

## **Searching for Optimal Inequality/Incentives**

Anders Björklund acknowledges financial support from the Swedish Council for Working Life and Social Research.

Anders Björklund  
Richard Freeman

January 2008 revision

Economic inequality is Janus-faced. Inequality creates incentives for people to move from lower rewarding activities to higher rewarding activities, which raises output and should reduce the difference in rewards. Inequality also produces differences in living standards that can lead some into poverty and social exclusion. In public debate, persons on the right stress the effect of inequality on incentives and work effort while persons on the left stress the effect of inequality on living standards for those with low incomes. Both are important.

From the 1960s through the present, Sweden was a world leader in reducing inequality and poverty. In the labor market, institutional wage determination compressed hourly earnings for persons with the same measured skills and limited differentials across skill groups (Björklund and Freeman, 1997); while dispersion of literacy and numeracy skills in Sweden was also low compared to the US (Devroye and Freeman, 2003). Family background played a smaller role in labor market success than the US (Solon, 2002; Björklund and Jäntti, 1997; Björklund et al., 2002). Inequality was lower in Sweden than in the US in long run/permanent earnings and income as well as in the transitory component (Aaberge et al. 2002).<sup>1</sup> Generous welfare benefits and high tax rates extended egalitarianism beyond the working population, so that the disposable income in the bottom decile of the income distribution was closer to the median than in most other countries.<sup>2</sup> As a result a poor child in Sweden had a higher income than a poor child in the US despite the US having higher per capita GDP. These facts led Social Democrats in Sweden and elsewhere to see the country as establishing an attractive welfare state alternative to more market-driven capitalist economies.

The huge recession that hit Sweden in 1991-94 challenged the viability of the Swedish model. Rates of unemployment rose from below 2 % to over 9%<sup>3</sup>, and the proportion of the

---

<sup>1</sup> Sweden was not the only country with a highly egalitarian distribution of income. Other Scandinavian countries and Belgium also had low inequality in labor market earnings and in total income, while Japan has low inequality in total income.

<sup>2</sup> In 1991 the disposable income of adults aged 20-64 in the bottom decile of the income distribution was 60% that of the median. Among children 0-17 the ratio the disposable income of those in the bottom decile was 67% of median income. Among adults, the ratio of disposable income in the top decile to income in the bottom decile was 2.67, while among children the ratio of income in the top decile to income in the bottom decile was 2.23.

<sup>3</sup> Unemployment rates vary depending on whether they have been adjusted for international comparability or not. The National Institute of Economic Research Sweden gives quarterly open unemployment rates that reach 9.4% in 1993Q4 and in 1997Q1. OECD gives standardized unemployment rates of 1.7% in 1990 that rise to 9.6% in 1996 and 9.9% in 1997.

work force on labor market programs reached 5.5% in 1994. The employment to population rate fell from 83.1 in 1990 to 70.7 in 1997,<sup>4</sup> in large part because Sweden reduced public sector employment to deal with a crisis in public finances. The rise in unemployment, job loss, and fiscal problems were a wake-up call that the economy was not as healthy as touted. Many analysts believed that Sweden had strayed too far from market solutions for the long-term success of the welfare state and called for market reforms that invariably increased inequalities.

From the mid-1990s through the mid-2000s the Swedish economy recovered smartly from recession. Real GDP per capita in purchasing power parity terms increased rapidly from 1993-94 to 2006, though Sweden still ranked lower in GDP per capita among those countries than it had in the 1980s. Productivity increased more in Sweden than in most other advanced OECD countries, including the US, and was accompanied by growth in real wages (Fredriksson and Topel, 2007). The current account in the balance of trade became positive. The country moved to the top rung in what the OECD has termed “investment in knowledge” – research and development spending, investment in higher education and investment in information technology. The World Economic Forum’s Global Competitiveness Report placed Sweden 4<sup>th</sup> out of 131 countries in competitiveness in 2007-2008 (<http://www.weforum.org/pdf/Gcr/profiles08/Sweden.pdf>).

But job growth lagged the recovery overall.<sup>5</sup> Between 1994 and 2000 private sector employment expanded by 300,000 while public sector employment stagnated. After exceeding the rate of unemployment in the EU at the peak of the recession, Sweden’s unemployment rate fell to 4% in 2001 and 2002. The proportion of the work force on labor market programs (which is not counted as part of unemployment) also fell, bottoming out at 2.1% in 2003, but even so the jobless rate including labor market programs remained high. As of 2005, the employment-population rate in the country was several points below the pre-recession 1991 level.<sup>6</sup>

*What happened to Sweden’s egalitarian outcomes during the crisis and recovery? Did the crisis lead Swedes to view inequality and life and job satisfaction differently than in the past? Did the incentives from increased inequality contribute to the recovery and competitiveness?*

---

<sup>4</sup><http://ocde.p4.siteinternet.com/publications/doi/files/302005041P1T050.xls>

<sup>5</sup> OECD, Report 2005. This occurred as well in the US, Korea and other countries.

