

Social policy as social vaccine

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Abstract

Background: The social and economic woes that have inflicted many countries around the world are testimony to the inadequacy of current institutional makeup of societies where individualism and market forces by and large have taken the leading role in directing societies' choices and resources. Problems of inequities in health and wealth, the widening gaps between the rich and the poor, employment insecurities, the growing social exclusion of the marginalized, and the looming environmental concerns are acute as ever. At the same time, the progressive social forces and the counter-balancing capacity of governments are being undermined by the prevailing neo-liberal forces. This sobering state of affairs can only lead to more problems and a growing frustration on the part of those who seek alternatives to the status quo, which have actually produced better results in certain countries.

Objective: This study takes the position that the involvement of democratic collective institutions (e.g., local organizations and governments at all levels) in setting societal priorities and directing resources towards achieving those priorities would avoid or mitigate many of the socioeconomic problems facing us today. It aims to show that comprehensive social policy could prevent the emergence of such problems and contain the problems that remain, effectively working as a *social vaccine*.

Method: The study uses macroeconomic panel data and socioeconomic indicators from OECD countries to empirically examine the relationships between indicators of social wellbeing on the one hand, and

measures of social policy on the other, while controlling for relevant macroeconomic covariates.

Results: The empirical results indicate that better population health outcomes are consistently associated with stronger social policies, including social spending on health and non-health services. Also, they show lower poverty rate is associated with higher social spending. Lower crime rate is also associated with higher social spending, but it is strongly country-specific.

Conclusion: Although improving social wellbeing and social protection are morally justified in their own right, the evidence presented in this study suggests that even a purely rational view concerned with the societal costs and benefits of public policy should find social policy an effective tool or vaccine against population ill-health, poverty, and crime.

Introduction

The social and economic woes that have inflicted many countries around the world are testimony to the inadequacy of current institutional makeup of societies where individualism and market forces by and large have taken the leading role in directing societies' choices and resources. Problems of inequities in health and wealth, the widening gaps between the rich and the poor, employment insecurities for a large portion of the labor force, the growing social exclusion of the marginalized, and the looming environmental concerns are acute as ever. Although these problems have been with us for a number of decades, the recent global financial crisis that started in 2008, and the consequent economic disasters that have swept through Europe and North America over the past three years or so, have brought the depth and breadth of such endemic problems into the spotlight.

The welfare state programs, which originated in the late 19th century and early 20th century in the industrializing countries, were developed into gov-

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ernments' enhanced social policies since the late 1940s. Such programs evolved in response to earlier sufferings during the First World War and the massive economic decline and unemployment that ensued during the Great Depression, as well as the enormous loss inflicted on massive populations during the Second World War. Aside from the dire social and economic consequences of the two wars, political expediency also had an important role in setting up welfare states. The threat of radicalization of the work force and gravitation towards radical leftist movements that elsewhere had led to revolutions, first in the former Soviet Union and later in Eastern Europe, were a stark reminder to the ruling politicians of the day of the unthinkable alternative that could ensue if major concessions were not granted to working populations and their dependents. In a sense, the welfare state or the social safety net served as some kind of *sociopolitical vaccine* that protected capitalist industrialized societies against the threat of communism.

Moreover, such protections, along with coordinated capital buildup, created stable environments that ushered in a relatively long period of economic prosperity which lasted almost three decades.¹ This so-called "golden age" of capitalism was made possible by massive public investments in physical and human infrastructure, technological progress, growing domestic and foreign demand for goods and services, and effective regulation of markets and the economy by the governments. During this time, incomes and standards of living for the majority of people in the Western industrial countries improved significantly, as if the tide of economic growth had lifted all the boats of prosperity, large and small.

With the threat of communism kept at bay during the long Cold War with the Communist Bloc, the capitalists in the Western world felt enough security to start questioning the legitimacy of the welfare state and concessions to the working class. The thriving capitalists perceived the impressive economic progress as the fruit of their own enterprise through the miracle of the free markets. They began to see their governments in a different light. They no longer saw them as responsible managers of the economy or promoters of business and industry or protectors of patent rights, but as interfering agents

distorting the markets and extorting heavy taxes from businesses to be spent on growing populations dependent on welfare programs. They thought the welfare state had served its purpose and was no longer necessary or, worse yet, it had become a huge burden on the economy and businesses, which could not afford to continue paying high wages and benefits to their workers. They believed the governments had grown too big, inefficient, and bureaucratic, far beyond their basic duties of national defense, maintaining order, and protection of property rights.

