Influence of Health Care Expenditures, GDP, Employment and Globalization on Cardiovascular Disease Mortality: Potential Implications for the Current Recession

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Abstract

The current business climate, including recession, and continuing globalization involving industrial restructuring, prompt concern about effects in the US of this combined threat to cardiovascular (CVD) illness – the largest source of industrialized country mortality. Individual level studies have linked limited health care access, lower socio-economic status and job loss to higher CVD mortality. It is essential to determine whether these findings prevail at the national level? If so, then CVD mortality rates will worsen as a result of economic loss, involving employment and GDP reductions, combined with business restructuring. Time-series analysis shows that health expenditures, labor force participation, and GDP per capita, tend to decrease CVD mortality, controlling for consumption risk factors. Employment rates are negatively related to CVD mortality over 1979-2006. Clearly, economic policy, as it influences business conditions, macroeconomic policy and health care financing, plays a major role in the nation's health.

Keywords: Business conditions, GDP, Cardiovascular illness, Recession, Employment, Globalization, Macroeconomic Policy, Health Care Financing

1. Research Questions

The current international recession is occurring within a context of increasing globalization, large-scale manufacturing job loss, and debate over health care costs and insurance coverage. The study concerns the potential impact of this widespread and severe recession on cardiovascular mortality and clinical practice in the United States, given what is known about the influence of various risk factors, biomedical technologies, and national health expenditures on CVD mortality.

1.1 Individual-Level Studies

Individual and clinical studies have shown that cardiovascular disease is complex, linked to several risk factors that can operate simultaneously. Individual level epidemiological studies consistently have linked limited health care access (Ford et al., 22007) lower socio-economic status (Alter et al., 2006; Antonovsky, 1989; Marmot & McDowall, 1986), job loss (Gallo et al., 2006; Jin, Shah, & Svoboda, 1995; Linn, Sandifer, & Stein, 1985; Morris, Cook, & Shaper, 1994; Moser, Fox, Jones, & Goldblatt, 1986; Sorlie & Rogot, 1990), and unhealthy consumption behaviors (including smoking, heavy alcohol use, over-eating) [Lynch, Glass, & Tran, 1988] to higher CVD mortality rates. However, previous investigators tended to treat the main CVD mortality risk factors as separate issues, with separate research literatures (e.g., health care access, socioeconomic status, employment, stress, and behavior change), leaving unclear the relative importance and interrelationships of the various key risk and benefit factors and their relation to national CVD mortality rates.

1.2 Conformity of National to Individual-Level Studies

Are the CVD risk factors, found important in epidemiological studies at the individual level, also related to trends and fluctuations in national level CVD mortality rates?

To answer this question, the investigation utilizes data about individual level risk factors at an aggregated national level, in concert with national level economic data regarding private and public health expenditures, and estimates the relative influence of the various risk factors on national CVD mortality rates. The findings contribute to the dialogue about how best to protect national health status in the context of the current international recession and continuing globalization with its restructuring of US industries.

2. Background

2.1 Economic Position of the National Population

Concern about the effect of the current recession on cardiovascular disease is founded on the threat it poses to the economic position of the national population. *At the national level*, per capita GDP is the financial basis for societal investments in health care and social welfare. Under non-recessional circumstances, stable economic growth fosters increased health insurance coverage, increased health care utilization for preventive and routine care, greater access to critical and rehabilitative coronary care, and greater capacity to purchase medications and therapies which prevent further heart attacks and complications.

2.2 Socioeconomic Status

It is also a ubiquitous epidemiological finding, *at the individual level*, that low socioeconomic status is a key predictor of relatively high morbidity and mortality rates in industrialized countries (Alter et al., 2006; Antonovsky, 1989; Marmot & McDowall, 1986). In particular, over the last 30 years, unemployment — a determinant of low socioeconomic status — is related to relatively high illness and mortality rates especially involving poor mental health and cardiovascular mortality (Gallo et al., 2006; Jin, Shah, & Svoboda, 1995; Linn, Sandifer, & Stein, 1985; Morris, Cook, & Shaper, 1994; Moser, Fox, Jones, & Goldblatt, 1986; Sorlie & Rogot, 1990). Further, in the U.S. employment has been a principal source of health insurance.

These harmful effects of job loss have been attributed in part to a lack of health insurance and a reduction in spending for preventive health care (e.g., assessment, immunizations) and the inconsistent use of prescribed medications through delay, minimization or discontinuance of dosages. In part, those who lose work often reduce routine follow-up visits for chronic illnesses, or delay in seeking health care to the point of need for emergency care (Kapur & Marquis, 2003; Berki et al, 1985).