<sup>6</sup> U.S. Department of Labor Bureau of Labor Statistics Office of Productivity and Technology <http://www.bls.gov/fls/> June 16, 2006, Comparative Real Gross Domestic Product Per Capita and Per Employed Person Fifteen Countries 1960-2005 Table 5

*Why has Sweden done so well in investing in knowledge and competitiveness despite lower inequality and pecuniary incentives than most other advanced economies?*

This study examines these questions. Section 1 shows that inequality in earnings and income increased moderately through the early 2000s while inequality in hours worked increased substantially, making it the most important form of inequality in the society. But the rise in inequality notwithstanding, Sweden remained a leading egalitarian economy in the world. Section 2 shows that Swedes are aware of the inequity and incentive sides of inequality and that their tolerance for inequality, while less than that of Americans, is similar to that of persons in most other advanced economies. It also shows satisfaction with living conditions has been relatively stable while satisfaction with wages has become modestly lower. Section 3 argues that the increased earnings inequality was productivity enhancing, but that factors other than pecuniary rewards underlie Sweden's large investment in university training and success in knowledge-intensive activity.

### **1. Earnings, Hours Worked, and Income Inequality**

To determine how the distribution of earnings changed in the 1990s-early 2000s period of recession and recovery, we examined employer reports on earnings from Statistics Sweden and individual reports on earnings from the LNU survey. Figure 1 displays the ratios of the earnings of employees in the 90<sup>th</sup> percentile of the before tax monthly earnings distribution to the earnings of employees in the 10<sup>th</sup> percentile (90/10 ratio) and the comparable ratios of earnings for persons at the 90<sup>th</sup> relative to median earnings (90/50) and of earnings at the median to earnings at the 10<sup>th</sup> percentile (50/10). All of the earnings are adjusted to a full-time equivalent basis from employer records for 1990-2006. The data show that the 90/10 ratio went from 1.8 in 1995 to 2.0 in 2003, with the rise roughly equally divided between an increase in the 90/50 ratio and an increase in the 50/10 ratio. These are significant changes in low inequality Sweden. The figure also gives percentile income ratios from the 1991 and 2000 LNU. The LNU data shows a smaller rise in inequality. The LNU had a higher level of inequality than the employer-based data in 1991 and a similar rate in 2000.

Björklund and Freeman (1997) found that Sweden's relatively egalitarian distribution of annual earnings was due as much to a narrow distribution of hours worked as to the more publicized narrow distribution of hourly earnings. To see how hours worked changed over the 1990s, we tabulated the distribution of working hours from the 1991 and 2000 LNU surveys,

which give annual hours for 1990 and 1999, respectively. The hours measure includes hours paid for but spent on vacation time and hours employed when the worker is on short-term absences due to sickness or caring for a sick child.

Table 1 gives the mean hours worked, the coefficient of variation in hours worked, and the distribution of hours worked for individuals aged 19-64. It shows a substantial increase in inequality of hours worked, with the coefficient of variation in hours worked rising from 0.52 to 0.63. The increase is due almost entirely to an increase in the proportion of persons working zero hours and thus long-term unemployed. Disaggregating hours for the age group 19-24, 25-54 and 55-64 shows that the largest increase is among 19-24 year olds, which reflects both unemployment of those out of school and the increased proportion of young persons in school without any accompanying time worked. The growth of inequality in hours is smallest for older people, possibly due to the incentives the reformed pension system gives to persons to keep working through age 67.<sup>7</sup>

Rising inequality in monthly earnings and hours worked increased the dispersion of annual disposable income among families during the recession and into the ensuing recovery. Panel A of figure 2 displays the Gini coefficient measure of inequality measured by Statistic's Sweden pre-1991 tax reform income definition (labelled old) and by its post-1991 tax reform definition (labelled new). The Gini from both definitions in the overlap period shows that the more inclusive definition increased inequality, so that an accurate reading of trends requires that we compute them separately. The Gini under the new definition increased from 0.23 to a peak of 0.31 in 2000 and then falls to 0.28-0.29 through 2005. Panel B of the figure, which measures inequality by income ratios for different deciles, tells a similar story. The income at the 90<sup>th</sup> percentile relative to that at the 10<sup>th</sup> percentile went from 2.55 in 1991 to 3.20 in 2005. The lines for the ratio of income for the 90<sup>th</sup> percentile to the median and for the median to the 10<sup>th</sup> percentile show that, as with ratios of earnings in figure 1, the rise in the 90/10 ratio is roughly equally divided between rises in the 90/50 ratio and the 50/10 ratio.