Ill-conceived macroeconomic policies of the mid-1970s, in the face of supply shocks in the form of oil price hikes, undermined the legitimacy of the Keynesian policies that were quite successful in maintaining economic stability and prosperity up to that point. The unprecedented stagflation that crippled the Western countries and concurrent policy confusion created a theoretical void and allowed the re-emergence of the so-called supply-side economics as an umbrella paradigm that included classical, neoclassical, or *laissez-faire* economics orientations. Backed by frustrated business leaders, the proponents of free-market capitalism were able to bring to power governments in their own image in the early 80s. "Thatcherism" in the UK and "Reaganomics" in the US were synonymous with the government ideology that markets are best left unfettered and the best government is the least government.²

The free market zeal spread around the world with the facilitation and manipulation of international organizations charged with the mandate to promote free trade, privatize the state-owned companies or public entities, dismantle government regulations and oversight, and disable labor unions and employment safeguards.² As a result, many governments in the Western world began to take down their walls of protection and engage in all sorts of bilateral, multi-lateral, regional, and global free trade agreements, opening up their markets to foreign competition. Thanks to abundant cheap labor overseas, off-shore tax shelters, and lack of government oversight in developing countries, production was increasingly relocated or outsourced to emerging developing economies of the Far East and Latin America with the predictable result of higher

unemployment and job insecurity in their home countries.

Concurrently, mounting budget deficits had forced the governments to slash welfare programs and social security, which they considered to be too generous and impeding work flexibility.³ They faced little resistance in doing so because the ruling ideology of free market economy, which emphasized individual responsibility and equal opportunity in the market, had convinced many middle class voters that the cuts were necessary and morally justified. This resulted in a transition from the so-called Fordist welfare state to post-Fordist “workfare state” in Western capitalist economies.³⁻⁶ The marginalized people, the working poor, and even those in the lower middle class were left with declining social protection at the time they needed it most. Not surprisingly, the economic divide between the poor and rich widened substantially. This growing inequality has not been a concern for the governments of many of the Western countries. The collapse of the Communist Bloc around 1989-1990 and the integration of China into the capitalist world has given further boost to the neoliberal governments in the Western world that the current market economy as practiced in their countries is the only viable model, if not the best model.

Such confidence in the pure market economy, however, was badly shaken during the financial crisis of late 2008. Freelancing financial marketers, working in a vacuum devoid of responsible regulation and oversight, almost brought the dominant capitalist economy of US to its knees. And as we all know, if it was not for the massive bailouts of the entire financial industry by the government of the US and indeed all the other governments in Europe and around the world, we would have witnessed a second Great Depression perhaps more devastating than the first. We have been lucky to escape with a “Great Recession” instead. The sad irony was that the proponents of free market economy, who desire a minimal government, were calling on the governments during the crisis to take over and rescue the markets. Yet, it is amazing that no sooner had the dust settled from the financial crisis, the very same companies that were at least in part responsible for

creating the crisis once again found themselves in a position to pass judgment on the creditworthiness of the very same governments that bailed them out.

We may have survived the recent financial crisis and the resultant economic decline. But growing inequalities and injustice will remain a powerful reminder that unregulated market economies with little social protection are doomed. As long as the progressive social forces and the counter-balancing capacity of governments are being undermined by prevailing neoliberal forces, this sober state of affairs can only lead to more problems and a growing frustration on the part of those who seek alternatives to the status quo – alternatives that have actually produced better social results in the Scandinavian countries.⁷⁻¹¹ Increasingly, people are becoming aware of the root causes of socioeconomic problems and are willing to openly express their deep frustration with the status quo. The recent Occupy Wall Street movement is just an example of such expression and a portent of the shape of things to come with the advent of potent social media. We have already witnessed the depth and breath of social resentment in Greece and to lesser extent in other southern European countries.

The present study emphasizes the historical role of welfare programs and the legitimate role of governments in regulating markets and protecting those who are either excluded from the markets or are casualties of the markets. It takes the view that social policy, as embodied in all sorts of welfare programs or social protection measures, would protect the society against ill health, poverty, inequality, and other social maladies.

