Version: Post-print

Labor Market Trends in North America
– Has Economic Well-being improved?

Lars Osberg
Andrew Sharpe[1]

Abstract

The last three decades have seen substantial growth in GDP per capita in North America, combined with low unemployment in recent years. However, what does this indicate about trends in economic well-being? GDP per capita includes many items that do not improve individual utility, while employment rates, strictly speaking, concern an input to the process of production, not an enjoyable output.

Section 1 of the paper presents some evidence on trends since 1970 in unemployment, employment, hourly wage rates and GDP per capita in the USA and Canada, and discusses their deficiencies as indicators of economic well being.

In Section 2, we argue that the economic well-being of a society depends on:

(1) effective per capita consumption flows, which includes consumption of marketed goods and services, un-marketed goods and services, and changes in life span and in leisure;

(2) net societal accumulation of stocks of productive resources, including tangible capital and housing stocks, human capital and R&D investment, environmental costs, and net change in level of foreign indebtedness;

(3) income distribution, (as indicated by the Gini index of inequality, and depth and incidence of poverty); and

(4) economic security (from unemployment, ill health, single parent poverty and poverty in old age).

The paper then develops an index of economic well-being for Canada and the USA for the period 1970 to 1999 and compares trends in economic well-being to trends in GDP. Since growth in GDP per capita exceeds growth in economic well-being, the paper concludes with a discussion of how the "productivity" of economic growth might be improved.

December 15, 2000

Labor Market Trends in North America:
Has Economic Well-being improved?[2]

1. Introduction

Standard measures indicate that long term economic performance in North America

has been strong, although stronger in the USA than in Canada in the early 1990s. Both the US and

Canadian economies experienced recessions in the early 1980s but over the entire period between

1970 and 1990, they both grew by about the same amount (per capita real GDP was up 55.2% in

Canada and 54.1% in the USA). In the early 1990s, both countries went into recession, but the

slowdown was much deeper and longer in Canada. A growth oriented monetary policy in the US has

enabled GDP per capita to grow by 21% from 1990 to 1999. Canadian monetary authorities have, by

contrast, been willing to pay a price in lower growth[3] for a slightly better inflation performance.

So what?

Does growth in GDP per capita imply greater economic well-being?

In 1980 Ronald Reagan asked the American people a seemingly simple question: "Are

you better off today than you were four years ago?" Although U.S. per capita disposable real income

was, in 1980, some 7.6 per cent higher than in 1976, his audiences answered "No!" More recently,

when Canadians were asked in 1998 how the overall financial situation of their generation compared

to that of their parents at the same stage of life, less than half (44%) thought that there had been an

---

[2] In order that this paper be self-contained and provide a full explanation of the methodology used to estimate the index of economic well-being, it draws on material from earlier papers which develop the index (Osberg 1985; Osberg and Sharpe 1998, 1999).

[3] It took until 1996 for Canadian GDP per capita to recover to its level of 1989 – by which time US GDP was 10.3% above its 1989 level. Since then growth has been comparable.

improvement – despite an increase of approximately 60% in real GDP per capita over the previous 25 years.[4] Evidently, national income accounting measures may not necessarily be a good guide to popular perceptions of trends in economic well-being.

Are such popular perceptions unreasonable? National income accounts omit consideration of many issues (for example, leisure time, the length of life) which are clearly important to the well-being of individuals. For many years, the System of National Accounts (SNA) has been the accounting framework within which most discussions of trends in economic well-being have been conducted, and Gross Domestic Product (GDP) per capita has been an often used summary measure of economic trends.[5] The compilers of the national accounts have often protested that their attempt to measure the aggregate value of marketed economic output was never intended as a full measure of economic well-being - *but* it has often been used as such.

Although GDP per capita has many deficiencies as a measure of economic well being, it is at least a *quantity output* measure. Trends in the unemployment rate and hourly wages are also often used to indicate economic performance – but the hourly wage rate is a *price* (the price of labour), from which individuals derive no direct utility. The unemployment rate measures utilization of an *input* in the production process. Their widespread use as evaluative criteria cannot be because they indicate directly the utility that individuals enjoy, but because they are indirect indicators of something else – like *potential consumption* or *insecurity*.

---

[4] For real GDP per capita see CANSIM D14606; for poll details see Angus Reid Globe/CTV poll of July 1998, available at www.angusreid.com

[5] Keunig (1998) reviews the contributions of Dawson (1996) and Kendrick (1996) and the most recent (U.N. 1993) revisions to the SNA.

Summarizing the economic well-being of a complex society inevitably requires a series of ethical and statistical judgements. There are many different dimensions to well-being, which are valued to different degrees by different observers. With a single index number, it may be difficult to disentangle the relative importance of value judgements and technical measurement choices in the construction of the index. Osberg (1985), therefore, proposed that an index of economic well-being should be based on indices of consumption, accumulation, inequality and insecurity.[6] This basic framework is consistent with a variety of theoretical perspectives. We, therefore, avoid a specific, formal model.[7]

The paper is divided into three main parts. In Part 1, we present evidence on trends in standard measures, such as GDP per capita and the unemployment rate. Part 2.1 develops estimates of the four key components or dimensions of the index of economic well-being -consumption flows, stocks of wealth, inequality, and insecurity. Part 2.2 develops preliminary estimates of the overall index and its components for the USA, and Canada, Part three discusses the "productivity" of economic growth for trends in economic well-being.[8]

---

[6] We argue for <u>the explicit recognition that the weights attached to each component will vary, depending on the values of different observers</u>. By specifying additive sub-indices, we are implicitly assuming that preferences for social outcomes are separable in their components (e.g. that the weight placed on consumption does not depend on the weight placed on inequality). We do not explicitly constrain the weights to be assigned to each component of well-being, since we think of them as the preferences of different observers. However, some observers may, if they are consistent, have linked preferences – for example, <u>if</u> attitudes to insecurity are driven solely by risk aversion (but see Osberg 1998), then the weight an individual places on inequality, and the weight he/she places on insecurity, will both depend on the second derivative of his/her utility function.

[7] However, a sufficient (but not necessary) set of conditions for the index of economic well-being which we propose would be that societal economic well-being can be represented as the well-being of a "representative agent", if: (1) such an agent has a risk-averse utility function (i.e. diminishing marginal utility); (2) from behind a "veil of ignorance" as to his/her own characteristics, each person draws an individual income stream (and prospects of future income) from the actual distribution of income streams; (3) each person has a utility function in which both personal consumption and bequest to future generations are valued; (4) individual income streams are exposed to unpredictable future shocks; (5) capital markets and public policies do not always automatically produce a socially optimal aggregate savings rate.

Recent Trends in Standard Variables

[Figures 1 to 4 go about here]

1.1 GDP per capita

Figure 1 presents the trend in real GDP per capita in Canada and the USA since 1970. Three slowdowns in growth can be discerned. In 1974/75 the USA had a more severe recession than Canada, but in 1981/82 the recession was sharper in Canada. In 1988, Canadian monetary authorities embarked on the pursuit of "price stability", and high interest rates meant that Canada led the USA into the recession of 1990/91 and lagged considerably in emerging from that recession. Nevertheless, by 1999 both countries had realized impressive gains in the level of real GDP per capita and both were growing strongly.

1.2 Unemployment and Employment

Figure 2 presents long term trends in the unemployment rate in Canada and the USA. As Riddell (1999) has documented, the divergence between Canadian and US unemployment rates in the 1980s can be primarily ascribed to the supply side – in Canada the labour force participation rate increased faster than in the USA. In the 1990s, however, the main event has been strong growth of aggregate demand and jobs in the USA, but a very delayed recovery in Canada. Figure 3 presents the employment/population ratio for the two countries. The recessions of the early 1980s and 1990s can be easily identified – and the difference in the recovery paths can also clearly be observed, as Canadian monetary policy remained subservient to the objective of maintaining a rate of core inflation in the range of 1% to 3%.

1.3   Trends in Hourly real wages

Figure 4 presents average direct hourly real wages for production workers in Canada and the USA. For many workers, hourly real wages have been fairly flat, for many years, in North America. Although there has been substantial growth in incomes at the top end of the income distribution (which has pulled up the average income of the population as a whole), the middle part of the income distribution has seen little progress (see Osberg, 1999). Figure 4 also illustrates the fact that Canadian and American production workers have fairly similar incomes. However, the difference between expressing Canadian wages in purchasing power parity adjusted US dollars, or converting at the current exchange rate, also illustrates the competitive advantage that Canadian firms get when the Canadian dollar is undervalued (as at present).

1.4   So what does all this have to do with Economic Well-Being ?

Economists often start by assuming that individuals derive utility from consumption and from leisure. But GDP per capita includes many items (such as exports or investment) which are not part of consumption while excluding completely any leisure enjoyed by individuals. The employment rate measures labour <u>supply</u>, which is often thought of by economists as a <u>cost</u> that people incur in order to enable consumption – it is not clear why working more is, by itself, a "good thing". The wage rate is useful as an indicator of the price of labour, (i.e. the rate at which people trade time for goods) but it is not inherently a source of utility. None of the above measures really correspond to anything that individuals would actually want. However, the difference between trends in average hourly real wages for production workers (flat and much the same in both countries) and trends in GDP per capita

(up strongly, but more so in the US) is a clue to the fact that indicators of economic performance may disagree. But saying that these indicators are unsatisfactory is one thing - what better measure can be constructed of economic well being ?

2. An Index of Economic Well-being

GDP is a measure of the aggregate marketed income of a society, however "income" is a flow variable that does not directly consider the aggregate value of the bequest this generation will leave to its descendants. Although those now alive clearly care about the level of their own consumption, they also care (in varying degrees) about the well-being of future generations. Furthermore, trends in average income do not reveal the chances which individuals have to share personally in the prosperity of the average. Individuals are justifiably concerned about where they might sit in the distribution of income, and the degree to which their personal economic future is secure. The four components or dimensions of economic well-being are, therefore:

- 2.1 effective per capita consumption flows

   - consumption of marketed goods and services, and effective per capita flows of household production, leisure and other unmarketed goods and services;

- 2.2 net societal accumulation of stocks of productive resources

    - net accumulation of tangible capital, housing stocks and consumer durables, net changes
in the value of natural resources stocks; environmental costs, net change in level of foreign
indebtedness; accumulation of human capital and R&D investment

- 2.3 income distribution - poverty and inequality,

    - the intensity of poverty (incidence and depth) and the inequality of income;

- 2.4 economic insecurity,

    - economic security from job loss and unemployment, illness, family breakup, poverty in old
age;

A fuller discussion of the rationale for this framework of consumption, accumulation, distribution and insecurity can be found in Osberg (1985). We distinguish these four main dimensions of economic well-being to enable persons with differing value judgements (e.g. a greater or lesser preference for intergenerational bequest, or for the reduction of poverty, compared to increases in average consumption) to account explicitly for those values. Each dimension of economic well-being is itself an aggregation of many underlying trends, on which the existing literature is sometimes spotty.[9]

We recognize that the System of National Accounts has, thanks to many years of

---

[9] Since a great deal of work has been done on the valuation of household production, there is at least a clearly

development effort by international agencies, produced an accounting system for GDP which is rigorously standardized across countries. Internationally comparable statistics on other dimensions of economic well-being are far less complete. However, using GDP per capita as a measure of well-being would implicitly: (1) assume that the aggregate share of income devoted to accumulation (including the value of unpriced environmental assets) is automatically optimal, and (2) set the weight of income distribution or economic insecurity to zero, by ignoring entirely their influence. Neither assumption seems justifiable.

2.1 Average Consumption Flows

Current consumption is certainly an important component of economic well being – but a better measure than GDP per capita is required. The objective of this section is to estimate its average effective level, and the reason for discussing our methodology in some detail is to show specifically how GDP can be improved on. Figure 5 presents our final calculation of trends.

The starting point is aggregate real personal consumption per capita[10] in constant prices. The System of National Accounts provides a strong basis for estimating the consumption of marketed goods and the cost of providing government services, and there have been enough studies of the value of household production to enable some confidence as to the range of reasonable values. Estimates are more imprecise when one considers the value of a number of other factors that also influence consumption flows, such as leisure, regrettables, the

defined range of estimates. However, economists have paid very little attention to the measurement of insecurity (see Osberg 1998), and the measures of economic insecurity are correspondingly underdeveloped.

[10]In this paper, no adjustment is made for potential consumer price bias (Boskin et al. 1999).

underground economy[11] and life expectancy. These factors are discussed below, with approximate estimates of their value, in some cases. At this stage in the development of the index of economic well-being, our preference (wherever possible) is to include, rather than exclude, imprecise measures. Since omitting a variable would implicitly set its value to zero, an imprecise measure is likely to embody a smaller error than omitting a variable. However, sometimes there is no estimate available at all and omission is sometimes unavoidable.

Life expectancy has increased significantly in recent years North America, and we have every reason to believe that having a long life is an important component of well-being. The economic value of these extra years of life should be included in the total consumption flows of individuals, since presumably people care both about how much they consume per year, and how many years they get to consume it.[12]

Years of life are one thing, and years of healthy, enjoyable life are a slightly different thing. A full appraisal of the value of increased longevity should consider trends in morbidity and health-adjusted life expectancy (HALE),[13] as well as easier-to-measure trends in longevity.