2.3 Emotional Stress

There are additional reasons to believe that the emotional stress related to economic recessions and job losses are important sources of decreased life expectancy, and increased cardiovascular mortality in particular. Long-term job losses can result in downward social mobility. In an attempt to diminish the emotional stress of such losses, some withdraw from relationships, are distraught, and resort to coping behaviors such as increased consumption of tobacco, alcohol, carbohydrates and animal fats, resulting in poor control of blood pressure, weight gain and increased body mass index — which epidemiological studies have shown as risk factors in cardiovascular disease (Carney, Freedland, Miller, & Jaffe, 2002; Lynch, Glass, & Tran, 1988; Ohlin, Nilsson, Nilsson, & Berglund, 2004; Sheps et al., 2002).

Do the findings at the individual level, which link both lower socioeconomic status and job loss to higher mortality rates, also pertain to entire national populations? If this is the case, decreases in national health care expenditures, poor economic growth and recession in general should be associated with increases in US cardiovascular mortality rates.

3. Recent Trends in Globalization and Employment

3.1 Globalization and Industrial Restructuring

The last quarter century has been a time of increasing globalization of industrial and labor market activity. Concurrently, the US has been experiencing restructuring of its manufacturing and service industries, combined with large-scale job losses in these industries. These trends have tended to decouple, *at the national level,* economic growth from employment changes. (See Figures 1a, b, c, d). Since the 1990's until the current recession, GDP per capita has shown a relatively smooth upward trend (Figure 1a).

In contrast, labor force participation as a proportion of the population (Figure 1c) shows a declining trend since 1997, as well as oscillating movements. It is significant that since 2000 rising unemployment rates have, remarkably, occurred over the same time period that GDP per capita has *increased*, suggesting a long term loss of jobs. A frequent method of reducing labor costs in the United States has been to shift employment to lower wage economies among the new industrializing countries. The implication of such job restructuring is that employees who have lost work in the US manufacturing and service industries will likely suffer a permanent decline in economic position, regardless of whether they are able to regain employment elsewhere (Podgursky & Swaim, 1987a; Podgursky & Swaim, 1987b; Uchitelle & Kleinfield, 1996).

3.2 Economic Loss to Subpopulations Despite Overall Growth

For those who lose permanent jobs, the alternative — if they wish to return to employment — is for many to "re-train" to enter another industry or occupation which is likely to offer lower seniority, wages, benefits, and pensions. Even with re-training, the entry into a new industry at a low level of seniority will result in wage/salary and benefit declines, in the short- and long-term (Podgursky & Swaim, 1987a; Podgursky & Swaim, 1987b; Uchitelle & Kleinfield, 1996).

Figure 2h shows another result of this decoupling of economic growth from employment trends: greater income inequality. The consequence of high GDP per capita in periods of increasing unemployment rates is continued elevation of income inequality, as reflected in the upward trend of the Gini Coefficient.

3.3 Health Effects of Job Loss

At the individual level, the effects of job loss on health would be expected to become increasingly severe, because of the greater potential for long-term unemployment, and widening economic inequality since the 1990s. Even for workers who have relatively high skill levels, there is a considerable job loss, with long-term declines in socio-economic status. This situation of downward mobility occurs more rapidly in permanent job loss than in the case where unemployment is "cyclical," and magnifies disparities in social and economic standing and purchasing power. Loss of health insurance further exacerbates the difficult situation facing the unemployed worker.

Indeed, several epidemiological studies in the last decade have shown this decrease in permanent employment resulting from restructuring to be linked to short-term increases in morbidity and mortality rates (Bambra & Elkemo, 2008; Kivimäki et al., 2008; Martikainen, Ma, & Ja, 2007; Virtanen et al., 2005). Under conditions of job loss in the era of globalization — especially coupled with recession — there is likely to be a more powerful and more rapid adverse health reaction than has occurred prior to the 1990's.

4. Methods

4.1 National-Level Measures

This study employs national-level measures, representative of individual level risk and benefit factors, to test whether, at the national level, there is a relationship over a specified time between age-standardized CVD mortality rates and acute myocardial infarction (AMI) mortality rates in the U.S. and:

- Health care expenditures as a proportion of the GDP
- GDP per capita
- Labor force participation

4.2 Analysis

Rather than testing each factor separately, it is desirable to test, simultaneously, the three hypotheses, while controlling for confounders. Time-series regression analysis was selected as the statistical method to estimate the relationships between age-standardized CVD and AMI mortality rates and national level factors. Thus, the test of the resulting model should shed light on the relative influence and interrelationships of health care expenditures, recession, job loss, and consumption risk factors on CVD and AMI mortality rates in the US over the same period.

