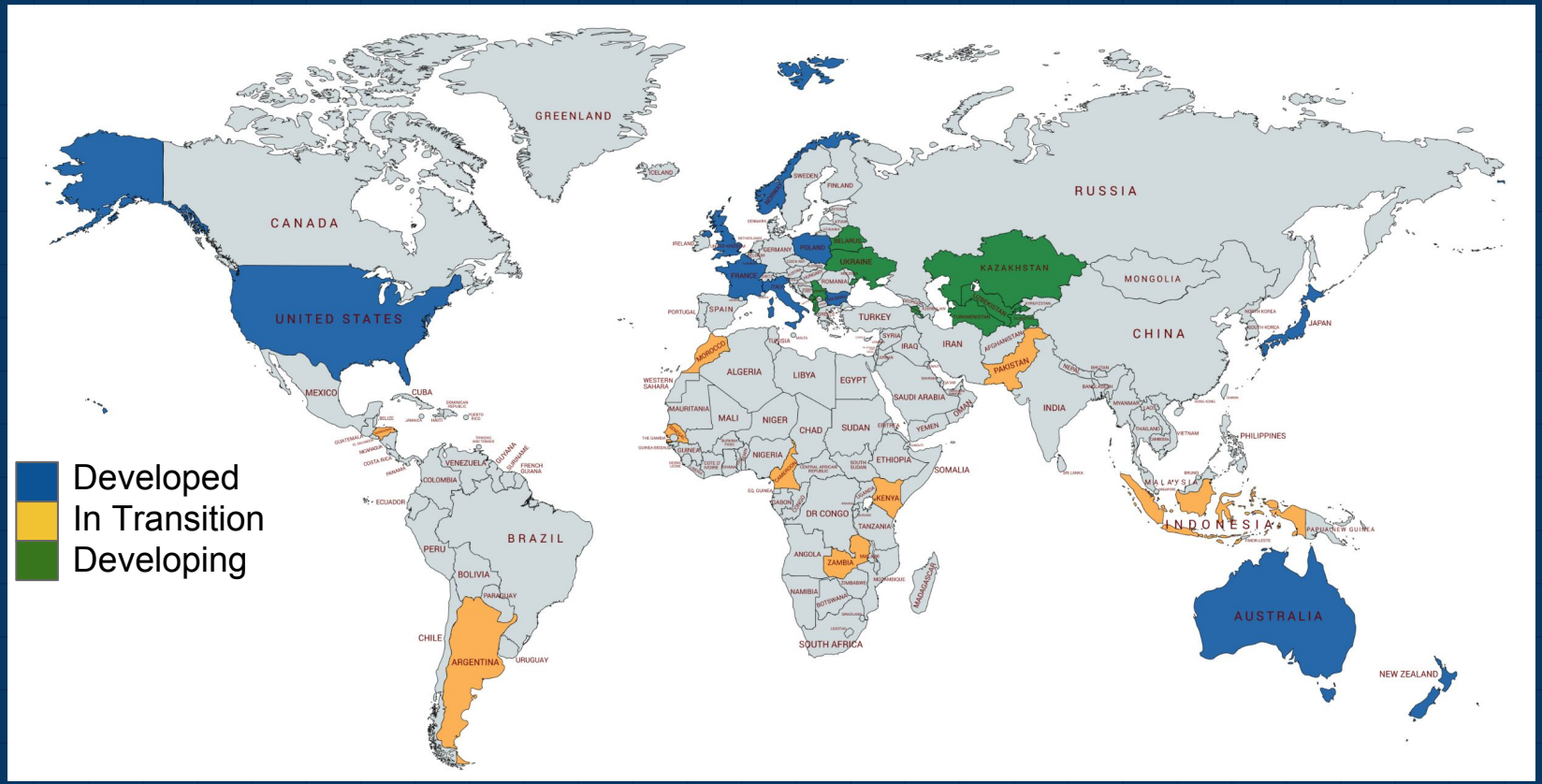
Where was the data found?