---

[11] Earlier versions of this paper presented estimates of the underground economy, based on benchmark estimates by Statistics Canada, the Bureau of Economic Statistics, and the trend in the share of the self-employed in total employment, on the argument that the self-employed have greater opportunity to hide income than paid workers. Since there always has been some level of "underground" activity, the issue for the measurement of trends in well-being is whether or not the prevalence of the underground economy has changed substantially over time. Rising tax rates may have increased the incentive to go underground, but the increased penetration of franchise systems in the small business sector and the greater computerization of business records may have also made it more difficult to escape detection by tax authorities. We do not include these estimates in this paper, because they make very little difference to measured output trends. Because the base level of underground activity is a relatively small share of GDP, the trend in a small number is an even smaller fraction of GDP.

[12] Dan Usher (1980) of Queen's University has developed a methodology for the estimation of the value of increased longevity.

[13] Wolfson (1996) found for 1990-1992 that the HALE for 15-year-olds was 7.8 years less than life expectancy (55.6 versus 63.4 years). However, since there is no time series on health-adjusted life expectancy for Canada, we do not know if the rate of increase in the HALE has been greater or lower than life expectancy over time.

However, in considering either, one has to face the issue that the value of more years of life may look very different, the closer one actually is to death. Changes in life expectancy are occurring "in real time" and are affecting the well-being of all now alive. In aggregating over the population now alive, one is aggregating over individuals at very different points in the life course. Although the economist's reflex is to consider the discounted value of lifetime utility, it may be highly problematic to view the value of additional years of life as discounted to the point of view of a teenager. For the purposes of this paper, we adopt the simple expedient of considering an increase in consumption per year or consumption for an increased number of years to be equivalent – i.e. we add to consumption flows in each year the percentage increase in average life expectancy.[14] However, we do recognize the crudity of this measure of an existential issue.

Data on life expectancy are taken from the OECD Health Data CD-ROM. Between 1971 and 1996, Canada enjoyed 7.9 per cent increased life expectancy and the United States was up 7.0 per cent. Personal consumption per capita is adjusted upward by the increase in life expectancy relative to base.[15]

When individuals cohabit in households, they benefit from economies of scale in household consumption. There is a large literature on the estimation of "equivalence scales", which attempt to account for the magnitude of such economies of scale in households of

---

[14] Implicitly, this procedure ignores both the differential values which individuals might place on changes in mortality probability at different ages and the distribution, by age, of actual changes in mortality probability.

[15] Longer life and a more affluent retirement may interact in their impacts on well being. To some extent, we capture these interactions - in section 2.4.4 below we note that economic insecurity depends partly on the level of poverty among the elderly, which has declined in most countries. However, no account is taken in this paper of any relative increase in well-being of the non poor elderly.

different sizes.[16] When comparing the average effective consumption of individuals over time, the implication is that as households have shrunk in average size, economies of scale have been lost. Trends in average per capita consumption should, therefore, be adjusted for the average loss over time of economies of scale in household consumption.

Since economies of scale diminish in family size, the extent of change in economies of scale depends on where change occurs in the distribution of family sizes.[17] All western countries have experienced a long-term decline since the 1970s in average family size – in the US, a 13% decline (from 3.67 to 3.18). The "LIS" equivalence scale (i.e. the square root of family size) has been applied to average family income to construct an index of equivalent family income (1981= 100), which is used to adjust personal consumption per capita.

Some of the economic activity included in GDP does not contribute to economic welfare, but rather are defensive expenditures, or intermediate inputs, that individuals make in order to be able to produce or consume. The costs households pay in order to commute to work are considered in the GDP to be part of household consumption, but the expenses which firms incur to bring materials to the work site are seen as an intermediate input in production. Since intermediate inputs in the business sector are netted out in the calculation of value added, it can be argued that similar expenditures by households should be subtracted from marketed consumption to obtain a better estimate of true consumption flows. Similarly, if the good that individuals want to consume is "a crime free street", but it now takes a greater expenditure on

---

[16] See, for example, Burkhauser et al. (1996) or Phipps and Garner (1994).

[17] Even though the impact on average household size is the same, the impact on average living standards of (for example) a five-person household splitting will differ from the impact of a two-person household splitting, since the latter change will imply a greater loss of economies of scale.

police services to produce that good, an increase in police expenditures that only serves to maintain the crime rate unchanged should not be counted as an increase in (public sector) consumption.

This paper uses the estimates of costs of commuting, crime, house pollution abatement and auto accidents constructed by Anielski and Rowe (1998) and subtracts these from the value of current consumption.

Among OECD countries there are major differences in both the initial level and trends over time in the average annual number of hours worked. Given these differences, level and growth rate comparisons of economic well-being are affected by working time differences. In this paper, we want to compare economic well-being over time and across countries. Ideally, one would like estimates of the proportion of non-market time that is spent in home production and the proportion of market remunerated time that consists of on the job leisure, in order to account for changes in the pace of work, both at home and in the workplace. Such measures are, however, infrequently available for any one country and difficult to compare across countries. We, therefore, proceed by standardizing for hours of paid work in relative, not absolute, terms, where the benchmark is the average annual hours worked per adult of working age in the United States in 1980.

Unlike the Measure of Economic Welfare (Tobin and Nordhaus 1972), no attempt is made here to define leisure activities, estimate the amount of leisure enjoyed, and place a value on this total leisure time. Rather, we adjust the value of consumption for differences in paid hours relative to a benchmark, with countries having average annual hours worked less than the

benchmark (USA 1980) having a positive adjustment to consumption and countries having more working time than the benchmark having a negative adjustment. Within the United States, years with fewer hours worked than those in the benchmark year have positive adjustments and those with more hours worked, negative adjustments.

Our methodology is equivalent to saying that at the margin, individuals ascribe a value equal to the after tax average wage to changes in non-working time that are not due to unemployment fluctuations. By comparing changes in working time to a benchmark level, we avoid the necessity of placing a monetary value on infra marginal hours of leisure, which might be highly problematic. Estimates of relative working time per person employed are adjusted for the employment/working age population ratio to provide estimates of relative non-working time on a working age population (15-64) basis to account for differences in employment/population ratios across countries. These estimates are then valued at the after tax[18] wage rate to provide estimates of the value of relative non-working time per working age person. This figure is then adjusted by the working age population/total population ratio to control for differences in demographic structures across countries. This amount, expressed in constant prices of the national currency, is then added to consumption flows to produce a working time-adjusted estimate of consumption relative to the U.S. benchmark. However, unemployment does not constitute leisure. To account for involuntary leisure we subtract average annual hours of unemployment per working age person from the relative non-working time estimate.

---

[18] To compare the gains, at the margin, from additional market work compared to either leisure or home production, we estimate the total "tax wedge" between taxed returns to time in the market and untaxed returns to leisure or home production as the sum of sales and income taxes. The share of general government current receipts in nominal GDP is used as the tax rate in the calculation of after tax wages of labour compensation.

There are very large differences in working time per employee across countries, and in 1997 the United States had the second highest average annual hours worked at 1883 hours per year. Between 1980 and 1997 most of the countries on which we have data experienced declines in working time, while the United States experienced increases. Average annual hours of non-working time relative to the 1980 U.S. benchmark[19] are calculated as the difference between a country's average annual hours worked per working age person in a given year and the 1980 figure for the United States (1225 hours). By 1997, per adult working hours in the USA were 204 hours above their 1980 level, but only up 38 hours in Canada. Since some of these changes are large (204 hours is equivalent to 4 hours per week) they represent substantial changes in well-being, which should be reflected in a reasonable measure of economic progress. However, since leisure hours receive zero valuation in GDP accounting, neither the declines nor the increases are reflected in GDP per capita.

Estimates of the imputed value of non-working time per person are expressed in constant prices in national currency units. These estimates are calculated as the product of the average annual number of hours of non-working time per working age person relative to the U.S. 1980 benchmark, after tax hourly compensation and the ratio of the working age population to the total population. Because we use national currency units (as opposed to common currency units), and because we are evaluating differentials at the margin, level comparisons of the aggregate value of non-working time are not possible.

---

[19] In this version of the paper we are unable to provide estimates of changes in working time prior to 1980 for the USA.

Some hours of unemployment are not by choice and do not contribute to economic well-being. Indeed, if there are psychological costs to unemployment, such hours may have strong disutility associated with them (Clark and Oswald 1994). We cannot, in this paper, provide estimates of the negative utility of unemployment time, nor the partial value of such time. As an approximation, however, in the calculation of the imputations for the value of non-working time, we can deduct hours of unemployment[20] – i.e. assign such hours zero value[21].

The provision of non-marketed or heavily subsidized services by the government is part of the consumption flow. Current expenditure Data (all levels of government including defense and capital consumption allowances, but excluding debt service charges and transfer payments) are taken from the OECD national accounts, expressed in constant prices in national currency units. The importance of government final consumption expenditures relative to personal adjusted consumption was 24.3 per cent in the United States- lower than in Canada (29.1 per cent).

The components of per capita consumption flows (adjusted personal consumption, government consumption, the cost of regretables and the imputation for non-working time) are summed to total consumption flows adjusted for hours worked.

[Figures 5 and 6 go about here]

---

[20] Total annual hours of unemployment are calculated as the product of the number of unemployed and average annual hours per employed person on the assumption that an unemployed person wants to work average hours. Total unemployed hours are then divided by the working age population to determine average annual hours of unemployment per working age person

[21] Unpaid work contributes to economic welfare and thus should in principle be included in an index of economic well-being. Unpaid work consists of both household work and volunteer work. Statistics Canada (1996) has produced estimates of unpaid work for Canada, and these estimates were incorporated into the original index of economic well-being developed for Canada (Osberg and Sharpe 1998). Because of the unavailability of internationally comparable estimates of the value of unpaid work for countries other than Canada, this component has not been incorporated into the index of economic well-being developed in this paper.

2.2 Accumulation, Sustainability and the Intergenerational Bequest

If individuals alive today care about the well being of future generations, measurement of trends in current well-being should include consideration of changes in the well-being of generations yet unborn. This consideration of future generations can also be justified on the grounds that a concept of "society" should include both present and future generations. Either way, wealth accumulation by this generation will increase the bequest left to future generations, and is an important component of well-being.[22]

Figure 6 provides our estimates of trends in the accumulation of productive assets. We emphasize that this component of economic well-being consists of those stocks of real productive assets that can generate real income for future generations – not the financial instruments that will determine the *allocation* of the returns from those assets. As Osberg (1998) discusses in more depth, financial "Generational Accounting" techniques focus on the distributional impact of government debt – but in this section we are concerned with the real accumulation of the total stock of productive assets. It is the stocks of "wealth" left to the next generation, broadly conceived to include environmental and human resources as well as physical capital stock, which will determine whether a society is on a long-run sustainable trajectory of aggregate consumption, irrespective of the distribution of those consumption flows at the individual level.

---

[22]If one could assume that income flows were always optimally divided between consumption and savings, one could omit separate consideration of consumption and wealth accumulation and concentrate on trends in average income. However, aggregate accumulation of private assets depends heavily on tax polixy and accumulation of public assets depends on spending decisions. Because both depend heavily on the political process, and because capital markets have significant imperfections, the assumption of automatic optimality seems too hopeful by far – for further discussion, see Osberg (1985a). Note that in aggregating over different forms of capital and

The physical capital stock includes residential and non-residential structures, machinery, and equipment in both the business and government sector. The greater the capital stock, the greater is the future productive capacity and future potential consumption flows, and economic well-being. The capital stock data are based on the perpetual inventory method where investment flows are accumulated over time, with depreciation rates applied to the different assets. Data for the current net fixed capital stock, expressed in constant prices of national currency units, have been taken from the OECD publication *Flows and Stocks of Fixed Capital*. It is assumed that the estimates are internationally comparable, although the use of different depreciation rates by statistical agencies may reduce comparability for both level and rate of growth comparisons[23]. Between 1980 and 1996, the increase in the fixed capital stock, on a per capita basis, was higher in Canada (27.4 per cent) than in the United States (24.3 per cent).

Closely related to the physical capital stock is the concept of the research and development (R&D) capital stock. In an era of rapid technological change, expenditure on R&D is a crucial ingredient in the ability of society to innovate and create wealth. Statistical agencies do not produce R&D stock data, but OECD data on annual flows of total business enterprise expenditure on research and development can be accumulated into a stock of R&D capital valued at cost of investment - a depreciation rate of 20 per cent on the declining balance is assumed. Between 1980

---

environmental assets we are implicitly following the "Hartwick Rule" for resource depletion, and assuming that accumulation and depletion of stocks of particular types of assets can be offset.