4.3 Data

This study concentrates on the years 1961-2006, during which the US experienced three mild national recessions and three major international recessions. Concurrently, there were widespread changes in coronary care treatment, including utilization of beta blockers, aspirin, statins, ACE inhibitors, angioplasty, clot dissolving medications, and by-pass surgery (Ford et al., 2007). Data sources include the Organization for Economic Cooperation and Development health accounting databases, the U.S. Department of Commerce, Bureau of Economic Analysis, and the U.S. Department of Agriculture and the Food and Agriculture Organization data base for consumption variables.

5. Results

5.1 Key Predictors

Test of the model revealed three factors which are highly significantly related to reductions in CVD mortality rates for the period 1961-2006 and for CVD and AMI (AMI data available since 1968) over 1968-2006: (a) health expenditures as a percentage of GDP; (b) real GDP per capita, and (c) labor force participation rates (Table 1). These variables show statistical significance controlling for the consumption factors (tobacco, carbohydrates, and animal fats). There is also a sharp drop in CVD mortality that is maintained following the mid-1970s presumably due to effects of major technological developments in CVD care (Ford et al., 2007). In the model the drop is expressed by a binary variable where pre -1975 is set at zero and post-1975 at 1.0.

5.2 Employment and Unemployment

The employment and unemployment rate variables were tested separately for their relations to CVD and AMI mortality rates (Figure 2i, j) over 1979-2006, coinciding with the large trend increase in globalization (Figure 3a, b). These tests adjust for health expenditures as a percentage of GDP and diagnostic changes due to ICD-10. Employment rates show significantly inverse, and unemployment rates show significantly positive, relations to CVD and AMI mortality rates (Table 2). Unemployment rates by duration of unemployment are positively and significantly related to CVD and AMI mortality rates. The relative duration of unemployment distinguishes the strength of the positive relationship of unemployment rates to CVD and AMI mortality rates (Table 2). Note that Tables 1 and 2 indicate that the labor market variables show stronger relations to AMI mortality than to total CVD mortality.

5.3 Control for Confounding Variables

Finally, in Figures 1e, f and Figure 2g, animal fat, carbohydrate consumption and tobacco distribution rates appear to be beneficially related to CVD mortality, which is epidemiologically and clinically incorrect. However, Table 2 shows that with controls for national health expenditures, GDP per capita and labor force participation rate, these variables are significantly related to CVD mortality rates with the correct positive sign (Appel, Sacks, & Carey, 2005; Hu & Willett, 2002). This study reaffirms the importance of the epidemiological requirement that the effects of potentially confounding variables need to be controlled in individual-level analyses, and suggests the requirement be extended to cover macroeconomic and health policy analysis.

6. Discussion

6.1 Significance of Globalization and Inequality

This investigation confirms, at the national level, the epidemiological research over the last three decades showing cardiovascular mortality rates related to poor health care access, lower economic status, and job loss. The test of the model shows that macro-economic and health care policy factors, such as level of health care expenditures, GDP per capita and labor force participation rates, can account for trends and fluctuations in cardiovascular mortality rates, controlling for known CVD risk factors of smoking, animal fat, and carbohydrate consumption.

In addition, Figure 1d, and Figure 2h identify parallel trends between increased economic inequality and unemployment that have become apparent since the year 2000. These upward trends are consistent with a literature reporting that globalization, as well as technological change, has led to a sharp increase in economic inequalities. This literature notes also a differential in unemployment and in wage stagnation that is increasingly pronounced in lower income groups as compared to more highly skilled workers (Moore & Ranjan, 2005; Wood, 1998).

6.2 Long-term versus Short-term Impact of Employment Loss

Reduced labor force participation has a negative effect on US cardiovascular health, likely reflecting the loss of health insurance, as well as chronic stress. Labor force participation is the primary variable that is used in this study to measure the effects of permanent employment loss that precede major economic loss. Simply looking at the contemporaneous effect of employment loss is misleading if we wish to understand the overall effect of unemployment on CVD mortality. Studies have shown the impact of risk and benefit factors for chronic disease extend over many years, for example, in smoking, diet, hypertension, and atherosclerosis research. Also, long term effects are reported in studies of chronic stress, major changes in economic position and benefits of preventive and routine medical care.

Epidemiologically, the most important damaging health implications of unemployment lie not in the short-term contemporaneous effects of employment loss, but in their cumulative medium- to long-term consequences. These may involve the inability of the unemployed person to find new employment consistent with his/her skills and social needs. In that case the individual may leave the labor force altogether and undergo considerable and permanent decline in economic position and, in a large proportion of cases, actually move into a situation of poverty and a marginal way of life (Blank & Blinder, 1985; Wilson, 1990). It is this situation of dropping out of the labor force which may be accompanied by chronic stress, clinical depression, and alcohol or other substance abuse, as well as debilitating physical illness (Jin, Shah, & Svoboda, 1995; Linn, Sandifer, & Stein, 1985; Morris, Cook, & Shaper, 1994; Moser, Fox, Jones, & Goldblatt, 1986; Sorlie & Rogot, 1990) that can be a major precursor to early mortality — especially due to cardiovascular disease.