- World Health Organization
- World Bank

More Data:

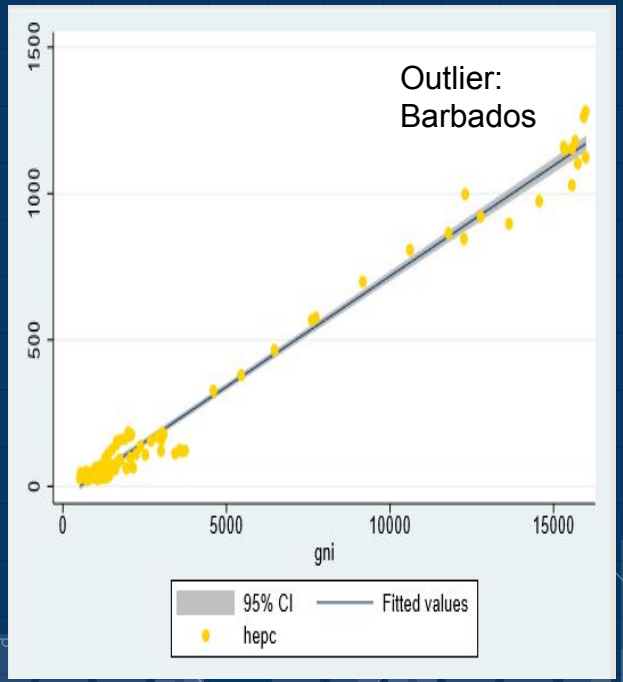
- We chose data from 30 different countries with an attempt to have an even spread between regions of the world and development levels
- We used dummy variables to represent each of the types of economies.
  - Developing was our reference case.
  - The two dummy variables were: *trans* (in transition) and *developed* (developed)

Countries Chosen

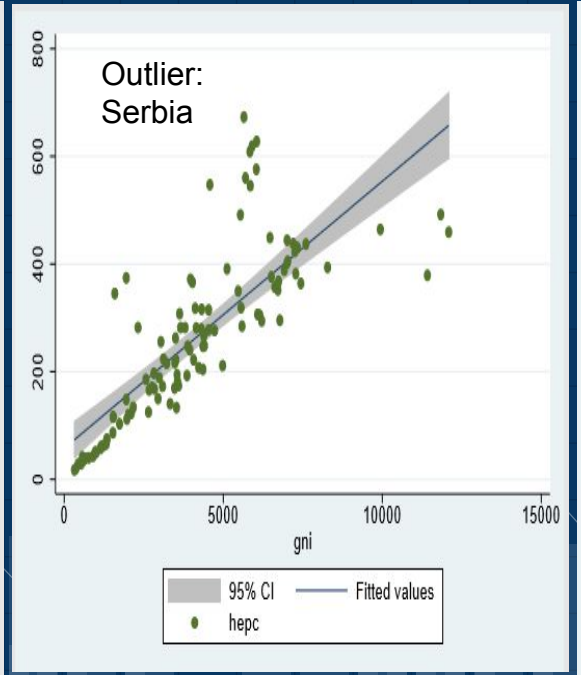


GNI on HEPC

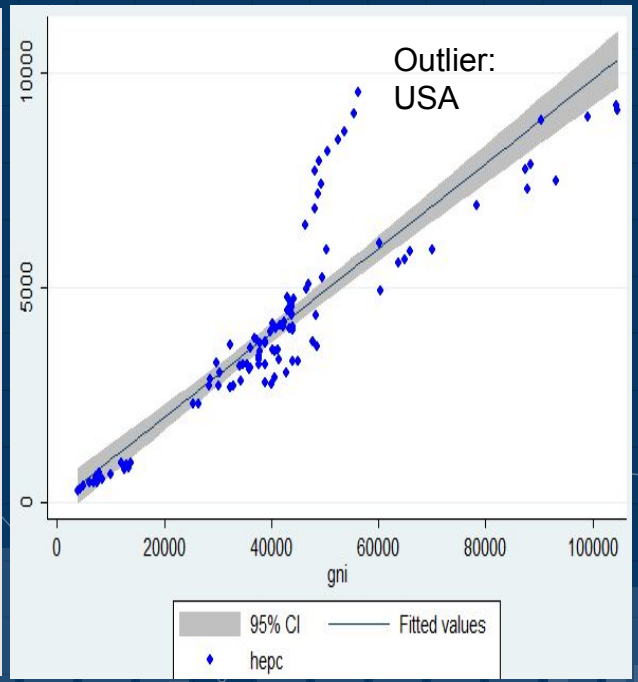
Developing



In Transition



Developed



Regression Models and Results (HEPC GNI)

```
reg hepc gni if developed == 0 & trans ==0
```

Source	SS	df	MS	Number of obs	=	110
				F(1, 108)	=	7396.00
Model	13531926.8	1	13531926.8	Prob > F	=	0.0000
Residual	197599.815	108	1829.62792	R-squared	=	[illegible]
				Adj R-squared	=	0.9855
Total	13729526.7	109	125958.96	Root MSE	=	[illegible]

hepc	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
gni	.0755448	.0008784	86.00	0.000	.0738036	.077286
_cons	[illegible]	5.226509	-7.19	0.000	-47.91689	-27.1972

```
reg hepc gni if developed == 1 & trans ==0
```