[23] See Coulombe (2000) who notes that the average depreciation rate for Canada's business sector capital stock over the 1961-97 period was 10% compared to 4.4 % in the US.

and 1996, the rate of change in the per capita real business enterprise R&D stock for business enterprises ranged was much higher in the United States (91 per cent) than in Canada (27 per cent)[24]

Current consumption levels could be increased by running down stocks of non-renewable natural resources or by exploiting renewable resources in a non-sustainable manner, but this would be at the cost of the consumption of future generations. A key aspect of the wealth accumulation component of economic well-being is net changes in the value of natural resources. From an intergenerational perspective, it is the value of the natural resources, not their physical extent, which counts. The valuation of these resources poses conceptual problems[25] but Statistics Canada (1997) has provided estimates for both physical and value estimates of natural resources such as forests, energy reserves, and minerals. These were used in the construction of the index of economic well-being for Canada and the United States (Osberg and Sharpe 1998, 1999).

The human capital accumulated by the workforce generates both current and future income. Trends in the stock of human capital, including both formal educational attainment levels and on-the-job training, are important determinants of current and future economic well-being. School retention and participation in post-secondary education have increased dramatically in many countries over the last three decades, and there is a strong relationship between educational

---

[24] The R&D investment series starts in 1960 so that the stock of R&D in 1960 is equal to the R&D investment that year and the series has a base of zero in 1959.

[25] The estimated market value is the price the resources would bring if sold on the open market. It is based on the difference between the annual cost of extraction of a given resource and the revenue generated from the sale of the resource. In other words, the total value or wealth associated with a stock is calculated as the present value of all future annual rent that the stock is expected to yield. The quality of the resources, the state of extraction technologies, the price of the resource, and factor costs determine this amount of rent.

attainment and individual income.[26] This paper uses an admittedly crude and incomplete (but feasible) input cost method - the cost per year of education expenditures at the primary, secondary and post secondary levels. Yearly estimates of the distribution of education attainment in the population were then used to compute the total cash cost of production of human capital in education. OECD data on the educational attainment of the 25-64 population and expenditure per student (available in both local currency and U.S. dollars) for the early childhood, primary, secondary, non-university tertiary and university level education were used to estimate the per capita stock of human capital. In order to distinguish clearly inter country differences in the quantity of education obtained, as opposed to differences in its cost of production, we apply a common cost base (the cost of education in the United States) to both countries.

We do not count the gross level of government or corporate debt as a "burden" on future generations, and we do not count as part of the intergenerational bequest the value of paper gains in the stock market.[27] In general, financial instruments represent both assets to their holders and liabilities to their issuers. The distribution of such assets/liabilities will play a major role in allocating the real returns to the future capital stock, but the issue at this point is the aggregate value of the intergenerational bequest.

---

[26] Like these other assets, the value of the human capital of living persons represents the future consumption that possession of such assets enables. The endogenous growth perspective has argued that the benefits of societal learning are partly the output such learning enables in the current generation and partly the fact that future generations can start learning at a higher level. As a consequence, higher levels of education produce a higher long-run growth rate, as well as a higher current level of income (Galor and Zeira 1993, Eckstein and Zilcha 1994). If this is correct, a production cost valuation of human capital may underestimate considerably the value of the human capital stock investments.

[27] Implicit in this position is a belief that current stock market valuations (especially in the US) are excessive, and that the economy has not in fact entered a qualitatively new Internet era.

However, net debt to foreigners is another issue. Since interest payments on the net foreign indebtedness of citizens of one country to residents of other countries will lower the aggregate future consumption options of those citizens, increases in the level of foreign indebtedness reduce economic well-being within a given country. Estimates of the net investment position, expressed in current U.S. dollars, are published in the IMF's *International Financial Statistics Yearbook*. These estimates have been converted to current price national currencies at market exchange rates and then deflated by the GDP deflator and adjusted for population to obtain real per capita estimates in the net international investment position, expressed in national currency units (Table 3).

Like the excess depletion of natural resources, current consumption can be increased at the expense of the degradation of the environment, reducing the economic well-being of future generations. Consequently, changes in the level of air and water pollution should be considered an important aspect of the wealth accumulation. Countries pass on from generation to generation both a natural and man-made national heritage. If this heritage were damaged, the economic well-being of future generations would be reduced. Since it is very difficult, if not impossible, to put a monetary value on, for example, the pristine condition of national parks, or historic buildings, there will be no attempt to set an aggregate value to these assets[28]. However, the issue of *trends* in well-being is the *change* in such assets, which is easier to measure and for

---

[28] Osberg (1985b) has argued that heritage preservation laws can be seen as an optimal intergenerational contract, which constrains the present generation not to despoil irreplaceable assets. In the presence of such constraints, the current generation still has to decide how large a bequest to future generations to leave in the form of replaceable assets, but the "national heritage" remains untouched. As a consequence, (like the family heirloom that is never priced because it will never be sold), trends in economic well-being can be evaluated without placing an explicit monetary value on irreplaceable environmental and cultural assets.

which indicators of environmental quality can be developed.

Probably the best-known environmental change is global warming arising from increased emissions of greenhouse gases, the most common of which is carbon dioxide emissions. Fortunately, data are available on these emissions and it is possible to estimate the costs of these emissions. These costs can then be subtracted from the stock of wealth to obtain an environmentally adjusted stock of wealth.

The conceptual issues to be dealt with in estimating the costs of CO2 emissions include whether the costs should be viewed from a global, national or sub-national perspective, whether the costs increase linearly with the levels of pollution, whether the costs should be borne by the producer or receptor of trans-border emissions, and whether costs should vary from country to country or be assumed the same for all countries. Since global warming affects all countries, we estimate world total costs of emissions and allocate these costs on the basis of a country's share of world GDP. Fankhauser (1995) has estimated that the globalized social costs of CO2 emissions (with no adjustment for different national costs) at $20 U.S. per ton in 1990. World Bank researchers (Atkinson et al. 1997) have applied this number to CO2 emissions in developed countries to estimate the value of the loss of environmental services as a proportion of output and the measure of genuine saving.

According to data from the International Energy Agency, world CO2 emissions in 1997 were 22,636 millions of metric tons. Based on the $20 U.S. per ton cost of CO2 emissions, the world social cost of CO2 emissions was $452,720 million. This amount was allocated on the basis on a country's share of nominal world GDP, expressed in U.S. dollars. It was then

converted into national currency at the purchasing power parity exchange rate and divided by population. As these costs represent a loss in the value of the services provided by the environment, they can be considered a deduction from the total stock of wealth of the society. For example, in 1997, per capita stocks of wealth in Canada were reduced by $415 Canadian because of the social costs imposed by CO_2 emissions according to this methodology.

As the estimates of the physical capital stock, the R&D capital stock, net foreign debt, and environmental degradation are expressed in value terms, they can be aggregated and presented on a per capita basis. Net foreign debt per capita is a negative entry, while the social costs of CO_2 emissions are subtracted from the stocks of wealth. For the 1980-1996 period, estimates for the five components of the wealth stock included in this paper are available. The rate of change for per capita real wealth stocks in national currency at constant prices was 16.0 per cent in the United – significantly lower than in Canada (23.3 per cent).

[Figure 7 goes about here]

2.3 Income Distribution - Inequality and Poverty

The idea that "Social Welfare" depends, in general, on both average income and the inequality of incomes has a long tradition in welfare economics. However, in measuring the level of social welfare, the exact relative weight to be assigned to changes in average incomes, compared to changes in inequality, cannot be specified by economic theory. Since Atkinson (1970) it has been recognized that the measurement of inequality itself depends on the relative value which the observer places on the utility of individuals at different points in the income

distribution. For a "Rawlsian", only changes in the well-being of the least well off matter, but others will admit some positive weight for the income gains of the non-poor,[29] and will assign some negative weight to inequality among the non-poor.

Since the economic well-being of the population is affected both by inequality in the distribution of income and by the extent of poverty, there are two issues: 1) one's perspective on the importance of inequality/poverty compared to trends in average income, and 2) one's view of the relative weight to be placed on poverty compared to inequality. We, therefore, suggest that a compound sub-index should place some weight (β) on a measure of inequality in the aggregate distribution of income and some weight ($1-\beta$) on a measure of poverty.

The most popular measure of inequality in the distribution of income is undoubtedly the Gini index. For the purposes of the construction of the index of economic well-being, we have chosen the Gini coefficient of after-tax household income.[30] Income inequality in 1994 as measured by the Gini coefficient was considerably larger in the United States (0.387) than in Canada (.287) - see Osberg and Xu (2000).

Recently, Osberg and Xu (1997) have noted that the Sen-Shorrocks-Thon measure of poverty intensity is both theoretically attractive as a measure of poverty, and also convenient,

---

[29] Jenkins (1991) surveys the issues involved in measurement of inequality.

[30] Since there is no data available on inequality and poverty within families, we have no option but to follow the standard pattern of assuming that equivalent income is equally shared among family members. Phipps and Burton (1996) have demonstrated that if children do not in fact share equally in household resources, inequality within the family can make a very big difference to perceptions of the level of child poverty – and the same implications would hold for gender inequalities. However, since the issue for this paper is the *trend* of poverty, our conclusions will hold unless there has been a systematic trend over time in the degree of inequality within families (e.g. if senior citizen families, whose share of the poverty population has fallen over time, have systematically different levels of within-family inequality than younger families).

since it can be decomposed as the product of the poverty rate, the average poverty gap ratio[31]

and the inequality of poverty gap ratios. Furthermore, since the inequality of poverty gap ratios

is essentially constant, changes in poverty depend on changes in the poverty rate and the average

poverty gap ratio. The overall index of equality is a weighted average of the indices of poverty

intensity for all units or households and the Gini coefficient, with the weights 0.75 and 0.25

respectively. The index is multiplied by –1 in order to reflect the convention that increases are

desirable.[32]Figure 7 presents the trend in Economic Equality from 1971 to 1999.

2.4 Insecurity

If individuals knew their own economic futures with certainty, their welfare would

depend only on their actual incomes over their lifetimes, since there would be no reason to feel

anxiety about the future. However, uncertainty about the future will decrease the economic

welfare of risk averse individuals. Individuals can try to avoid risk through social and private

insurance, but such mechanisms do not completely eliminate economic anxieties, which have to

be considered a subtraction from well-being.

Although public opinion polling can reveal that many feel themselves to be economically

insecure, and that such insecurity decreases their subjective state of well-being, the concept of

---

[31] The poverty rate is the proportion of persons who fall below the poverty line, defined here as one half the median equivalent after-tax family income. The poverty gap ratio is defined as the percentage gap between the poverty line and the income of those below the poverty line.

[32] In the period 1994 to 1997, poverty has risen in Canada and fallen in the USA, for example. Canadian provinces are now indistinguishable from many U.S. states – see Osberg (2000).

economic insecurity is rarely discussed in academic economics.[33] Consequently, there is no

generally agreed definition of economic insecurity. Osberg (1998) has argued that economic

insecurity is, in a general sense, "the anxiety produced by a lack of economic safety – i.e. by an

inability to obtain protection against subjectively significant potential economic losses." In this

sense, individuals' perceptions of insecurity are inherently forward looking, the resultant of their

expectations of the future and their current economic context – hence only imperfectly captured

by measures such as the ex post variability of income flows.[34] Ideally, one would measure

trends in economic security with data which included (for example) the percentage of the

population who have credible guarantees of employment continuity and the adequacy of

personal savings to support consumption during illness or unemployment. However, such data

is not widely available. For these reasons, rather than attempt an overall measure of economic

insecurity, this paper adopts a "named risks" approach, and addresses the change over time in

four key economic risks.

Over fifty years ago, the United Nations' Universal Declaration of Human Rights stated:

> *Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other loss of livelihood in circumstances beyond his control.* [Article 25][35]

---

[33] To be precise, in the ECONLIT database from 1969 to December 1997, there are nine matches to the term "economic insecurity". A search of the Social Sciences Index from 1983, and the PAIS International and PAIS Periodicals/Publisher Index from 1972, yielded eleven matches. The Social Sciences Citation Index for the years 1987-1997 was similarly unproductive.

[34] For example, a tenured professor with occasional consulting income may have a variable income stream, but feel little insecurity – and data only on individuals' income streams cannot reveal who had a credible long-term employment guarantee (like tenure), and who sweated out a series of short term contract renewals.

[35] In the 1990s, the gender specificity of the language of 1948 will strike many people as odd – but Article 2 makes

For this paper, we construct measures of the percentage change over time in the economic risks associated with unemployment, illness, "widowhood" (or single female parenthood) and old age. In each case, we model the risk of an economic loss associated with the event as a conditional probability, which can itself be represented as the product of a number of underlying probabilities. We weight the prevalence of the underlying risk by the proportion of the population that it affects. Figure 8 presents the results. The core hypothesis underlying the measure of economic insecurity proposed here is that changes in the subjective level of anxiety about a lack of economic safety are proportionate to changes in objective risk.

[Figure 8 goes about here]

The economic risk associated with unemployment can be modeled as the product of the risk of unemployment in the population and the extent to which people are protected from the income risks of unemployment. We have taken as a proxy for the risk of unemployment changes in the employment rate (employment/population ratio). Changes in this ratio reflect changes in the unemployment rate and changes in the participation rate (both cyclical and structural). The extent to which people have been protected by unemployment insurance (UI) from the financial impacts of unemployment can be modeled as the product of: 1) the percentage of the unemployed who claim regular UI benefits, and 2) the percentage of average weekly wages replaced by UI.