The study goes beyond intuitive, anecdotal and cross-sectional evidence to systematically examine the empirical relationships between social wellbeing and social spending using panel data for a large group of the OECD countries from the period 1980-2009 as available. Social wellbeing is measured by population health outcomes, poverty, income inequality, and crime. The general finding of the study is that greater social protection through social spending improves population health and reduces poverty and income inequality directly and reduces crime indirectly through reduced inequality.

Social vaccine, social policy, and social determinants of health

The metaphor of social vaccine and its evolution

Social vaccine is a relatively new concept whose meaning and scope has been evolving. The origin of the concept may have arisen in counselling and psychological studies¹² that considered self-esteem as “a ‘social vaccine,’ or a dimension of personality that empowered people and inoculated them against a wide spectrum of self-defeating and socially undesirable behavior.”^{13(p3)} The term has been used in the HIV/AIDS literature with a focus on education. For example, Baker and colleagues emphasize the critical role of schooling as a social vaccine against HIV infection.¹⁴ In the fight against HIV/AIDS, the concept has also been broadly understood as “a comprehensive package of preventive education, promotion of contraceptive use and edification of communities.”¹⁵ In addition, the International Labour Organization (ILO) has advocated for a social vaccine “which includes such elements as social inclusion, income and job security, social security and solidarity.”¹⁶ A recent definition of the concept has been proposed as follows:

A social vaccine is a process of social and political mobilisation which leads to increased government and other institutions’ willingness to intervene with interventions, applied to populations rather than individuals, aimed at mitigating the structural social and economic conditions that make people and communities vulnerable to disease, illness and trauma.^{17(p429)}

In the present study, social vaccine is thought of as any measure or set of measures that protects a society against ill being, just as a medical vaccine protects the individual against ill health. Such measures are generally referred to as social policy. This notion of social vaccine is close to that of the ILO. Social policy is conventionally understood as a set of programs or policies implemented mostly by governments to protect the wellbeing of certain segments of population who are not faring well on their own with market allocation as the primary distributor of resources and income. It includes welfare programs, public assistance, unemployment insur-

ance, and the like, collectively referred to as the welfare state.

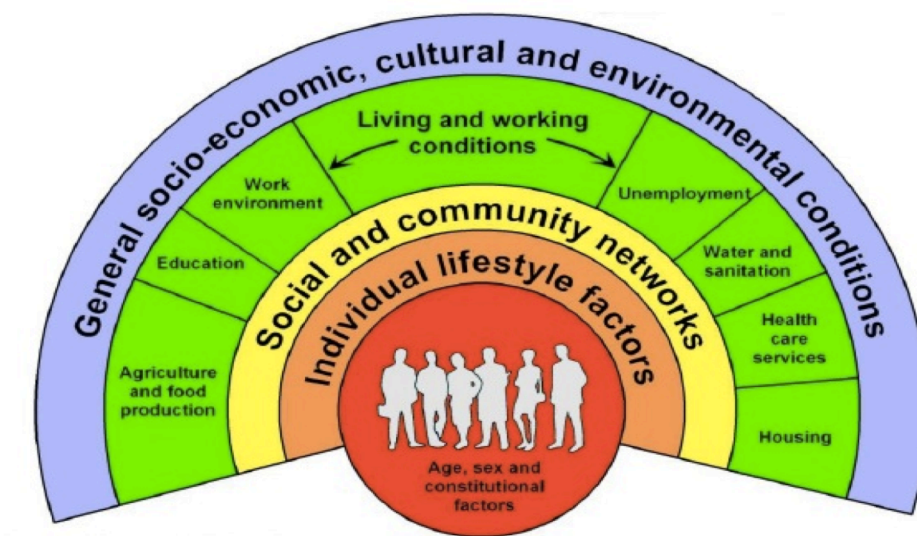
Social determinants of health

Social vaccine is concerned with the health and wellbeing of entire populations. More specifically, it views health and wellbeing as outcomes of social structure and the distribution of societal resources. As such, it belongs to the emerging social determinants of health (SDOH) paradigm. This paradigm considers the social and economic environment as the upstream or root cause of the health problems of populations.¹⁸⁻²⁷ Social environment broadly refers to living conditions and socioeconomic status of people. Dahlgren and Whitehead provide a layered schematic model of determinants of health (Figure 1) in which the upstream role of socioeconomic environment in population health is contrasted with that of downstream individual constitutional (biological) determinants.²⁸

The literature on SDOH is growing fast and is beginning to find its way into the mainstream media in spite of the dominance of the biomedical discourse in such media. The WHO Commission on Social Determinants of Health (CSDH) has completed its final report with a key message that “social injustice is killing people on a grand scale.” It urges governments and policy makers around the world to recognize SDOH and formulate policies to address these determinants.²⁷ Some of the key areas of SDOH as identified in the literature include early childhood development, employment status/working conditions, income/poverty, inequality, social inclusion, education, gender, race, ethnicity, and culture.