7. *Concluding Discussion*

7.1 New Evidence of Impact of the Recovery on Health

This paper presents new empirical evidence that trends and fluctuations in US national CVD mortality rates overall, and acute myocardial infarction rates in particular, follow contractions and expansions of health care expenditures, real (i.e., inflation-adjusted) GDP per capita, and labor force participation rates, adjusting for CVD consumption risk factors. International recessions produce declines in real GDP per capita, and those declines coupled with continuing globalization of the economy, have decreased labor force participation rates in the US. Private and public insurance and medical care can mitigate cardiovascular illness, but in the US health care access is predominantly subject to payment from individual wages and health insurance connected to employment. Few can afford to continue health care benefits if they lose a job and are unemployed for long periods (Pear, 2008).

7.2 Macroeconomic Policy

Perhaps the most important set of policies that are invoked by this study relate to the overall economy. These involve economic growth and employment. At present, we have a reenactment of the classical debate over the role of government in the promotion of private sector growth: Keynesian stimulus versus more conservative approaches which emphasize minimal government involvement, deficit reduction and potential inflation. Models like the one presented in this article can be useful for simulating and forecasting the impact of specific economic policies. Subsequent approaches can simulate the effects of, say, GDP per capita and unemployment rates on future CVD mortality. The validity of such simulations can be tested when data on CVD mortality, as well as consumption risk factors, become available for the United States over 2007-2012. However, the national and international economies display a radically different pattern from what we have experienced in previous decades.

7.2 Safety Nets

In a recessional period of severe job and income loss, the usual safety net involving health care is particularly insecure. Prolonged periods without health insurance negatively affect utilization of prevention, detection, clinical care, and follow-up for cardiovascular disease, as those fearing substantial unemployment defer seeking health care or filling drug prescriptions (Pear, 2008). The obvious conclusion is that the US must re-examine its national health insurance policies, especially given the global economic crises which are expected to extend over several years. Adjustments will need to be made in unemployment insurance, especially if no change occurs in national health insurance.

Yet, advocating for national health insurance is not the whole story. To date there has been no formal, organized effort from the health sector to define as a cardiac risk group those suffering short- or medium-term job loss, or other effects of this severe recession, and to reach the out-of-work with proven interventions to mitigate chronic stress, lower the risk of (first) heart attack or stroke, and promote heart attack recovery.

It is noteworthy that while clinical depression, withdrawal from relationships, escalating anger, and chronic anxiety are usually linked to mental health problems, such aspects of emotional stress are strongly implicated in CVD illness. The programs in the mental health sector for emotional support of individuals who lose jobs, have not spread to cardiovascular health programming.

7.4 Medical and Public Health Response

This study suggests interventions at other levels to better address this risk group:

- Medical practitioners should be cognizant of the employment and economic circumstances of patients to assure adequate prevention, care and follow-up in cases of life-threatening illness. Actions include discussing ways patients can save money on medications through use of generics, talking with them about lifestyle factors that may have changed in this stressful time, and providing emotional support. Similarly, unemployment and job counselors need to be watchful of the health of clients and refer to public sources of health care wherever available.

- Many hospitals and clinics conduct courses in stress management, women's health, diabetes control, and other community health education subjects. These courses could also draw on the experiences of the mental health community in the 1980s to develop support groups for those currently "in transition" between jobs. The purposes would be to (a) prevent withdrawal from the labor force by those undergoing emotional stress and hopelessness; (b) permit screening for hypertension, angina, cardiac arrhythmias, and other conditions of chronic stress that could lead to heart attack; and (c) promote positive lifestyle factors such as weight control, exercise, adequate sleep and supportive friendships.

- City, county, state health departments need to develop a programmatic response to the health issues generated by unemployment and severe recession in their service areas — along the lines that the health profession has been thinking about disaster planning, with the program adapted to the challenges, opportunities and resources of the local situation. A key task will be outreach through partnerships with community organizations, service groups, and schools, because those affected by economic recessions and labor markets do not fall into the usual categories for public services (poor, disabled, unimmunized).

Finally, economists should be aware that the powerful effects of the economy on health are reflected in the medical and public health literature.

References

Alter, D.A., Chong, A., Austin, P.C., Mustard, C., Iron, K., Williams, J.I., ...Naylor, C.D**.** (2006). Socioeconomic status and mortality after acute myocardial infarction. *Annals of Intern Med*, 144, 82-93.