In this paper, we do not attempt to model the psychological insecurities associated with

---

it clear that all Articles of the Universal Declaration of Human Rights are to be guaranteed to male and female persons equally.

health. Recent decades have seen both substantial advances in medical technology and

increased awareness of health hazards (such as Jakob-Kreutzfeld Syndrome -"mad cow

disease") which were previously unimaginable. It is not clear whether subjective anxieties

about health have increased or fallen as a result.

Viewed from a longer-term perspective, the economic insecurities associated with illness

in developed economies certainly dropped considerably with the introduction of universal health

insurance in many countries. However, a full estimate of the trend in economic anxieties

associated with ill health should include the risk of loss of earnings. Historically, a portion of

the labour force has had some income loss protection through sick leave provisions in their

individual or collective employment contracts. One implication of a trend to short-term contract

employment and self-employment in developed economies is an increase in the fraction of the

population whose employment income ceases totally in the event of ill health. Data limitations

prevent us from modelling such risks. Instead, we focus on the risk of health care costs,

assuming that risk is proportional to the share of uninsured private medical care expenses in

disposable income.

The OECD Health Data CD-ROM provides a long time series on medical care expenses

as a proportion of disposable income (excluding medical insurance premia and net of insurance

reimbursement for medical expenses). This was much higher (14.0 per cent) in the United States

than in Canada (3.2 per cent). However, to follow the convention that increases in the sub-

components of the index of economic security are improvements, we want an index of

"security" and not an index of "insecurity", hence we multiply the risk of illness, where

increases are negative for economic well-being, by –1. A negative sign, therefore, indicates that

an increased negative value represents a decline in well-being (and a decreased negative value,

an increase in well-being).

When the UN Universal Declaration of Human Rights was drafted in 1948, the

percentage of single parent families was relatively high in many countries, partly as a result of

World War II. At that point in time, "widowhood" was the primary way in which women and

children lost access to male earnings. Since then, divorce and separation have become the

primary origins of single parent families. However, it remains true that many women and

children are "one man away from poverty", since the prevalence of poverty among single parent

families is extremely high. To model trends in this aspect of economic insecurity, we multiply

(the probability of divorce) * (the poverty rate among single female parent families)[36] * (the

average poverty gap ratio among single female parent families)[37]. The product of these last two

variables is proportional to the intensity of poverty.

We stress that in constructing a measure of the economic insecurity associated with

single parent status, we are *not* constructing a measure of the social costs of divorce. Economic

well-being is only part of social well-being, and divorce has emotional and social costs (e.g. for

the involved children) that are not considered here. Arguably, over time the social costs

associated with divorce (e.g. stigma) have changed, as the institution of marriage itself has

---

[36] However, RATE= INCIDENCE x AVERAGE DURATION. Since the poverty rate among single parents is equal to the conditional probability that a single parent will enter poverty and the average duration of a poverty spell, we implicitly account jointly for the duration of poverty spells and for their likelihood.
[37] This procedure effectively ignores single male parents. While the authors of this paper feel this is an important group, males comprise only about 10 per cent of the single parent population, and their income loss on divorce is considerably less than that of women.

changed – but such issues lie well beyond the scope of this paper. The annual divorce rate in 1996 was 4.33 per cent of legally married couples in the United States but lower in Canada (2.62 per cent).   The poverty rate for single female parents in the most recent year (in brackets) from LIS micro-files was slightly higher - at 44.0 per cent (1997) - in the United States than in Canada, 40.7 per cent (1994). The difference in average poverty gap ratio for single female parents was greater - United States (39.6 per cent), Canada (27.5 per cent).

Again, to follow the convention that increases in the sub-components of the index of economic security are improvements, we want an index of "security" and not an index of "insecurity", hence we multiply the risk of single-parenthood, where increases are negative for economic well-being, by –1. A negative sign, therefore, indicates that an increased negative value represents a decline in well-being (and a decreased negative value, an increase in well-being).

Since income in old age is the result of a lifelong series of events and decisions, which we cannot hope to disentangle in this paper, we model the idea of "insecurity in old age" as the chance that an elderly person will be poor, and the average depth of that poverty. The poverty rate for the elderly in the most recent year (in brackets) for LIS micro-data files was much higher in the United States, at 24.4 per cent (1997) than in Canada, 4.8 per cent (1994). The average poverty gap ratio for the elderly was also higher in the United States (24.4 per cent), than in Canada (13.4 per cent).

Again, to follow the convention that increases in the sub-components of the index of economic security are improvements; we want an index of "security" and not an index of

"insecurity". Hence we multiply the risk of elderly poverty by –1. A negative sign, therefore, indicates that an increased negative value represents a decline in well-being (and a decreased negative value, an increase in well-being).

2.4. Overall Index of Economic Security

The four risks discussed above have been aggregated into an index of economic security using as aggregation weights the relative importance of the four groups in the population:

- For unemployment, the proportion of the population aged 15-64 in the total population.

- For illness, the proportion of the population at risk of illness, which is 100 per cent.

- For single parent poverty, the proportion of the population comprised of married women with children under 18.

- For old age poverty, the proportion of the population in immediate risk of poverty in old age, defined as the proportion of the population aged 45-64 in the total population.

The above proportions have been normalized for all years to one. For example the weights for Canada in 1997 were the following: unemployment (0.2779), illness (0.4160), single parenthood (0.2158), and old age (0.0904).[38] Implicitly, by expressing changes as proportionate to an initial base, we are assuming that individuals habituate to a given level of background stimulus, but respond similarly to proportionate changes in stimulus.

---

[38] In order that the base year for the indexes of all risks of economic security be the same at 1.000 in Table 9, the constant 2 has been added to the indexes of risk of illness, single parenthood, and old age, whose original base was –1.

Based on the above weights, the overall index of economic security for Canada and the

US is shown in Figure 8. The decline in economic security in Canada in the 1990s is notable.

2.5. Estimates of trends in the Overall Index of Economic Well-being

2.5.1 Weighting of components

Trends in any index are determined by the choice of variables that are included in the

index, the trends in those variables, and the weights these variables receive. Since the four main

dimensions of average consumption, intergenerational bequest, inequality/poverty and insecurity

are separately identified, it is easy to conduct sensitivity analyses of the impact on perceived

overall trends of different weighting of these dimensions, and this has been a major feature of

our previous papers. However, for present purposes we present only a simple average of the four

components of well-being, and refer readers interested in sensitivity testing to Osberg and

Sharpe (1999, 2000

As the sub-components of the consumption flows and wealth stocks are expressed in

dollars, there is no need for explicit weighting. Their dollar values represent implicit weights.

In terms of the inequality/poverty subcomponents, a somewhat Rawlsian perspective would

assign greater importance to poverty than to overall inequality trends. On this basis[39], a weight

of 0.1877 or (=0.25*0.75) has therefore been given to the poverty intensity and 0.0625

(=0.25*0.25) to the Gini -i.e. poverty is given three times the weight of inequality. The

subcomponents of the economic security index are weighted by the relative importance of the

---

[39] A pure Rawlsian would put all the weight on the well-being of the least well off.

specific population at risk in the total population.

[Figure 9 about here]

3. Trends in the overall index of economic well-being

We are acutely conscious that the data sources available to us are far from what we would like. However, we hope that enough data remains to give a preliminary indication of trends in economic well-being from a broader perspective than that provided by GDP accounting. In other work, (e.g. Osberg and Sharpe, 2000) we have examined explicitly the sensitivity of our overall index of economic well being to the weighting of its components. Generally, the more heavily current average consumption is emphasized, the closer our index comes to GDP per capita. However, in every instance the consideration of a wider range of issues than those recognized in GDP accounting reduces the measured increase in economic well-being.

In the United States, GDP per capita increased by approximately 30% over the 1980 to 1997 period, but our "standard" index is essentially flat, with a total increase of 3% over the period. The USA has been marked by a substantial increase in economic inequality over this period, and increases in money income have been limited to the top end of the income distribution (see Osberg 1999). As well, increases in money income in the U.S. have been obtained at the cost of substantial increases in working hours. Hence, this is not an unreasonable finding. Since Canada saw a substantial decrease in economic security in the 1990s, with no counterbalancing gain in average consumption, there was a slight decline in

overall economic well being for the period as a whole.

3.1 Level Comparisons of Economic Well-being

Comparisons of the level of well-being across countries are inherently much more problematic than comparisons of the trends in various components of economic well-being within countries. In cross country comparisons, the institutional context of economic data differs to a far greater extent than in within country, over time comparisons. Calculations of purchasing power parity equivalence across several countries have greater uncertainty than comparisons of within country consumer price levels. Statistical agencies in different countries differ in their data availability and data gathering practices to a greater degree than they change those practices over time in the same country. For all these reasons, this paper avoids direct commentary on comparative levels of economic well-being.

4. Conclusion and Implications for Social Policy

Early economists were fairly broad in their conception of "prosperity", but were in no doubt that it had many positive implications. More recently, the measure of economic success has been narrower – and it falls to critics of the SNA to show that alternative measures to GDP per capita are possible, plausible and make some difference. This paper has, therefore, developed an index of economic well-being based on four dimensions or components of economic well-being - consumption, accumulation, income distribution, and economic security.

In general, a key finding of this paper is that economic well-being has increased at a much

slower rate over the last 20 years than real GDP per capita. Although GDP per capita is a widely-used indicator, it is best seen as an *input* into economic well-being. Hence, if "productivity" is the ratio between "outputs" and "inputs", and if the output we want (economic well being) is growing more slowly than the input we supply (GDP per capita), then in a very real sense social productivity is declining.

Why should someone concerned with social policy be concerned with the divergence between trends in economic well-being and trends in GDP?

Historically, the "welfare state" of advanced capitalist countries aimed at mitigating the extent of economic insecurity and economic inequality – two key dimensions of economic well being. Recent years have seen substantial revisions to social policy in both Canada and the USA, and it is precisely the inequality and insecurity dimensions of well being in which there have been the strongest adverse trends. If growth in GDP no longer translates into as great an increase in economic well being, these recent changes in social policy may well be responsible for this decline in social productivity.

Social policy clearly operates within the context set by macro economic policy and by broader social, economic and technological change, and each particular social policy needs to be evaluated on its own merits. Nevertheless, the general implication of this paper is that social policy design should consider the impacts of policy on all the dimensions of economic well being – consumption, accumulation, distribution and insecurity.

Bibliography

Atkinson, Anthony B. (1970) "On the Measurement of Inequality" *Journal of Economic Theory* Vol 2 (1970): 244-263.

Atkinson, Anthony, Lee Rainwater, and Timothy M. Smeeding (1995) *Income Distribution in OECD Countries: Evidence from the Luxembourg Income Study* (Paris: Organisation for Economic Co-operation and Development).

Atkinson, Giles, Richard Dubourg, Kirk Hamilton, Mohan Munasinghe, David Pearce, and Carlos Young (1997) *Measuring Sustainable Development: Macroeconomics and the Environment* (Cheltenham, UK: Edward Elgar).

Bailey, Martin Neil, Gary Burtless, and Robert E. Litan (1993) *Growth with Equity: Economic Policymaking for the Next Century* (Washington, DC: Brookings Institution).

Baumol, William and Wallace Oates (1995) "Long-Run Trends in Environmental Quality" in Julian L. Simon (ed.) *The State of Humanity* (Cambridge, Mass.: Basil Blackwell): 444-475.

Bettmann, Otto L. (1974) *The Good Old Days-They Were Terrible!* (New York: Random House).

Bibby, Reginald (1995) *The Bibby Report: Social Trends Canadian Style* (Toronto: Stoddard).

Blanchflower, David G. and Andrew J. Oswald (1997) "The Rising Well-Being of the Young" NBER Working Paper No. 6102 (Cambridge, MA: National Bureau of Economic Research).

Blendon, Robert J., John M. Benson, Mollyann Bridie, Richard Morin, Drew E. Altman, Daniel Gitterman, Mario Brossard, and Matt James (1997) "Bridging the Gap Between the Public's and Economists' Views of the Economy" *Journal of Economic Perspectives* 11(3), Summer: 105-118.

Boskin, M.J. (chairman), E.R. Dulberger, and Z. Griliches (1999) *Toward A More Accurate Measure of the Cost of Living* Final Report to the Senate Finance Committee from the Advisory Commission to Study the Consumer Price Index (Collingdale: DIANE publishing company).

Brink, Satya, and Allen Zeesman (1997) "Measuring Social Well-Being: An Index of Social Health for Canada" Research Paper R-97-9E, Applied Research Branch, Human Resources Development Canada.

Brown, Clair (1994) *American Living Standards, 1918-1988* (Cambridge, Mass.: Blackwell).

Burkhauser, R.V., T. M. Smeeding, and J. Merz (1996) "Relative Inequality and Poverty in Germany and the United States Using Alternative Equivalence Scales" *The Review of Income and Wealth* 42(4): 381-400.

Clark, Andrew, and Andrew Oswald (1994) "Unhappiness and Unemployment" *The Economic Journal* 104(424): 648-659.