A key finding of the SDOH literature is the existence of health inequities along socioeconomic dimensions, known as the health gradient. Strong evidence shows that the further up you are on the socioeconomic ladder, the healthier you are. Thus, it is no wonder that the poor and marginalized among us are the least healthy. Health gradients are observed both within populations and between populations. Health gradients along the socioeconomic dimensions were first identified in the findings of the Black Report.²⁹ Since then, a large number of studies have produced evidence for health gradients

Figure 1. Dahlgren and Whitehead's model of determinants of health



along other dimensions including income, education, employment status, inequality, social capital, access to healthcare services, and so on.

Addressing the SDOH through social policy is a fundamental preventive investment by the governments that pays off handsomely in terms of improved population health and reduced healthcare costs. We should not think of social policy as handouts to the so-called “welfare bums.” We should think of it as a social vaccine that prevents ill health and other social maladies such as poverty, inequality, social exclusion, social unrest, and crime. Social policy helps reduce poverty and inequality by *secondary* redistribution of income and other societal resources and improves the living conditions and the health of those at the bottom of socioeconomic ladder. This narrower view of social policy is known as *residual* social policy. However, when extended to investment in public infrastructure, early childhood development, education, job market training and protection, regulating the markets, and protecting the environment, social policy would lead to a more equitable (socially just) *primary* distribution of income and other resources. Such broader view of social policy is referred to as *universal* or *transformative* social policy.³⁰

Data and methodology

Data

Data from the period 1980-2009 is used for 25 OECD countries to estimate the relationships between social wellbeing and social spending. Social wellbeing is measured by population health outcomes, including life expectancy and mortality rates. It is also measured by social outcomes, including poverty and crime rates. Social spending is measured by public social spending on health and public social spending on other non-health areas, both measured as a proportion of gross domestic product (GDP) of the country. GDP per capita, unemployment rate, and union density – the proportion of the labor force that is unionized in a country - are used as control variables as appropriate in different models. Data on population health outcomes is taken from the OECD Health Data.³¹ Data on income (GDP), unemployment, social expenditures, poverty, and inequality are obtained from the OECD online database (StatExtracts).³² Data on crime and homicide are obtained from the European Union database (Eurostat).³³ The latter provides data for some OECD countries that are not members of the European Union. While data on population health (life expectancy and mortality rates) were available

for the entire period (1980-2009) and for almost all 25 OECD countries, data on poverty rates were limited to several selected years – starting in mid-1980s and appearing in 5-year intervals with the latest year being 2008 – reducing the sample points significantly. Consistent data on crime rates were only available since 1991 for most (but not all) countries in the sample.

Methodology

The study uses panel estimation methods to capture both the temporal and spatial dimensions of sample data and account for unobservable country-specific effects. Health outcomes are regressed on the natural log of income per capita (LGDP), social expenditure on health (SOCXH) and non-health social expenditure (SOCXNH) – both measured as a proportion of GDP. A common time trend (T) and its square (T²) are also included in the model to allow for a non-linear time trend. Thus, a typical model for a health outcome is specified as:

$$H_{it} = \alpha_i + \beta_1 LGDP_{it} + \beta_2 SOCXH_{it} + \beta_3 SOCXNH_{it} + \beta_4 T + \beta_5 T^2 + u_{it}$$

where H_{it} stands for a health outcome such as life expectancy or mortality rate in country i during time period t . α_i represents unobserved country specific effects and u_{it} is the error term. Two interaction terms D1T and D2T (not shown in the above model) represent the interactions of dummy variables D1 and D2 with the common time trend (T). D1 is used to capture any variation from the common time trend experienced by three countries in the sample (Germany, Poland, and Slovakia) after the fall of communism around 1990. D2 is used to capture any change in the common time trend due to the financial and economic crises of 2008 and 2009 for all countries in the sample. Life expectancies are those at birth (LEB), at age 40 (LE40), and at age 65 (LE65) separately estimated for men and women. Mortality rates include neonatal mortality rate (NMR), infant mortality rate (IMR), maternal mortality rate (MMR) and all-cause mortality rates (ACMR) for men and women.