Antonovsky, A. (1989). Social inequalities in health: a complimentary perspective. In: N.J. Fox (Ed), *Health inequalities in European countries* (pp. 386-397). Aldershot, U.K.: Gower.

Appel, L.J., Sacks, F.M., & Carey, V.J. (2005). Effects of protein, monounsaturated fat, and carbohydrate intake on blood pressure and serum lipids: Results of the Omni Heart randomized trial. *JAMA*, 294 (19), 2455-2464.

Bambra, C., & Elkemo, T. (2008, Oct 17). Welfare state regimes, unemployment and health: A comparative study of the relationship between unemployment and self-reported health in 23 European countries. *J Epidemiol Community Health*. doi:10.1136/jech.2008.077354

Berki, S.E., Wyszewianski, L., Lichtenstein, R., Gimotty, P.A., Bowlyow, J.E., Papke, M.E., …Bromberg, J. (1985). Health insurance coverage of the unemployed. *Med Care*, 23 (7), 847-54.

Blank, R.M., & Blinder, A.S. (1985). *Macroeconomics, income distribution, and poverty*. Social Science Research Network, National Bureau of Economic Research, Working Paper No. 1567.

Carney, R.M., Freedland, K.E., Miller, G.E., & Jaffe, A.S. (2002). Depression as a risk factor for cardiac mortality and morbidity. A review of potential mechanisms. *Journal of Psychosomatic Research,* 53, 897-902.

Ford, E.S., Aljani, U.A., Croft, J.B., Critchley, J.A., Labarthe, D.R., Kottke, T.E., ...Capewell, S. (2007). Explaining the decrease in U.S. deaths from coronary disease, 1980-2000. *NEJM*, 356 (23), 2388-2398.

Gallo, W.T., Teng, H.M., Falba, T.A., Kasl, S.V., Krumholz, H.M., & Bradley, E.H. (2006). The impact of late career job loss on myocardial infarction and stroke: A 10 year follow up using the health and retirement survey. *Occupational and Environmental Medicine*, 63 (10), 683-687.

Hu, F.B., & Willett, W.C. (2002). Optimal diets for prevention of coronary heart disease. *JAMA*, 288 (20), 2569-2578.

Jin, R.L., Shah, C.P., & Svoboda, T.J. (1995). The impact of unemployment on health: A review of the evidence. *Can Med Assoc J*, 153 (5), 529-666.

Kapur, K., & Marquis, M.S. (2003). Health insurance for workers who lose jobs: Implications for various subsidy schemes. *Health Affairs*, 22 (3), 203-13.

Kivimäki, M., Shipley, M.J., Ferrie, J.E., Singh-Manoux, A., Batty, G.D., Chandola, T., ...Smith, G.D. (2008). Best-practice interventions to reduce socioeconomic inequalities of coronary heart disease mortality in UK: A prospective occupational cohort study. *Lancet*, 372 (9650), 1648-54.

Linn, M.W., Sandifer, R., & Stein. S. (1985). Effects of unemployment on mental and physical health. *Am J Public Health*, 75, 502-506.

Lynch, W.D., Glass, G.V., & Tran, Z.V. (1988). Diet, tobacco, alcohol, and stress as causes of coronary artery heart disease: An ecological trend analysis of national data. *Yale J Biol Med*, 61 (5), 413-26.

Marmot, M.G., & McDowall, M.E. (1986). Mortality decline and widening social inequalities. *Lancet*, 1, 274-276.

Martikainen, P., Ma, N., & Ja, M. (2007). The effects of unemployment on mortality following workplace downsizing and workplace closure: A register-based follow-up study of Finnish men and women during economic boom and recession. *American Journal Epidemiology*, 165 (9), 1070–1075.

Moore, M.P., & Ranjan, P. (2005). Globalization vs. skill-biased technological change: implications for unemployment and wage inequality. *The Economic Journal*, 115, 391-422.

Morris, J.K., Cook, D.G., & Shaper, A.G. (1994). Loss of employment and mortality. *BMJ*, 308, 1135-1139.

Moser, K.A., Fox, A.J., Jones, B.R., & Goldblatt, B.O. (1986). Unemployment and mortality: Further evidence from the OPCS longitudinal study 1971-81. *Lancet*, 1, 365-7.

Ohlin, B., Nilsson, P.M., Nilsson, J-A., & Berglund, G. (2004). Chronic psychosocial stress predicts long-term cardiovascular morbidity and mortality in middle-aged men. *European Heart Journal*, 25, 867-873.

Pear, R. (2008, Dec 6). When a job disappears, so does the health care. The *New York Times*.

Podgursky, M., & Swaim, P. (1987a). Job displacement and earnings loss: Evidence from the displaced worker survey. *Industrial and Labor Relations Review*, 41, 17-29.