Coulombe, Serge (2000) "The Canada-US productivity growth paradox" Working Paper Number 12, March 2000, Industry Canada, Ottawa

Crabbe, Philippe (1997) "Sustainable Development: Concepts, Measures, Market and Policy Failures at the Open Economy, Industry, and Firm Levels," Occasional Paper Number 16, Industry Canada, October.

Dale, Ann and John B. Robinson, eds. (1996) *Achieving Sustainable Development* (Vancouver: UBC Press).

Dawson, J. C. ed. (1996) *Flow-of-Funds Analysis* (Armonk: M.E. Sharpe).

Eisner, Robert (1989) *The Total Income System of Accounts* (Chicago: University of Chicago Press).

Evans, Robert G., Morris L. Barer, and Theodore R. Marmor (1994) *Why Are Some People Healthy and Others Not? The Determinants of Health of Populations* (Hawthorne, NY: Aldine de Gruyter).

Fankhauser, S. (1995) "Evaluating the Social Costs of Greenhouse Gas Emissions" Energy Journal 15: 157-84.

Hamilton, Kirk (1994) "Green Adjustments to GDP" *Resources Policy* 20(3): 155-168.

Hardi, Peter, and Stephan Barg (1997) "Measuring Sustainable Development: Review of Current Practice" Occasional Paper Number 17, Industry Canada, November.

Hayward, Steve, and Laura Jones (1998) *Environmental Indicators for Canada and the United States* Critical Issues Bulletin (Vancouver, B.C.: Fraser Institute).

Henderson, D.W. (1974) *Social Indicators: A Rationale and Research Framework* (Ottawa:

Economic Council of Canada).

Human Resources Development Canada (1998) "An Analysis of Employment Insurance Benefit Coverage," Working Paper W-98-35E, Applied Research Branch, October.

Jaques, A., F. Neitzert, and P. Boileau (1997) Trends in Canada's Greenhouse Gas Emissions, 1960-1995, Environment Canada, April.

Jenkins, S. (1991) "The Measurement of Income Inequality" in ed. L. Osberg *Economic Inequality and Poverty: International Perspectives* (Armonk, NY: M.E. Sharp Inc.): 3-38.

Jorgenson, Dale, and Barbara Fraumeni (1992) "The Output of the Education Sector" in eds. Z. Griliches et al. *Output Measurement in the Service Sectors* NBER Studies in Income and Wealth Vol. 56 (Chicago: University of Chicago Press): 303-338.

Lippert, Owen, and Michael Walker, eds. (1997) *The Underground Economy: Global Evidence of its Size and Impact* (Vancouver, B.C.: Fraser Institute).

Kemp, Katharine, and Gaston Levesque (1998) "Purchasing Power Parity Estimates for Canada and Implications for Volume Comparisons" paper presented at the annual meeting of the Canadian Economics Association, University of Ottawa, May 28-31 (posted at www.csls.ca/new/cea_pape.html).

Kendrick, J.W., et al. (1976) *The Formation and Stocks of Total Capital* (New York: Columbia University Press).

Kendrick, J.W., ed. (1996) *The New System of National Accounts* (Boston: Kluwer Academic Publishers).

Keuning, Steven (1998) "A Powerful Link Between Economic Theory and Practice: National Accounting" *The Review of Income and Wealth* 44(3): 437-446.

Messinger, Hans, and Abe Tarasofsky (1997) "Measuring Sustainable Economic Welfare: Looking Beyond GDP" paper presented at the annual meeting of the Canadian Economics Association, St. John's, Newfoundland, June 2-4 (available on line at www.csls.ca).

Mishel, Lawrence, and Jared Bernstein (1996) "Trouble in Paradise: Eroding Wages and Growing Income Inequality" paper commissioned by the Competitiveness Policy Council, September, www.cais.net/cpc/running

Mishel, Lawrence, Jared Bernstein, and John Schmitt (1997) *The State of Working America, 1996-97* Economic Policy Institute (Armonk, NY: ME Sharpe).

Mishel, Lawrence, Jared Bernstein, and John Schmitt (1999) *The State of Working America, 1998-99* (Ithaca: ILS Press).

Moss, Milton, ed. (1973) *The Measurement of Economic and Social Performance* (New York: Columbia University Press).

Murphy, Brian, and Michael Wolfson (1998) "New Views on Inequality Trends in Canada and the United States" *Monthly Labor Review* 121(4), April: 3-23.

National Forum on Family Security (1993) *Family Security in Insecure Times* Volume I.

National Forum on Family Security (1996) *Family Security in Insecure Times* Volume II and Volume III.

Nordhaus, William (1997) "Do Real-Output and Real-Wage Measures Capture Reality: The History of Lighting Suggests Not" in eds. Bresnahan, Timothy, and Robert J. Gordon *The Economics of New Goods* NBER Studies in Income and Wealth Vol. 58 (Chicago: University of Chicago Press): 29-66.

OECD (1996) *Measuring What People Know: Human Capital Accounting for the Knowledge Economy* (Paris: Organization for Economic Cooperation and Development).

OECD (1998) *Human Capital Investment: An International Comparison* Centre for International Research and Innovation (Paris: Organisation for Economic Co-operation and Growth).

Osberg, Lars (1985a) "The Measurement of Economic Welfare" in David Laidler (coordinator) *Approaches to Economic Well-Being* Vol. 26 of the Royal Commission on the Economic Union and Development Prospects for Canada (MacDonald Commission) (Toronto: University of Toronto Press).

Osberg, Lars (1985b) "The Idea of Economic Well-Being" Paper presented at the 19th General Conference of the International Association for Research in Income and Wealth, Noordwijkerhout, Netherlands, August 25-31, mimeo, Dalhousie University, June, Mimeo.

Osberg, Lars, ed. (1991) Economic Inequality and Poverty: International Perspectives (Armonk: NY), ME Sharpe).

Osberg, Lars (1997) "Economic Growth, Income Distribution and Economic Welfare in Canada, 1975-1994" *North American Journal of Economics & Finance* 8(2): 153-166.

Osberg, Lars (1998) "Meaning and Measurement in Intergenerational Equity" in ed. Miles Corak *Government Finances and Intergenerational Equity* (Ottawa: Statistics Canada and Human Resources Development Canada): 131-139.

Osberg, Lars (1998) "Economic Insecurity" Discussion Paper No. 88, Social Policy Research Centre, University of New South Wales, Sydney, Australia.

Osberg, Lars (1999) "Long Run Trends in Economic Inequality in Five Countries A Birth Cohort View" paper presented at Jerome Levy Institute Conference on Macro Dynamics of Inequality, October 28, 1999 - available at http://is.dal.ca/~osberg/home.html

Osberg, Lars (2000) "Poverty in Canada and the USA: Measurement, Trends and Implications" *Canadian Journal of Economics* 33(4), November: 847-877.

Osberg, Lars, and Andrew Sharpe (1999) "An Index of Economic Well-being for Canada and the United States" paper presented to the annual meeting of the American Economics Association, January 3-5, New York.

Osberg, Lars, and Kuan Xu (2000) "International Comparisons of Poverty Intensity: Index Decomposition and Bootstrap Inference" *Journal of Human Resources* 35(1), Winter: 51-81.

Ostry, Sylvia, and Mahmood Zaidi (1979) *Labour Economics in Canada* 3rd Edition (Toronto: Macmillan).

Phipps, S., and T.I. Garner (1994) "Are Equivalence Scales the same for the United States and Canada?" *The Review of Income and Wealth* 40(1): 1-18.

Picot, Garnett (1996) "Earnings Inequality, Working Time and Wages Among Men and Women" Business and Labour Market Analysis Division, Statistics Canada, mimeo.

Ragan, Christopher (1998) "On the Believable Benefits of Low Inflation" Working Paper 98-15 (Ottawa: Bank of Canada).

Riddell, C. (1999) 'Canadian Labour Market Performance in International Perspective,' *Canadian Journal of Economics*32:5, 1097-1134

Robinson, John B., ed. (1996) *Life in 2030: Exploring a Sustainable Future for Canada* (Vancouver: UBC Press).

Ross, David, Richard Shillington, and Clarence Lochhead (1994) *The Canadian Fact Book on Poverty* (Ottawa: Canadian Council on Social Development).

Sharif, N., and S. Phipps (1994) "The Challenge of Child Poverty: Which Policies Might Help?" *Canadian Business Economics* 2(3) Spring: 17-30.

Sharpe, Andrew, and Myles Zyblock (1997) "Macroeconomic Performance and Income Distribution in Canada" *North American Journal of Economics & Finance* 8(2): 167-199.

Sharpe, Andrew, and Larry Mishel (1998) "A comparison of the Economic Well-Being of Canadians and Americans" paper presented at the CSLS Conference on the State of Living Standards and Quality of Life in Canada, October 30-31, Ottawa, Ontario (Paper posted at www.csls.ca under conferences)

Sheridan, Mike (1996) "Statistics Canada's Experience with Low Income Cutoffs" paper presented at the Experts Group on Household Income Statistics, December 2-4, Canberra, Australia (http://lissy.ceps.lu/canberra/papers/sheridn2.htm).

Slottje, Daniel J., Gerald W. Scully, Joseph G. Hirschberg, and Kathy J. Hayes (1991) *Measuring the Quality of Life Across Countries: a Multidimensional Analysis* (Boulder, Col.: Westview Press).

Smith, Phillip (1994) "The Canadian National Accounts Environmental Component: A Status Report" in *National Income and Expenditure Accounts, Annual Estimates, 1982-1993* Cat. 13-201.

Statistics Canada (1994) *The Size of the Underground Economy in Canada*, Studies in National Accounting #2 Cat. No.13-603.

Statistics Canada (1996a) *Environmental Perspectives* Cat. No. 11-528.

Statistics Canada (1996b) *Households' Unpaid Work: Measurement and Valuation*, Studies in National Accounting #3 Cat. No. 13-603.

Statistics Canada (1997) Environment-Economy Indicators and Detailed Statistics 1997 (Econnections: Linking the Environment and the Economy) Cat. No. 16-200, December.

United Nations (1993) in collaboration with Eurostat, International Monetary Fund, Organisation for Economic Co-operation and Development, and World Bank *System of National Accounts 1993* Series F, No. 2, Rev. 4 (New York: joint publication by

Eurostat, IMF, OECD, UN and the World Bank).

United Nations Development Programme (1997) *Human Development Report: 1997* (New York: Oxford University Press).

Usher, Dan (1980) *The Measurement of Economic Growth* (Oxford: Basil Blackwell).

Vanier Institute of the Family (1994) *Profiling Canada's Families* (Ottawa: Vanier Institute of the Family).

Waring, Marilyn (1988) *Counting for Nothing: What Men Value and What Women Are Worth* (Wellington, New Zealand: Allen and Unwin).

Weinberg, Daniel (1996) "Changing the Ways the United States Measures Income and Poverty" paper presented at the Experts Group on Household Income Statistics, December 2-4, Canberra, Australia (http://lissy.ceps.lu/canberra/papers/weinberg.htm).

Wilkinson, R.G. (1996) *Unhealthy Societies: The Afflictions of Inequality* (London: Routledge).

Wolfson, Michael (1994) "Toward a System of Health Statistics" *Daedalus* 123(4), Fall: 181-195.

Wolfson, Michael (1996) "Health-Adjusted Life Expectancy" *Health Reports* 8(1), Summer: 41-45.

Woolley, Frances (1998) "Work and Household Transactions" in *How Families Cope and Why Policymakers Need to Know* CPRN Study No. F02 (Ottawa: Canadian Policy Research Networks).

World Bank (1997) "Expanding the Measure of Wealth: Indicators of Environmentally Sustainable Development" Environmentally Sustainable Development Studies and Monographs Series No. 17. (Washington, DC: World Bank).