Poverty as a social outcome is regressed on log of per capita income (LGDP), union density (UNID), unemployment rate (UR), and total social

expenditure as a proportion of GDP (SOCXT). As with the health outcomes, T and T² are also included in the poverty model. Thus, the model for poverty is specified as:

$$POV_{it} = \alpha_i + \beta_1 LGDP_{it} + \beta_2 UNID_{it} + \beta_3 UR_{it} + \beta_4 SOCXT_{it} + \beta_5 T + \beta_6 T^2 + u_{it}$$

where POV indicates poverty rate after tax and transfers. α_i and u_{it} are as defined as in the health outcomes model. Poverty rate is defined as the proportion of individuals with incomes less than or equal to 50% of the median income in each country, which provides a consistent measure across the countries. Union density (UNID) is used to capture the impact on poverty of collective bargaining in protecting jobs and wages during the primary distribution, whereas SOCXT is used to capture the impact of secondary (residual) redistribution.

Finally, crime is specified by the following model:

$$CRIME_{it} = \alpha_i + \beta_1 LGDP_{it} + \beta_2 UR_{it} + \beta_3 SOCXT_{it} + \beta_4 T + \beta_5 T^2 + u_{it}$$

where CRIME stands for total crime rate (measured per 100,000 population) in a country during time period t , and the other regressors are as defined above.

The above models are estimated using fixed cross-sectional (country-specific) effects.* The estimation results for each of the health and socioeconomic outcomes are provided in the following section.

Estimation Results

Estimation results for health outcomes are reported in Tables 1 and 2. The results for socioeconomic outcomes are reported in Table 3. Table 1 shows the results for life expectancy that are estimated for men and women separately.

The results in Table 1 clearly indicate that higher average income (LGDP) and higher social expenditure on health (SOCXH) and non-health services (SOCXNH) contribute to higher life expectancy at birth (LEB), at age 40 (LE40) and at age 65 (LE65)

* Hausman tests were applied to compare the suitability of fixed versus random cross-sectional effects. In all cases, a fixed-effect specification proved to be a better specification.

Table 1. Estimation results for life expectancy

Dependent variables	LEB		LE40		LE65	
	Men	Women	Men	Women	Men	Women
Constant	60.75* (4.539)	51.35* (3.300)	27.63* (3.140)	17.65* (2.380)	11.95* (1.874)	-1.933 (2.108)
LGDP	0.907† (0.462)	2.449* (0.343)	0.591§ (0.316)	2.068* (0.246)	0.150 (0.190)	1.857* (0.219)
SOCXH	0.114* (0.030)	0.149* (0.036)	0.056† (0.024)	0.105* (0.032)	0.080* (0.018)	0.055† (0.028)
SOCXNH	0.020† (0.009)	0.102* (0.013)	-0.029* (0.008)	0.066* (0.010)	-0.021* (0.006)	0.064* (0.010)
T	0.130* (0.015)	0.080* (0.013)	0.132* (0.009)	0.068* (0.010)	0.076* (0.007)	0.041* (0.010)
T ²	0.003* (0.0003)	0.001* (0.0003)	0.002* (0.0002)	0.001* (0.0003)	0.002* (0.0002)	0.001* (0.0003)
D1T	0.379* (0.114)	0.571* (0.120)	0.305* (0.082)	0.525* (0.086)	0.377* (0.059)	0.529* (0.073)
D2T	-0.005* (0.002)	-0.001 (0.003)	0.001 (0.002)	0.002 (0.003)	0.002 (0.002)	0.002 (0.003)
R ² (full model)	0.970	0.958	0.960	0.945	0.948	0.918
R ² – FE	0.503	0.509	0.521	0.509	0.385	0.467
n	24	24	24	24	24	24
t	27.5	27.5	27.2	27.2	27.4	27.4

Notes: Standard deviations are given in the brackets below each parameter estimate. Statistical significance at 0.01, 0.05 and 0.10 are noted by *, †, and §, respectively. R² – FE refers to the R² of the base model with fixed effects only. n is the number of cross sections (countries) in each estimated model, and t indicates the average number of observations (periods) used in each model.