Podgursky, M., & Swaim, P. (1987b). Duration of joblessness following displacement. *Industrial Relations*, 26, 213-226.

Sheps, D.S., McMahon, R.P., Becker, L., Carney, R.M., Freedland, K.E., Cohen, J.D., ...Kaufmann, P.G. (2002). Mental stress-induced ischemia and all-cause mortality in patients with coronary artery disease: Results from the psychophysiological investigations of myocardial ischemia study. *Circulation*, 105 (15), 1780-4.

Sorlie, P.D., & Rogot, E. (1990). Mortality by employment status in the national longitudinal mortality study. *Amer J Epi*, 132, 983-92.

Uchitelle, L., & Kleinfield, N.R. (1996, March 3). The downsizing of America: Analysis of displaced workers survey, Bureau of Labor Statistics. *The New York Times*, Section 1, (pp. 1).

Virtanen, P., Vahtera, J., Kivimäki, M., Liukkonen, V., Virtanen, M., & Ferrie, J. (2005). Labor market trajectories and health: A four-year follow-up study of initially fixed-term employees. *Am J Epidemiol*, 161 (9), 840-6.

Wilson, W.J. (1990). *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy*. Illinois: University of Chicago Press.

Wood, A. (1998). Globalization and the rise in labor market inequalities. *The Economic Journal*, 108, 1463-1482.

Table 1: Multivariable Regression Models for Age Standardized Cardiovascular Disease (CVD) and Acute Myocardial Infarction (AMI) Mortality Rates (per 100,000 based on US 2000 standard population)

	Standardized Beta Coefficients		
	CVD 1961-2006 [2]	CVD 1968-2006 [3]	AMI 1968-2006 [4]
Intercept			
Real GDP per capita in 2000 US $, Exponential Trend	-0.467 ***	-0.584 ***	-0.566 ***
Total Health Expenditures as Percent of GDP	-0.203 ***	-0.206 ***	-0.101 *
Labor Force Participation Rate Ages 15 - 64	-0.200 ***	-0.216 ***	-0.294 ***
Carbohydrate Consumption in Grams Per Day	0.095 **	0.133 ***	0.109 ***
Animal Fat Consumption in Grams Per Day	0.039 **	0.059 **	0.042 **
Total Distribution of Tobacco Products Per Adult	0.144 ***	0.096 *	0.131 ***
Binary Variable, Years 1975 – 2005 = 1.0	-0.126 ***	-0.125 ***	-0.096 ***

Legend
1: *p< .05; 2: **p< .01; 3: ***p< .001
2: Adjusted R²= .998, Durbin-Watson d= 2.05
3: Adjusted R²= .997, Durbin-Watson d= 1.94
4: Adjusted R²= .998, Durbin-Watson d= 1.83

Table 2: Regression Relations of Employment and Unemployment Rates to Cardiovascular and Acute Myocardial Mortality, Adjusted for Total Health Care Expenditures as Percent of GDP, U.S. 1979-2006

|	CVD Mortality	
	Standardized Beta Coefficient	
Organization for Economic Cooperation and Development Data Base	CVD Total	AMI
OECD Health Data Base		
Total Employment as percent of total labor force	-0.152 ***	-0.188 ***
Total Employment as percent of total population	-0.173 ***	-0.222 ***
Civilian Employment as percent of total labor force	-0.172 ***	-0.215 ***
Civilian Employment as percent of total population	-0.208 ***	-0.264 ***
Wage and Salary employment as percent of total labor force	-0.213 ***	-0.259 ***
Wage and Salary employment as percent of total population	-0.256 ***	-0.318 ***
Unemployment as percent of total labor force	0.152 ***	0.188 ***
Unemployment as percent of total population	0.147 ***	0.178 ***
OECD Statistical Data Base		
Total Unemployment rate under one month	0.221 **	0.298 ***
Total Unemployment rate one to three months	0.171 ***	0.208 ***
Total Unemployment rate three to six months	0.137 ***	0.163 ***
Total Unemployment rate six to twelve months	0.125 ***	0.146 ***
Total Unemployment rate one year and over	0.099 **	0.109 **