Figure 1
Real Gross Domestic Product per Capita 1970-1999
1999 US Dollars at Purchasing Power Parity
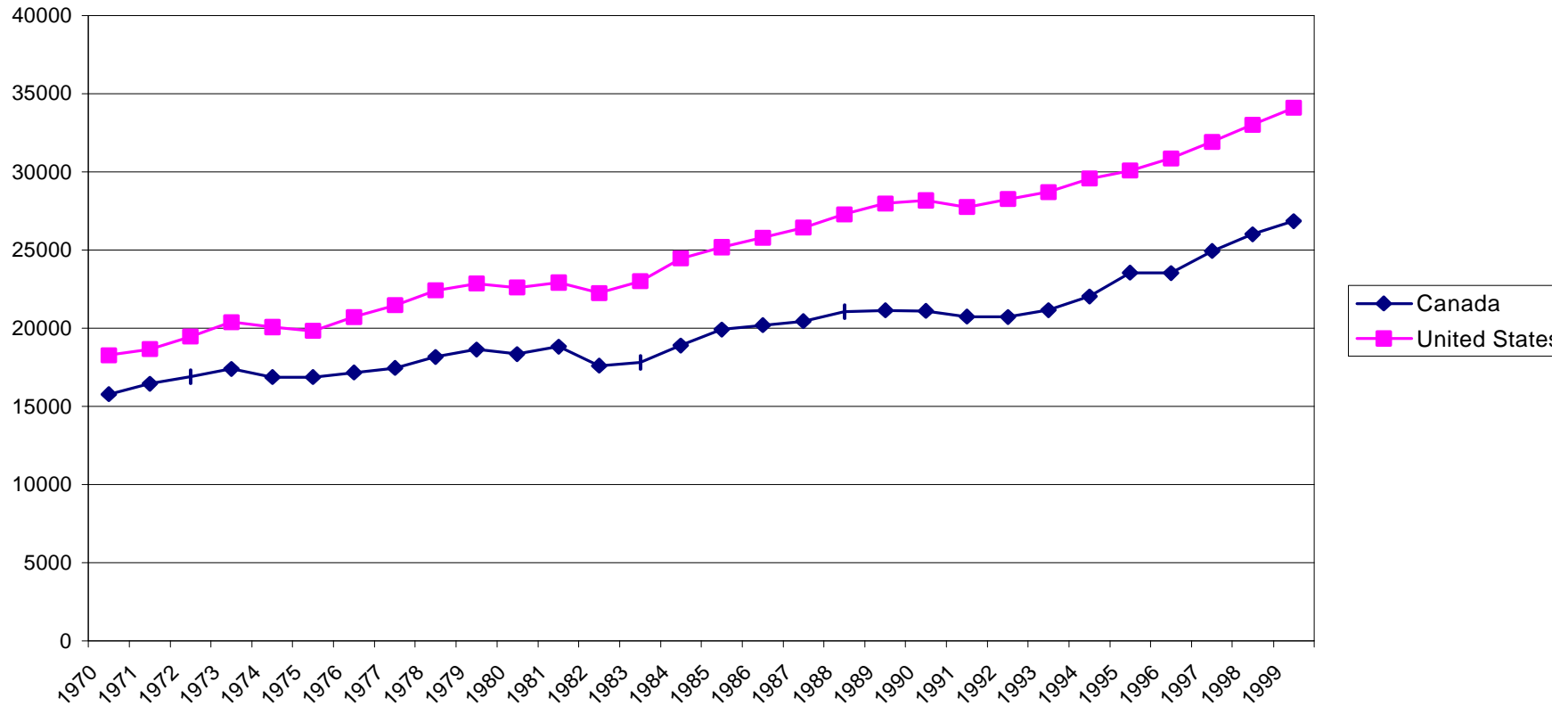
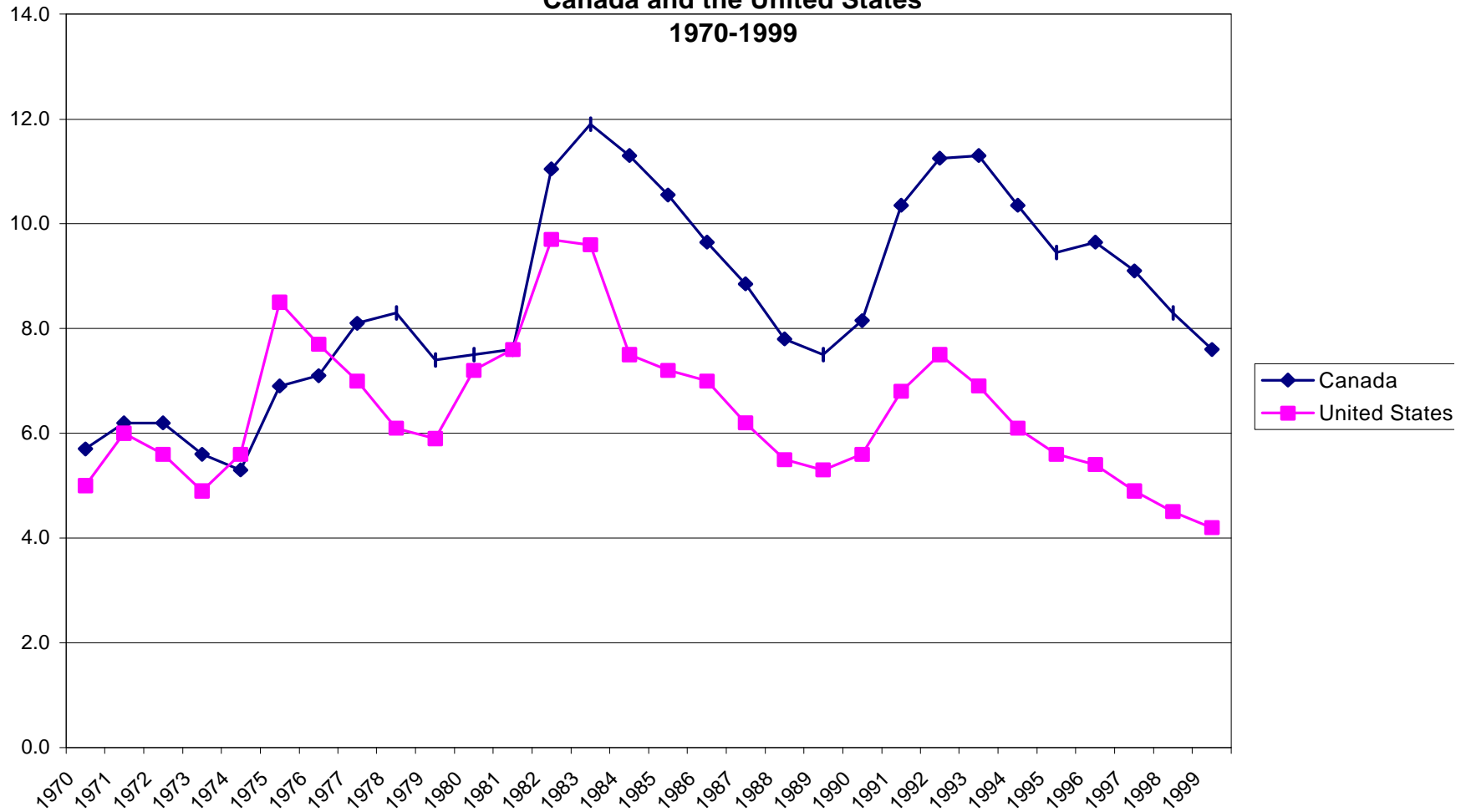Sources: Canada GDP - CANSIM matrices 9219 (series d28609) , 6967 (series D44960)
                      price deflator matrix 8625
            US -   GDP & price deflator Bureau of Economic Analysis (see: http://www.bea.doc.gov/bea/dn1.htm)
                      population: US census bureau (see:http://www.census.gov/population/estimates/nation/popclockest.txt)
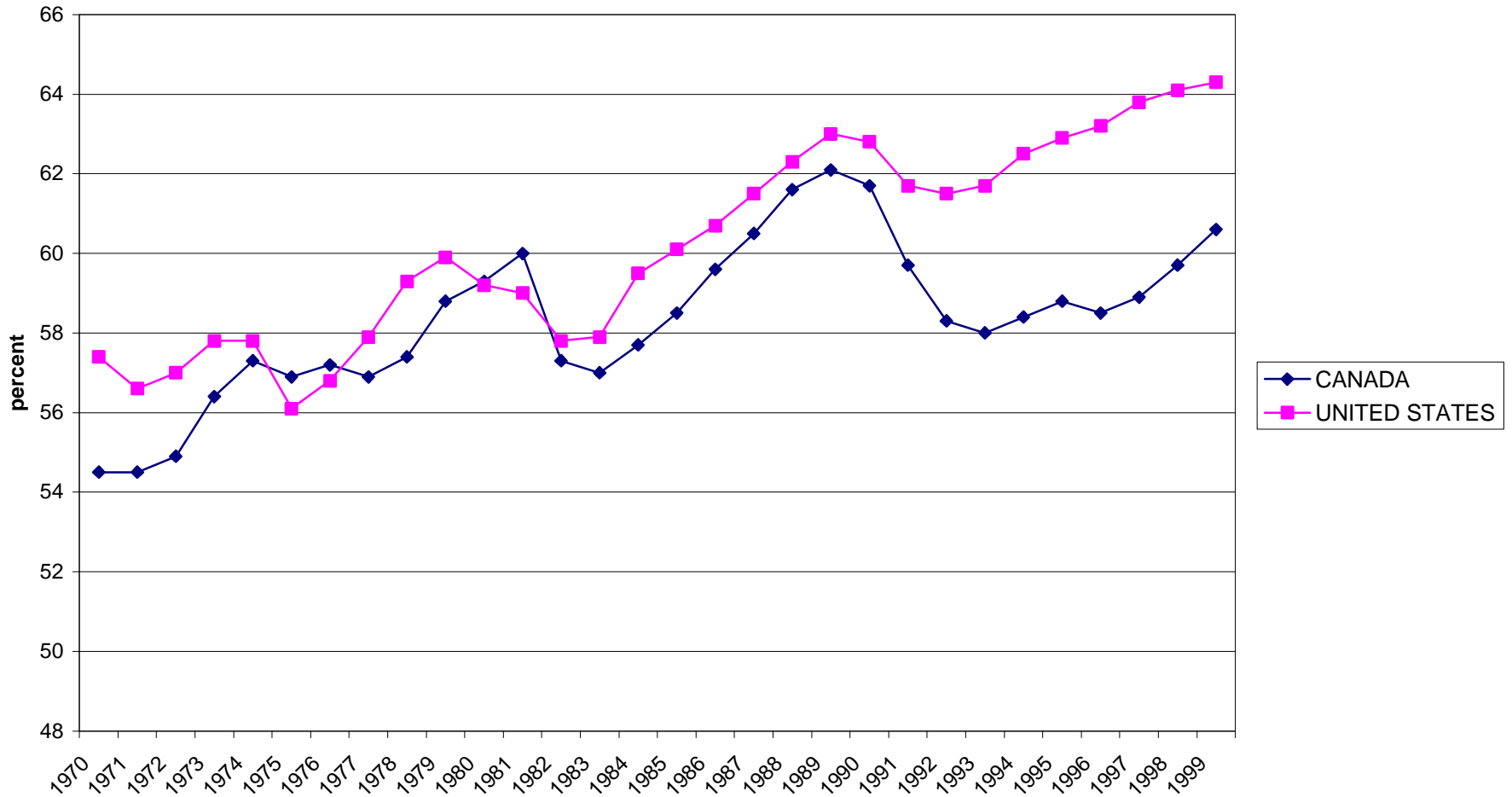   PPP's OECD (see: http://www.oecd.org/std/ppp/pps.htm)

Figure 2
Unemployment Rates
Canada and the United States
**1970-1999**

Sources: Canada: CANSIM matrices 9219 (series d28599) and 6967 (series d44950)
United States CANSIM matrix 2537 (series b53106)

Figure 3
Employment / Population Ratio
Canada and the United States

source: U.S. Bureau of Labor Statistics, International Comparisons of Foreign Labor Statistics
(see: http://stats.bls.gov/special.requests/ForeignLabor/flslforc.pdf)

49

Figure 4
Hourly Direct Pay for Production Workers in Manufacturing
Canada and the US 1975-1990
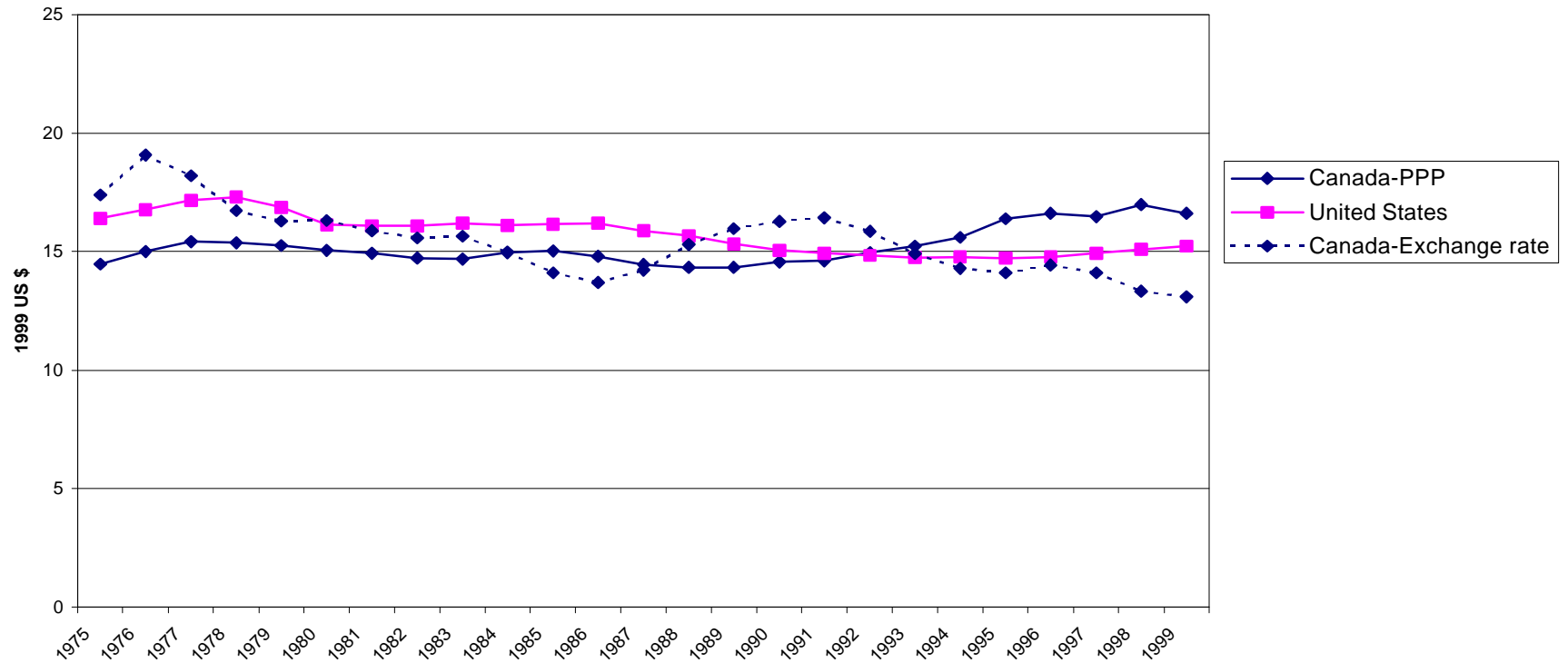
Hourly direct pay includes (a) pay for time worked (basic time and piece rates plus overtime premiums, shift differentials, other premiums and bonuses paid regularly each pay period, and cost-of-living adjustments) and (b) other
direct pay (pay for time not worked (vacations, holidays, and other leave, except sick leave), seasonal or irregular bonuses and other special payments, selected social allowances, and the cost of payments in kind), before payroll
deductions of any kind. Direct pay is also measured on an hours-worked basis for every country.
source : US Bureau of Labor Statistics (ftp://ftp.bls.gov/pub/special.requests/ForeignLabor/supptab.txt)