for women. For men, higher average income contributes to life expectancy at birth, but not to life expectancy at age 40 and age 65. Social expenditure on health contributes positively to all three life expectancies for both men and women. Social expenditure on non-health services contributes positively to life expectancy at birth for both men and women. However, its contribution to life expectancy at age 40 and age 65 is different for men than women. While it contributes positively to those life expectancies for women, it affects those life expectancies negatively for men. The magnitude of contribution by income and social spending on health and non-health are consistently higher for women than men, except for the contribution of social spending on health to life expectancy at age 65. The results also show a non-linear (quadratic) time trend for the panel, indicating rising life expectancy at an increasing rate. The R²s for the full models are all very

high, indicating a very good fit. However, a good portion of such R²s belongs to the unobserved country fixed-effects (R² – FE). The fixed effects are not shown in the table. The results from the interaction term D1T indicate there has been additional gain in life expectancy for three countries in the sample – Germany, Poland, and Slovakia – that were affected by the fall of communism around 1990. As for the possible impact of the financial crisis of 2008, the results from the interaction term D2T indicate that only life expectancy at birth for men was adversely affected.

Table 2 reports the estimation results for mortality rates. Only all-cause mortality rates (ACMR) are estimated for men and women separately.

As we would expect, the factors that contribute to higher life expectancy should reduce mortality. The results in Table 2 reflect a general pattern of reduced mortality rates due to higher GDP and so-

Table 2. Estimation results for mortality rates

Dependent variables	NMR	IMR	MMR	ACMR	
				Men	Women
Constant	80.83* (3.904)	71.54* (11.82)	66.95* (34.92)	1544.6* (206.3)	1604.7* (206.1)
LGDP	-7.072* (0.431)	-5.429* (1.266)	-4.742 (3.550)	-36.78§ (20.87)	-85.67* (20.96)
SOCXH	-0.184§ (0.098)	-0.492* (0.191)	-0.121 (0.337)	-8.815* (2.773)	-8.197* (2.400)
SOCXNH	-0.225* (0.023)	-0.264* (0.039)	-0.505* (0.121)	0.866 (0.784)	-3.733* (0.722)
T	-0.098* (0.022)	-0.230* (0.043)	-0.094 (0.114)	-12.21* (1.042)	-5.733* (0.963)
T ²	0.003* (0.0005)	0.003* (0.0009)	0.001 (0.002)	-0.101* (0.029)	-0.016 (0.025)
D1T	0.033 (0.199)	0.185 (0.333)	-3.136† (1.422)	-18.03 (11.30)	-5.842 (8.314)
D2T	-0.003 (0.002)	0.013* (0.005)	0.016 (0.018)	0.152 (0.343)	-0.161 (0.158)
R ² (full model)	0.885	0.871	0.941	0.956	0.937
R ² – FE	0.610	0.626	0.894	0.455	0.499
n	24	24	24	24	24
t	26.6	27.1	25.1	25.7	25.7

Notes: Standard deviations are given in the brackets below each parameter estimate. Statistical significance at 0.01, 0.05 and 0.10 are noted by *, †, and §, respectively. R² – FE refers to the R² of the base model with fixed effects only. n is the number of cross sections (countries) in each estimated model, and t indicates the average number of observations (periods) used in each model.

cial expenditure on health and non-health services. Here, too, the contributions are statistically significant, except for those of LGDP and SOCXH to maternal mortality (MMR). The gendered pattern of magnitude of contributions that were observed for life expectancy is generally echoed here in the results for all-cause mortality (ACMR). That is, GDP and SOCXH contribute more to women's ACMR than men's, while the contribution of SOCXNH to ACMR is comparable for both genders. The estimated coefficients for time indicate a non-linear time trend for NMR, IMR, and ACMR for men, and no time trend and a linear time trend for MMR and ACMR for women, respectively. The results for the interactive term D1T indicate a statistically significant reduction in MMR for the former communist countries after 1990. Additionally, the results for D2T indicate a statistically significant, albeit very

small, increase in IMR after the 2008 financial crisis. The R²s are slightly smaller than those in Table 1, but are still quite high. As was the case with the life expectancy models, a large portion of R²s in mortality models are due to unobservable fixed country effects, especially for MMR.