Legend
1: *p< .05; 2: **p< .01; 3: ***p< .001
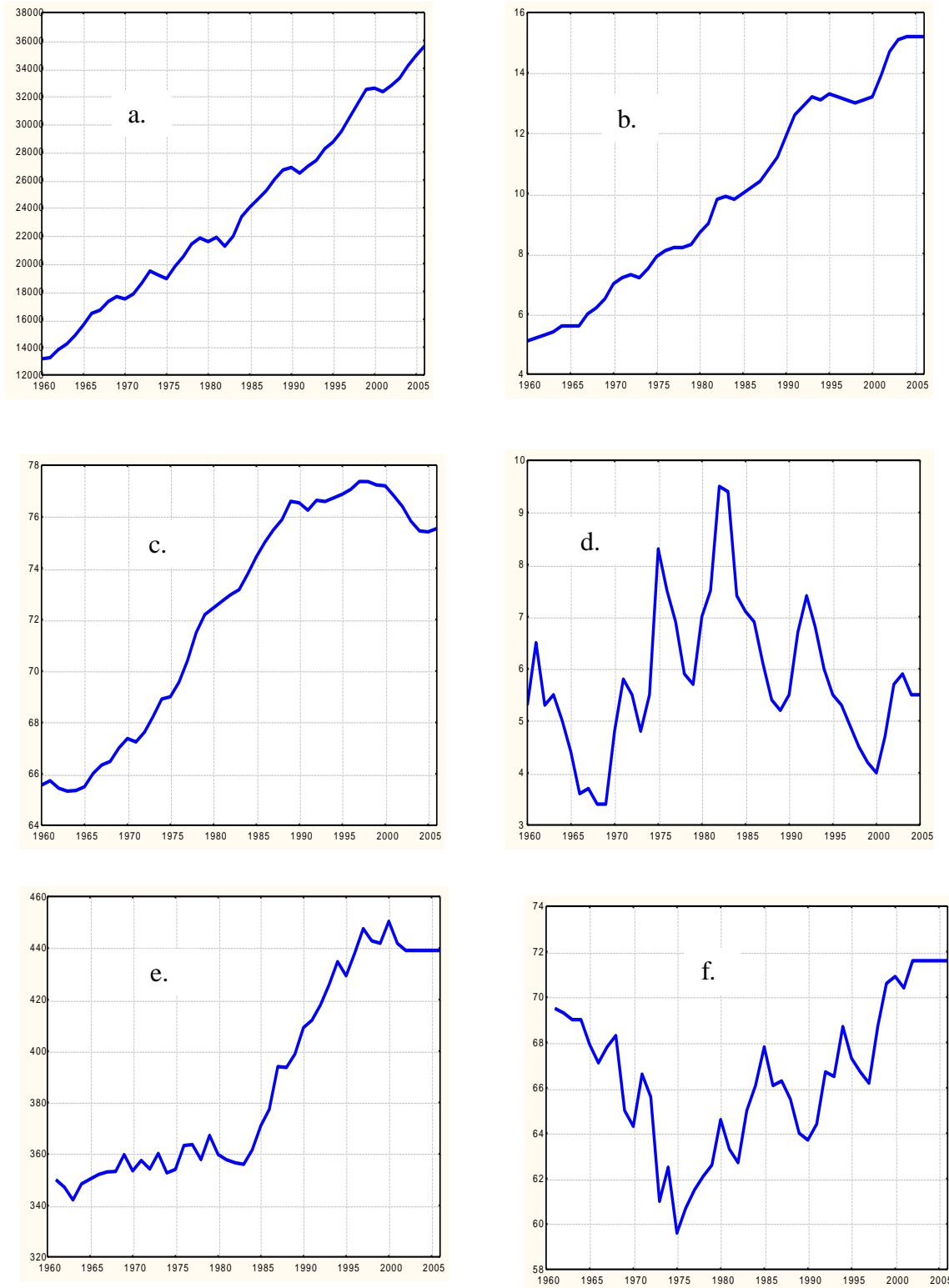
Figure 1.

a = Real GDP per capita in constant 1996 US$
b = Total health expenditure as percent of GDP
c = Labor force participation rate as percentage of pop 15-64
d = Total unemployment as percentage of total labor force
e = Carbohydrates consumption in grams per capita per day
f = Animal fat consumption in grams per capita per day