Figure 5
Trends in Average Consumption in the USA and Canada
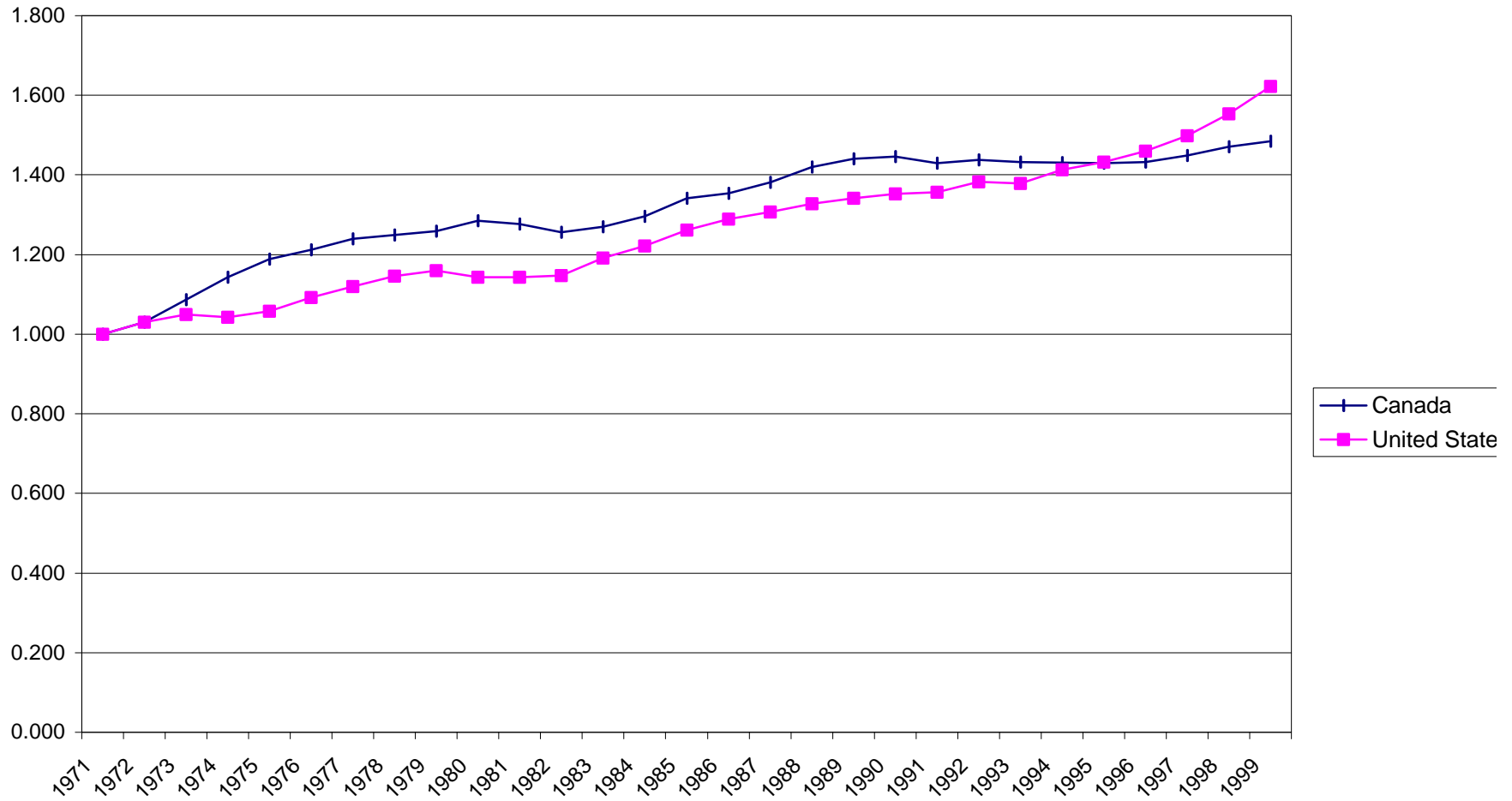
Source:see appendix tables A1

Figure 6
Wealth Accumulation Trends in the USA and Canada
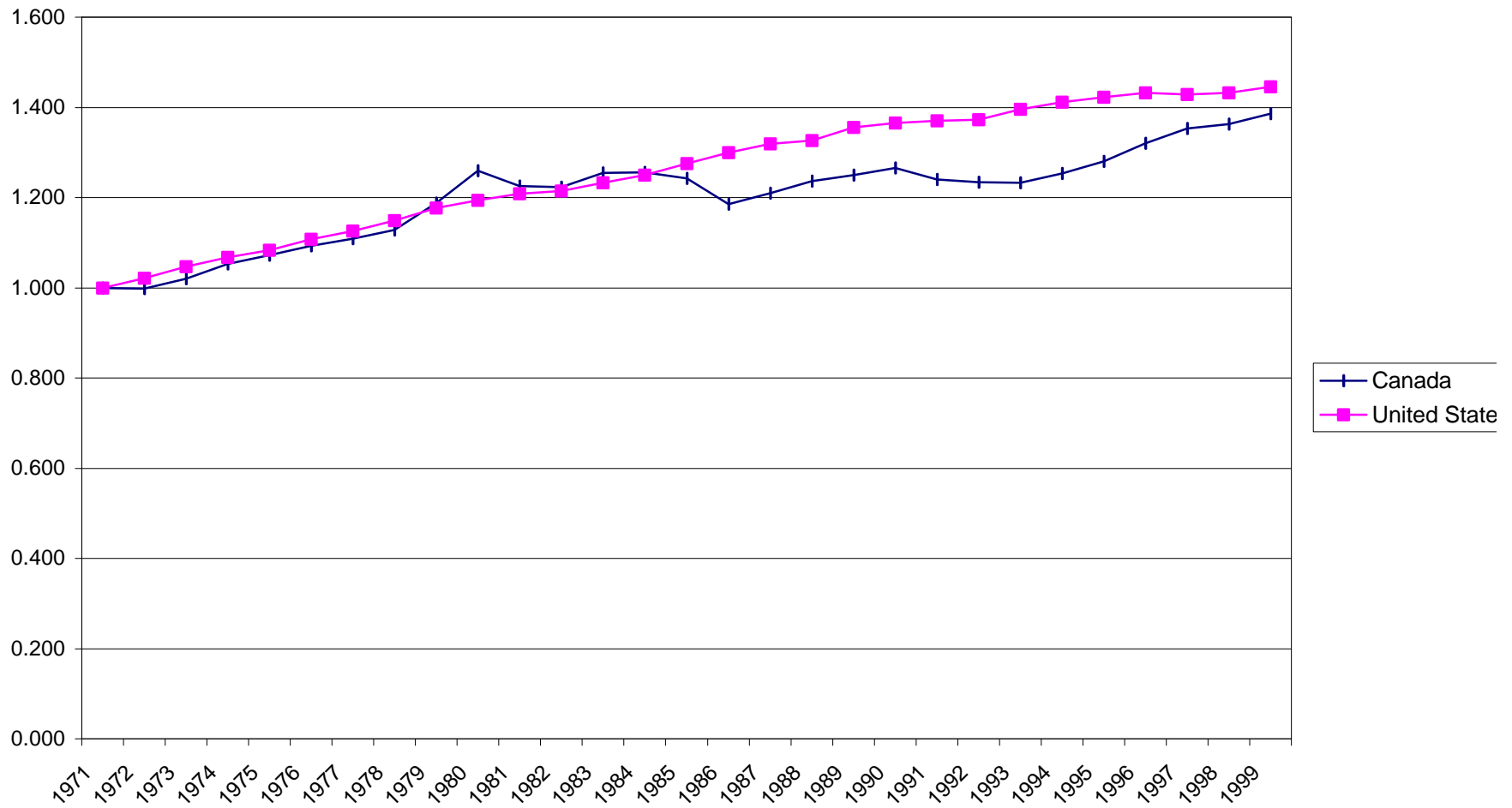
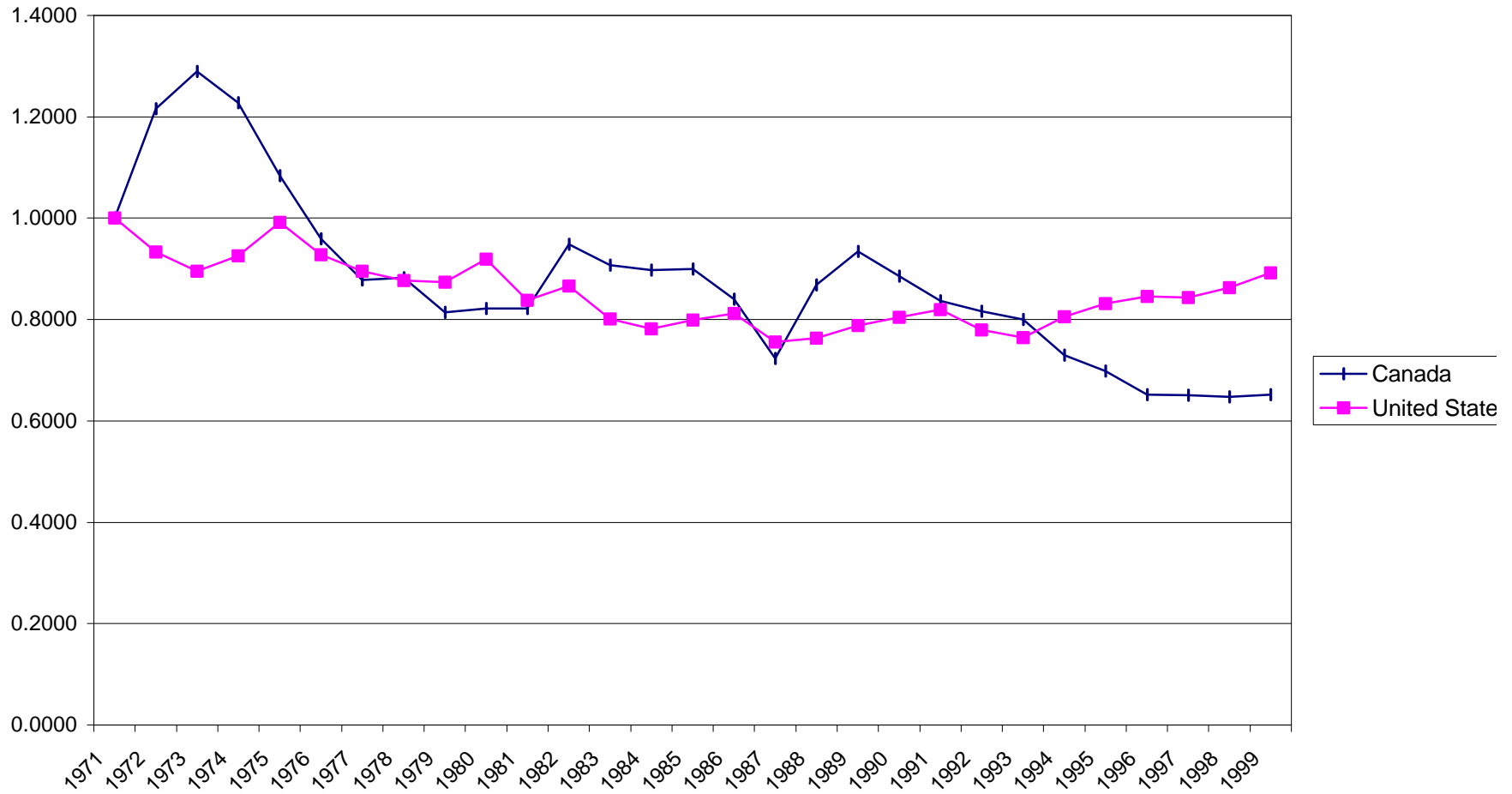