Turning to the results for socioeconomic outcomes, Table 3 reports the estimation results for poverty and crime. The poverty measure used for the estimation is *poverty rate after tax and transfers* to avoid the potential problem of endogeneity between poverty and social spending. However, given the possibility of endogeneity between poverty and LGDP, two-stage least squares (2SLS) estimation results are reported along with the ordinary least squares (OLS) results. The 2SLS corrects for the possible endogeneity of LGDP. Also in view of a possible endogeneity between crime and social

Table 3. Estimation results for socioeconomic outcomes

Dependent variables	Poverty		Crime	
	OLS	2SLS	OLS	2SLS
Constant	10.78 (35.41)	13.96 (37.92)	-318.6* (93.70)	2.457* (0.300)
LGDP	0.567 (3.660)	0.298 (3.909)	36.75* (8.955)	8.360* (0.561)
UNID	-0.100 [§] (0.055)	-0.096 (0.061)		
UR	0.122 [†] (0.055)	0.128 [†] (0.059)	0.517* (0.149)	0.871* (0.157)
SOCXT	-0.216 [†] (0.105)	-0.257 [†] (0.118)	0.999* (0.316)	-1.034* (0.281)
T	0.086 (0.119)	0.097 (0.116)	-0.584 (0.476)	-0.399 (0.541)
T ²	-0.002* (0.0007)	-0.002 [†] (0.0008)	-0.009 (0.011)	0.005 (0.012)
D1T	0.737 (0.509)	0.782 (0.614)		
D2T	0.014* (0.003)	0.014* (0.003)		
R ² (full model)	0.934	0.932	0.965	0.957
R ² – FE	0.906	0.906	0.960	0.960
n	24	24	22	285
t	4.7	4.6	17.4	0.946

Notes: Standard deviations are given in the brackets below each parameter estimate. Statistical significance at 0.01, 0.05 and 0.10 are noted by *, †, and §, respectively. R² – FE refers to the R² of the base model with fixed effects only. n is the number of cross sections (countries) in each estimated model, and t indicates the average number of observations (periods) used in each model.

spending, both OLS and 2SLS estimation results are reported for crime as well. The interactive terms D1T and D2T are not included in the crime model in part because crime data were only available after 1991 and more so due the impossibility of estimating the model with the common time trend included.

The results for poverty from both OLS and 2SLS are fairly similar. They indicate that income (LGDP) and union density (UNID) make no statistically significant contribution to poverty rate. However, unemployment rate (UR) and total social spending (SOCXT) show statistically significant effects on poverty. Higher unemployment rate increases poverty rate, whereas higher social spending reduces poverty rate. The results also show a very gradually

declining non-linear time trend for poverty, and a small but statistically significant increase in poverty after the crisis of 2008.

The results for crime are somewhat different between OLS and 2SLS estimation. In both sets of results income (LGDP) and unemployment rate make positive statistically significant contributions to crime rate. However, the contribution of total social spending (SOCXT) is positive under OLS but negative under 2SLS. This implies that endogeneity between crime and social spending is plausible and 2SLS are probably more reliable. If so, the results from 2SLS indicate that higher social spending reduces crime rates. No statistically significant time trend is observed for crime.

Discussion

The findings for life expectancy, as reported in Table 1, strongly support the positive contribution of higher average income along with greater social spending to life expectancy at various ages. To get a sense of the magnitude of such contribution, for example, a 2.72-fold increase in GDP amounts to 0.907 years gain in life expectancy at birth for men but 2.45 years for women. The same increase in GDP amounts to 0.591 years gain in life expectancy at age 40 for men, but 2.068 years for women. The gains in life expectancy decline with age so that the gain for the same increase in GDP amounts to no increase in life expectancy at age 65 for men, but 1.857 years for women. Both social spending on health and social spending on non-health services contribute to higher life expectancy for men and women. Like income, these contributions generally decline with age. For instance, a 1% increase in social spending on health (measured as a proportion of GDP) leads to a life expectancy gain of 0.114 years at birth and 0.080 years at age 65 for men. The same increase in social spending on health leads to a life expectancy gain of 0.149 years at birth and 0.055 years at age 65 for women. The contribution of social spending on non-health services more or less follows the same pattern as social spending on health. However, the magnitude of the contribution is significantly smaller. Although the magnitude of income effects on life expectancy appear to be much larger than those of social spending, it should be noted that a 2.72-fold increase in social spending on health would be equivalent to 10.5% (on average) increase in such spending. Similarly, a 2.72-fold increase in social spending on non-health services is equivalent to 25% (on average) increase in spending. Such magnitude of change would bring the effects of social spending on health close to that of income. Regardless of the specific magnitude of contribution, it is clear that women are gaining more in life expectancy from higher income and social spending than men. A possible interpretation is that women benefit more from the greater availability of resources (due to higher GDP) and greater social spending on health, education, childcare, and housing because these are important for the wellbeing of women, who play multiple roles in society. Life expectancy tends to have a gently rising non-linear trend, which could be attributed to overall improvements in socioeconomic conditions and improvements in technology and healthcare systems. There is also evidence of additional gains in life ex-

pectancy after 1990 for the formerly communist countries in the sample, which may be related to improved sociopolitical conditions in those transitional countries.