Source	SS	df	MS	Number of obs	=	110
				F(1, 108)	=	426.54
Model	521198365	1	521198365	Prob > F	=	0.0000
Residual	131968722	108	1221932.61	R-squared	=	[illegible]
				Adj R-squared	=	0.7961
Total	653167087	109	5992358.6	Root MSE	=	[illegible]

hepc	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
gni	.0984831	.0047685	20.65	0.000	.0890311	.1079352
_cons	[illegible]	218.6891	0.05	0.957	-421.7073	445.2521

```
reg hepc gni if developed == 0 & trans ==1
```

Source	SS	df	MS	Number of obs	=	110
				F(1, 108)	=	180.07
Model	1678411.19	1	1678411.19	Prob > F	=	0.0000
Residual	1006670.19	108	9321.02026	R-squared	=	[illegible]
				Adj R-squared	=	0.6216
Total	2685081.37	109	24633.7741	Root MSE	=	[illegible]

hepc	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
gni	.0495821	.0036949	13.42	0.000	.0422581	.0569061
_cons	[illegible]	17.97969	3.21	0.002	22.12673	93.40446

Interpretation (HEPC GNI)

Per dollar increase in GNI, HEPC increases by 0.050 (In Transition)

Per dollar increase in GNI, HEPC increases by 0.076 (Developing)

Per dollar increase in GNI, HEPC increases by 0.099 (Developed)

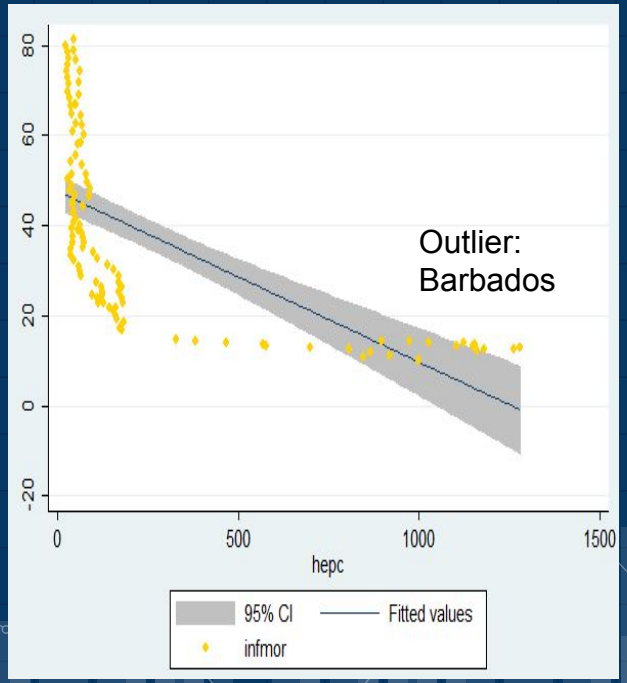
Interpretation Continued:

Why is this stronger in developing economies than in transition?

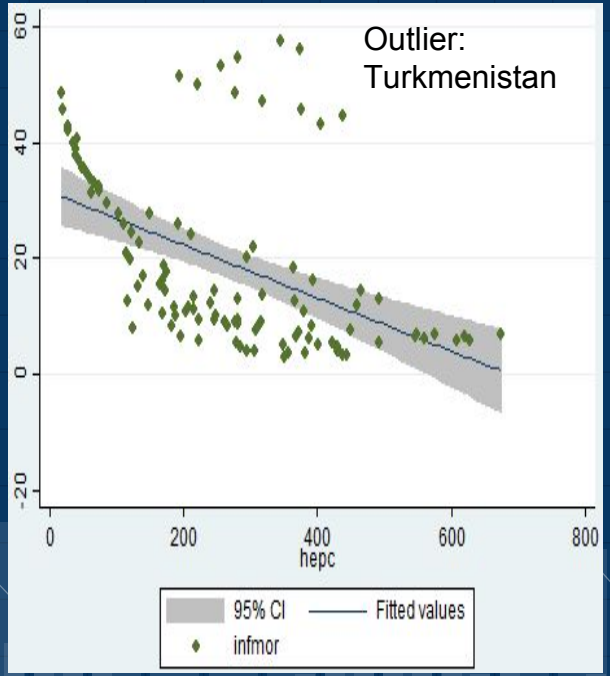
- Developing are focusing on building infrastructure.
- Developing nations are really focusing on lowering infant mortality (ex-spending money on immunization)
- Developed nations treat more expensive/advanced illness