Source:
US Dept Commerce, Bur Econ Anal, US Census Bur
OECD Health Data
LABORSTA International Labour Office Bur Stats
OECD Health Data
FAOSTAT Statistics of the FAO, United Nations
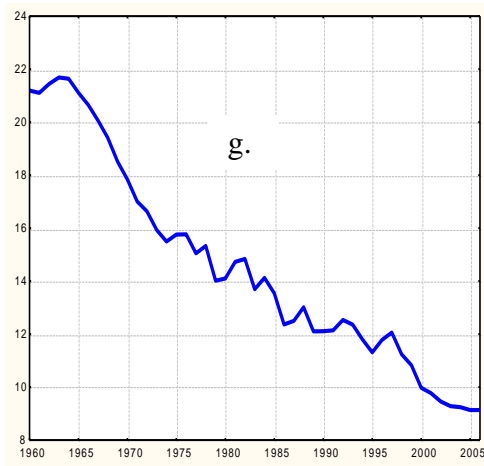FAOSTAT Statistics of the FAO, United Nations
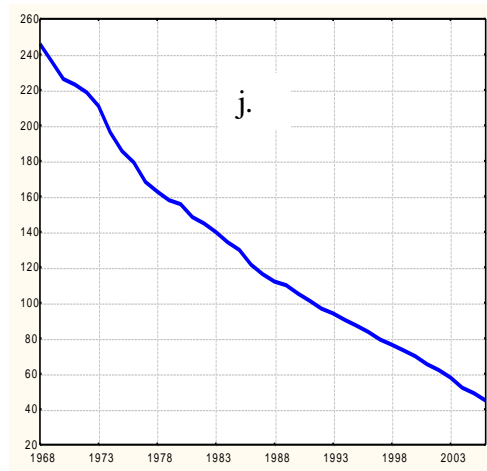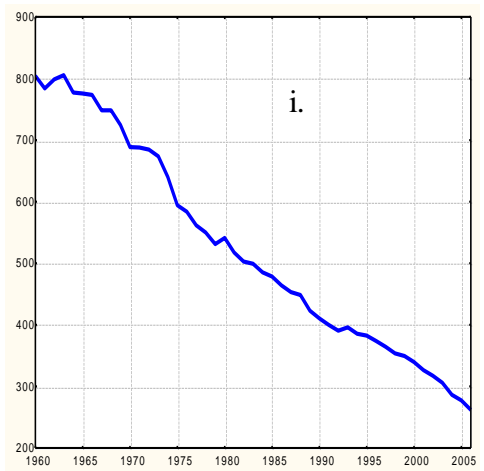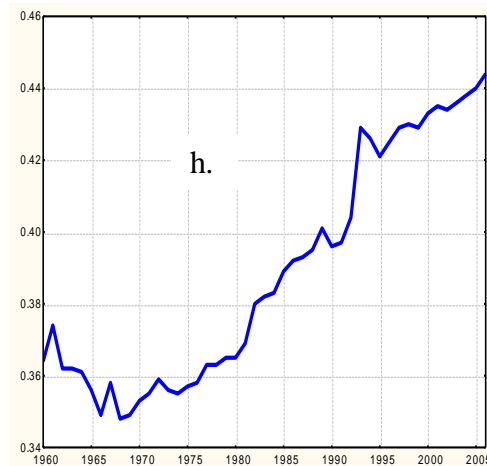
Figure 2.

g = Tobacco total distribution in kilograms per capita per year
h = Gini Index of income inequality of families
i = Age standardized CVD mortality rate by ICD code and year
j = Age standardized AMI mortality rate by ICD code and year

Source:
USDA, Foreign Agric Service, Prod, Supply & Distrib
US Census Bureau, Housing & Household Econ Stat
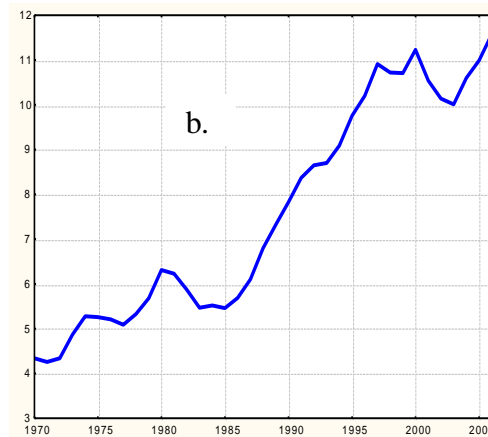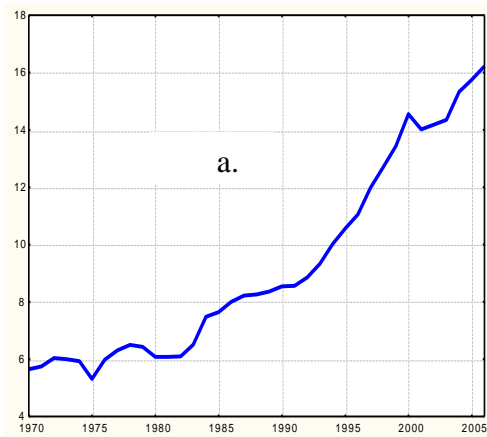ASDR, CDCP, NCHS
ASDR, CDCP, NCHS

Figure 3.

a = Import penetration rates of goods and services, constant
    prices, constant exchange rates
b = Export (propensity) for goods and services as percent of
    GDP, constant prices, constant exchange rates

Source:
OECD Stat Extracts, OECD Annual Ntl Acct Database

OECD Stat Extracts, OECD Annual Ntl Acct Database