The contribution of higher income and social spending to reduced mortality rates, as reported in Table 2, echo our findings for life expectancies. As expected, higher income and social spending (both health and non-health) contribute to lower mortality rates. For example, a 2.72-fold increase in GDP per capita reduces neonatal mortality rate (NMR) by 7.072, infant mortality rate (IMR) by 5.429, and maternal mortality rate (MMR) by 4.742 (all per 1,000 live births). Also, the same increase in income reduces all-cause mortality by 36.78 for men and 85.67 for women (per 100,000 population). On the other hand, a 1% increase in social spending on health (as a percentage of GDP) reduces neonatal mortality by 0.184 and maternal mortality by 0.492 (per 1,000 live births). The same increase in social spending on health reduces all-cause mortality by 8.815 for men and by 8.197 for women (per 100,000 population). The contribution of social spending on non-health services to reduced infant mortality rate is almost double the contribution of social spending on health. Several studies have demonstrated lower infant mortality rates in countries with more generous social spending.^{7,9-11,34} The role of social spending on health, especially early in life, is consistent with the expanding evidence on the role of social determinants of health. Also consistent with the results for life expectancy, the contribution of income and non-health social spending to reduced all-cause mortality is greater for women than men. There is not much gender difference in reduction in all-cause mortality due to social spending on health. As expected, a gently declining non-linear time trend is evident for all mortality rates. Additional decline in mortality in the formerly communist countries after 1990 is only observed for maternal mortality.

The findings for poverty and crime reported in Table 3 contain some interesting patterns. Higher unemployment appears to contribute to higher poverty and crime rates. Lack of earnings through primary distribution pushes some people to poverty and, in extreme cases, distress from unemployment could lead to crimes such as theft. On the other hand, social spending as secondary distribution appears to reduce poverty as well as crime. The anomalous result is the positive relationship between income and crime. We cannot explain this seemingly spurious relationship. Omitted variables and the

dominance of country-specific effects might be potential culprits. Finally, a very gradual declining time trend is observed in poverty rates, but a small increase in poverty is observed after the 2008 financial crisis.

The lack of contribution of variables in the crime model (beyond those of the fixed effects) to R^2 s indicate that crime is strongly country-specific and has to do with various cultural and institutional factors in the countries that are not captured by the selected variables for this model. Indeed, the country-fixed effects (available from the author) for crime rates range from about 16.8 for Japan to 137.4 for Sweden (per 100,000 population). Ironically, countries that are well known for their generous social spending register higher rates of crime than those with less social spending, such Greece or Portugal. While it is possible that the official crime data may not reflect the actual crime rate in a country, the role of culture and other social institutions in the prevalence of crime cannot be ignored. A thorough examination of the dynamic relationships between poverty or crime on the one hand, and social spending, unemployment, and income on the other, requires dynamic modeling (e.g., dynamic panel) methods to capture the effects of lagged values of variables on their current values. However, the available of data at this point prevents such undertaking.

Conclusion

The results of this study consistently show that income, social expenditure on health and non-health services have favorable impact on life expectancy and mortality rates. As for poverty, higher social expenditure reduces poverty, whereas higher unemployment increases poverty. Similarly, higher social expenditure reduces crime, but higher unemployment increases it. The results are robust for life expectancy and mortality rates, but less so for poverty and crime rates. Taken together, such results support the existing evidence on the important role of the social determinants of health. They imply that increasing income (in primary distribution) and increasing social spending (as secondary distribution) as part of a universal social policy pays off well in terms of improved population health and wellbeing and reduced poverty and crime rates. Although improving social wellbeing and social protection are morally justified in their own right, the findings imply that even a purely rational view concerned with the societal costs and benefits of public policy should find social

policy an effective tool or vaccine against population ill-health, poverty, and crime. Social policy in its broader conception can also prevent social tension and popular unrest, both of which undermine the security, stability, and long-term sustainability of a society.

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