Source: see appendix table A1
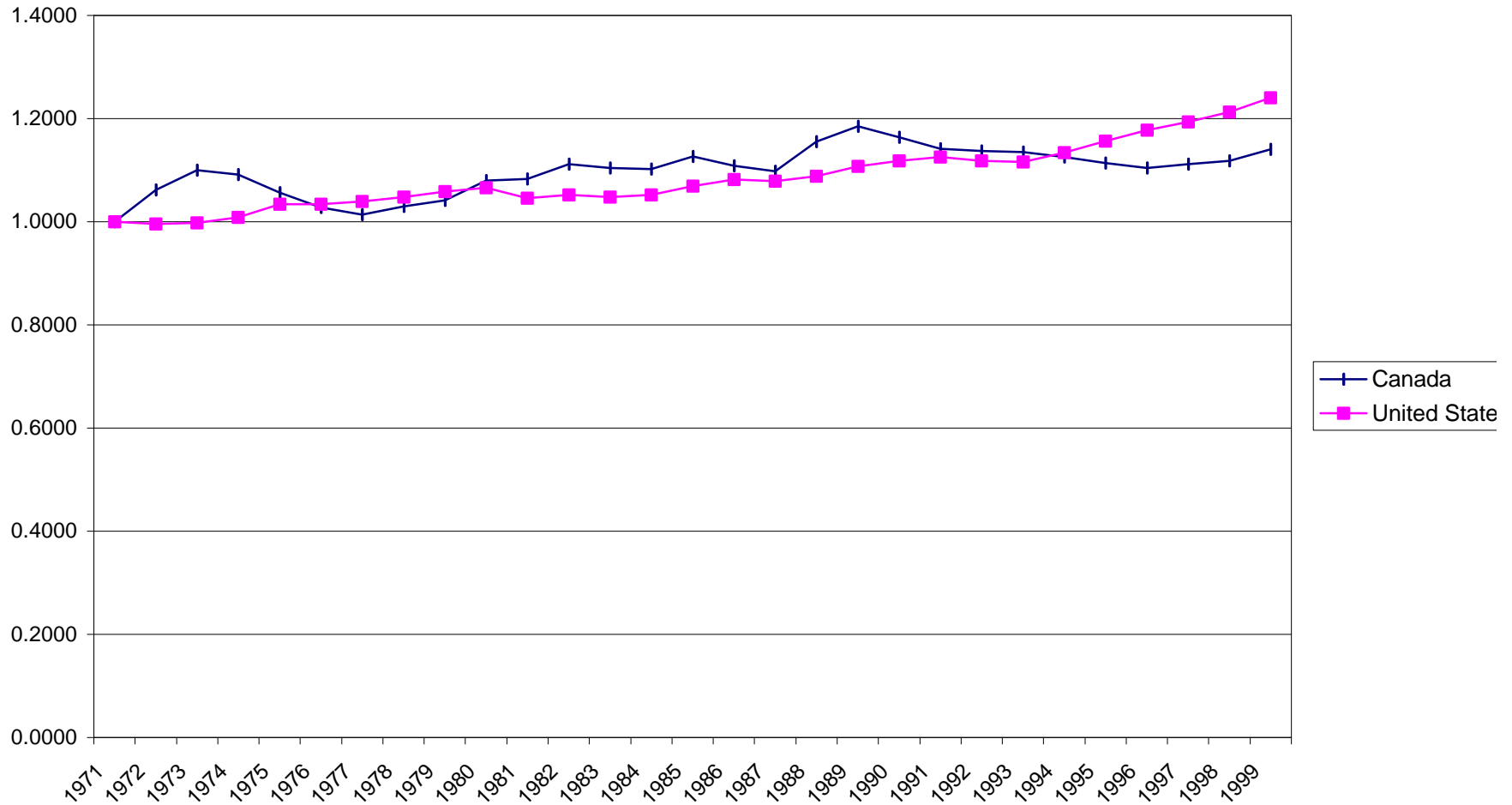
Figure 7
Trends in Income Equality
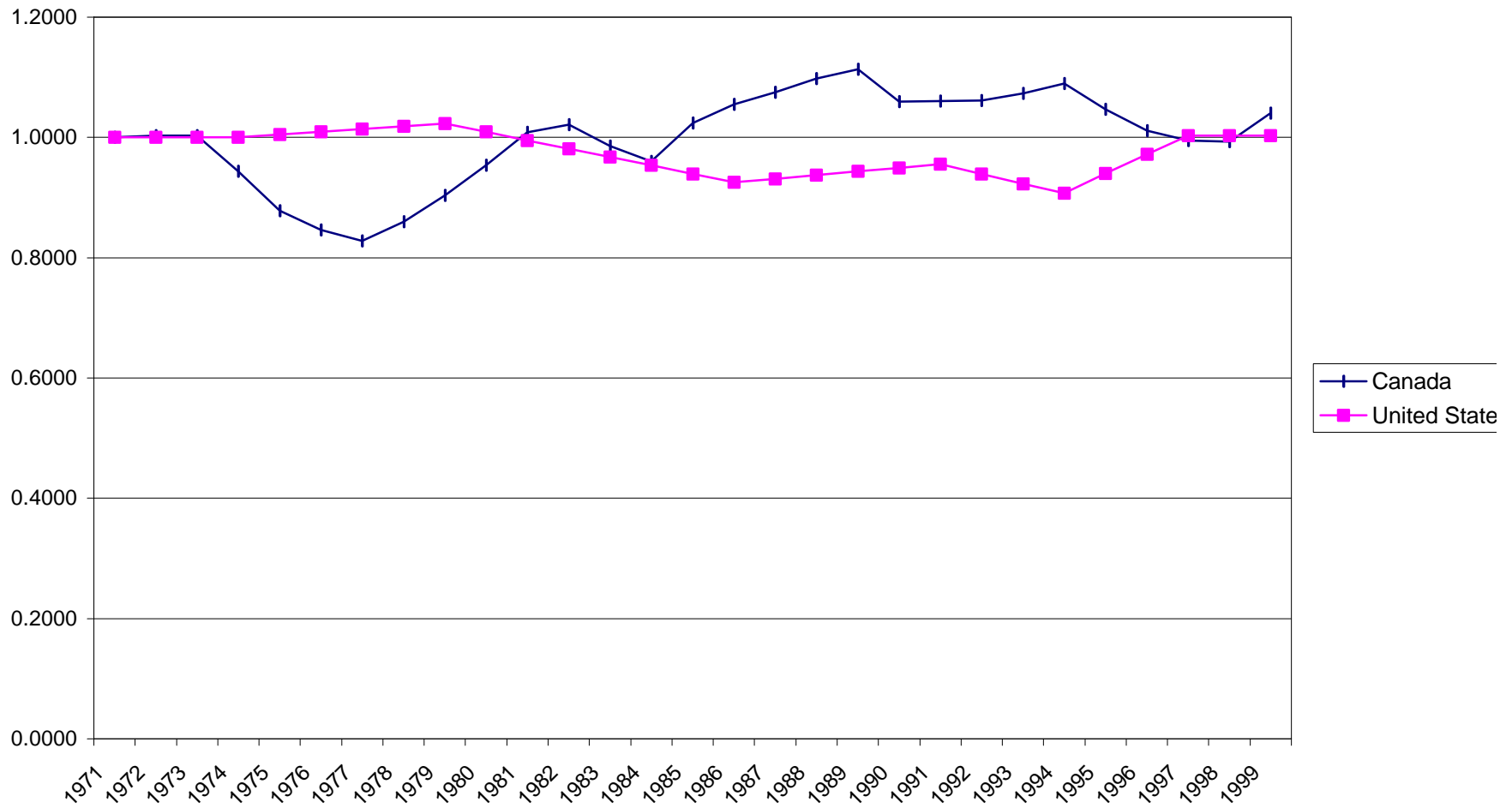
Source: see appendix table A1

Figure 8
Trends in Economic Security

Source: see appendix table A1

Figure 9
Trends in Economic Well-Being in Canada and the USA
[Equal weighting of Consumption, Accumulation, Distribution and Economic Security

Source: see table A1

TABLE A1

	Index of Adjusted total Consumption			Wealth Stocks			equality measures			Economic Security			well-being index	
	Canada	United States		Canada	United States		Canada	United States		Canada	United States		Canada	United States
1971	1.000	1.000	1971	1.000	1.000	1971	1.0000	1.0000	1971	1.0000	1.0000	1971	1.0000	1.0000
1972	1.030	1.030	1972	0.999	1.021	1972	1.0034	1.0000	1972	1.2160	0.9330	1972	1.0620	0.9961
1973	1.087	1.050	1973	1.020	1.046	1973	1.0034	1.0000	1973	1.2895	0.8956	1973	1.1000	0.9979
1974	1.142	1.042	1974	1.053	1.067	1974	0.9435	1.0000	1974	1.2278	0.9253	1974	1.0917	1.0087
1975	1.189	1.058	1975	1.073	1.083	1975	0.8782	1.0046	1975	1.0843	0.9915	1975	1.0560	1.0343
1976	1.212	1.092	1976	1.093	1.107	1976	0.8458	1.0091	1976	0.9591	0.9282	1976	1.0275	1.0341
1977	1.239	1.120	1977	1.109	1.126	1977	0.8278	1.0137	1977	0.8779	0.8959	1977	1.0135	1.0389
1978	1.249	1.146	1978	1.128	1.149	1978	0.8602	1.0182	1978	0.8821	0.8773	1978	1.0298	1.0475
1979	1.259	1.159	1979	1.188	1.177	1979	0.9034	1.0228	1979	0.8144	0.8733	1979	1.0414	1.0582
1980	1.286	1.143	1980	1.260	1.194	1980	0.9536	1.0090	1980	0.8213	0.9193	1980	1.0801	1.0664
1981	1.276	1.143	1981	1.226	1.208	1981	1.0088	0.9952	1981	0.8213	0.8375	1981	1.0830	1.0460
1982	1.256	1.148	1982	1.223	1.214	1982	1.0209	0.9814	1982	0.9481	0.8663	1982	1.1119	1.0525
1983	1.270	1.191	1983	1.255	1.233	1983	0.9862	0.9674	1983	0.9077	0.8008	1983	1.1046	1.0480
1984	1.295	1.222	1984	1.256	1.250	1984	0.9605	0.9534	1984	0.8975	0.7819	1984	1.1023	1.0519
1985	1.341	1.261	1985	1.242	1.275	1985	1.0236	0.9393	1985	0.8995	0.7992	1985	1.1265	1.0687
1986	1.354	1.289	1986	1.186	1.299	1986	1.0548	0.9251	1986	0.8397	0.8124	1986	1.1085	1.0814
1987	1.381	1.307	1987	1.210	1.319	1987	1.0750	0.9313	1987	0.7238	0.7557	1987	1.0974	1.0784
1988	1.419	1.328	1988	1.236	1.326	1988	1.0978	0.9374	1988	0.8688	0.7633	1988	1.1555	1.0887
1989	1.441	1.341	1989	1.250	1.356	1989	1.1135	0.9435	1989	0.9339	0.7878	1989	1.1847	1.1071
1990	1.445	1.352	1990	1.266	1.365	1990	1.0594	0.9496	1990	0.8852	0.8047	1990	1.1641	1.1179
1991	1.429	1.356	1991	1.240	1.370	1991	1.0608	0.9556	1991	0.8371	0.8200	1991	1.1420	1.1256
1992	1.437	1.383	1992	1.234	1.372	1992	1.0615	0.9395	1992	0.8163	0.7791	1992	1.1372	1.1184
1993	1.432	1.379	1993	1.233	1.396	1993	1.0729	0.9232	1993	0.8007	0.7647	1993	1.1348	1.1157
1994	1.431	1.413	1994	1.253	1.412	1994	1.0893	0.9069	1994	0.7299	0.8056	1994	1.1258	1.1343
1995	1.430	1.432	1995	1.281	1.423	1995	1.0466	0.9400	1995	0.6989	0.8313	1995	1.1140	1.1566
1996	1.433	1.460	1996	1.321	1.432	1996	1.0115	0.9721	1996	0.6522	0.8453	1996	1.1043	1.1772
1997	1.449	1.498	1997	1.353	1.429	1997	0.9946	1.0031	1997	0.6509	0.8439	1997	1.1119	1.1935
1998	1.471	1.554	1998	1.363	1.432	1998	0.9926	1.0031	1998	0.6472	0.8635	1998	1.1185	1.2131
1999	1.484	1.623	1999	1.386	1.445	1999	1.0406	1.0031	1999	0.6517	0.8924	1999	1.1408	1.2409