HEPC on INFMOR

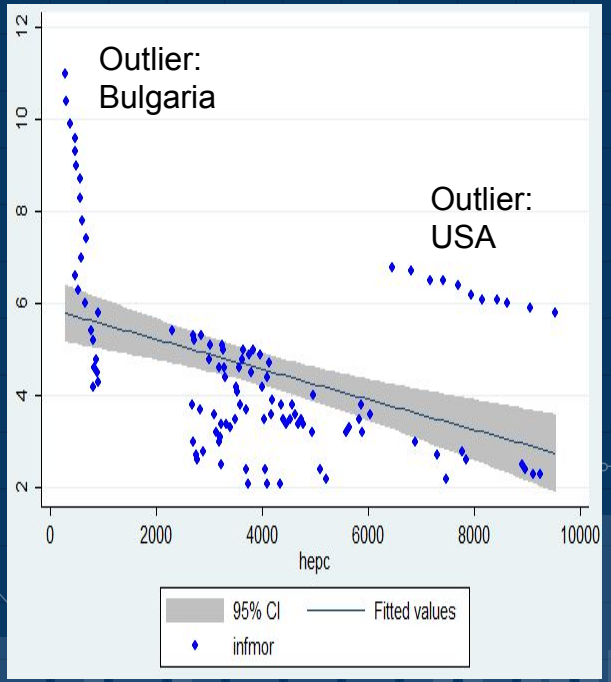
Developing



Transition



Developed



Regression Models and Results (INFMOR HEPC)

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reg infmor hepc if developed == 0 & trans ==0
```

Source	SS	df	MS	Number of obs	=	110
				F(1, 108)	=	71.56
Model	19619.3444	1	19619.3444	Prob > F	=	0.0000
Residual	29611.6748	108	274.182174	R-squared	=	[illegible]
				Adj R-squared	=	0.3929
Total	49231.0192	109	451.660727	Root MSE	=	[illegible]

infmor	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
hepc	-.037802	.0044688	-8.46	0.000	-.0466599	-.028944
_cons	[illegible]	1.917555	24.76	0.000	43.68166	51.28352

```
reg infmor hepc if developed == 1 & trans ==0
```

Source	SS	df	MS	Number of obs	=	110
				F(1, 108)	=	22.41
Model	70.0190441	1	70.0190441	Prob > F	=	0.0000
Residual	337.439956	108	3.12444404	R-squared	=	[illegible]
				Adj R-squared	=	0.1642
Total	407.459001	109	3.73815597	Root MSE	=	[illegible]

infmor	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
hepc	-.0003274	.0000692	-4.73	0.000	-.0004645	-.0001903
_cons	[illegible]	.3221253	18.28	0.000	5.251045	6.528062

```
reg infmor hepc if developed == 0 & trans ==1
```

Source	SS	df	MS	Number of obs	=	110
				F(1, 108)	=	30.75
Model	5615.32042	1	5615.32042	Prob > F	=	0.0000
Residual	19719.6623	108	182.589466	R-squared	=	[illegible]
				Adj R-squared	=	0.2144
Total	25334.9827	109	232.431034	Root MSE	=	[illegible]

infmor	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
hepc	-.0457308	.0082463	-5.55	0.000	-.0620764	-.0293852
_cons	[illegible]	2.536891	12.41	0.000	26.46256	36.51968

Interpretation (INFMOR HEPC)

Per dollar increase in HEPC, INFMOR decreases by .046 (InTransition)

Per dollar increase in HEPC, INFMOR decreases by .037 (Developing)

Per dollar increase in HEPC, INFMOR decreases by .0003 (Developed)

Interpretation Continued

Why is this stronger in transition economies than developing?

- Nations in transition may have developed more infrastructure, so the money spent can go to people more directly.
- Less corruption that would inhibit efficient use of money
- Technology

Further Research

- Effect of amount spent on healthcare has a greater effect in developing and transition economies than developed economies
  - Where is the expenditure going?
  - Where is the increase in expenditure most impactful?
- Reasons for why transition nations have greatest effect in decrease in infant mortality as healthcare spending increases
  - increases in spending going towards more medical care rather than building medical infrastructure
  - corruption in government
- Technology

Conclusion

- Help guide aid fund and development projects
  - Predict effects of the increase in health care spending
    - Efficiency of spending in each country
- GNI may also increase where there are more healthy citizens who can participate in the economy which is affected by infant mortality (paradox)
- Outside aid is important for developing economies