The rise in inequality was not, however, associated with losses of income for lower income families. Panel C of figure 2 shows the real disposable income of persons in different percentiles in the 1980s and in the period of rising inequality. The real disposable household incomes at the 10<sup>th</sup> percentile fell from 1989 to 1997 but then recovered to be about 10% higher

---

<sup>7</sup> We obtained similar results with hours worked per adult household member.

than it was in 1991. The increased inequality took the form of greater growth of incomes for higher income families, shown by the sharp upward trend in the earning of persons in 90<sup>th</sup> percentile from 1995 through 2005 – a gain of about 37% -- rather than in declines of incomes for lower income families.

To what extent did Sweden's welfare state maintain incomes of households at the bottom of the distribution during the recession? Table 2 uses data specially tabulated for our study by Statistics Sweden on the percentage of household disposable income accruing to persons in different deciles from earnings, capital returns, pensions, and various government programs. If welfare state programs provided a stable safety net, we would expect that the share of incomes from programs like sickness, parental leave, UI and labor market programs; universal tax free benefits and means-tested tax free benefits would rise sharply between 1991 to 1995 and fall thereafter for persons in the low income deciles but not for those in higher income deciles. The table shows such a pattern. In 1991 the sum of the share of income in the three program areas in the bottom part of the table is 29.1% for the bottom decile, 26.7% for the next lowest decile, and 24.2% for the third lowest decile. In 1995 the sum of the shares of income for these groups are 49.8%, 42.5% and 31.2%, respectively – increases of 23.1 points, 25.8 points, and 6.9 points. By contrast, the share of income from these programs barely changes for persons from the 4<sup>th</sup> decile to the top decile. In the recovery although the shares of income from these programs falls for the lower income deciles, they remain higher than in the past for persons in the bottom and second bottom deciles.

The data in table 2 also show jumpiness in capital incomes at the bottom of the distribution and in the share of pension incomes. The fall in the share of capital incomes indicates that many persons were in the lowest decile because of capital losses while the changing share of pension incomes implies that pensions kept older persons from falling in the distribution in the recession.

### **Long-run inequality vs transitory inequality**

So far we have looked at cross-sectional inequality in incomes. Such measures can be misleading indicators of changes in permanent incomes since they are affected by transitory factors.<sup>8</sup> To see whether the picture of Swedish inequality before, during and after the crisis

---

<sup>8</sup> A common hypothesis is that compared to European social welfare states the United States has greater income mobility over the career so that comparisons of income inequality

shown in figures 1 and 2 changes markedly if we take account of income mobility, we use Swedish register data that follow individuals' earnings over time. We look at inequality based on annual earnings and five-year averages for four cohorts of Swedish men from 1981 to 2005, based on a 35-percent sample of the whole Sweden-born population of men, including the zero observations for those who did not have any earnings from work.<sup>9</sup>

Figure 3 reports results from this analysis for cohorts of men born in 1950, 1955, 1960 and 1965. For each cohort we report measures of earnings inequality from age 31 onwards. We start at 31 to avoid the large increase in earnings that usually takes place during the process of labor market entrance. The figure shows first that the older cohorts had lower inequality at each age level than the younger cohorts. For example, the 1950-cohort aged 31-35 years in 1981-85 had a coefficient of variation around 0.40-0.45 compared to a coefficient of variation of around 0.6 for 1965-cohort at the same age. The same pattern of greater inequality at the same age is found for successively younger cohorts. Second, the figure shows rising earnings inequality by age for a specific cohort. This pattern – which presumably reflects differential investments in on-the-job training – is so strong that it is hard to discern a clear rise inequality during the crisis period 1991-95. Third, the measures of inequality that cover five year earnings show sufficiently large increases in inequality to rule out increased short-run earnings volatility as an important factor behind rising inequality in the Swedish labor market.

Finally, Figure 4 gives a measure of earnings mobility based on annual and long-run inequality—the so-called the Shorrocks measure.<sup>10</sup> It shows some differences between the cohorts, but the magnitude of mobility is too low to challenge the conclusion of rising longer run measures of inequality given in the cross-sections of annual inequality in figures 1 and 2. Thus, our analysis supports Gustavsson's (2007) finding that the increased inequality largely is due to changes in the long run component of earnings rather than in transitory earnings.

---

based on cross-sectional incomes exaggerates US-European differences. Research through the early 1990s has shown that the US is not much different than Germany (Burkhauser and Poupore 1997) or than the Nordic countries (Aaberge et al. 2002) in this respect.

<sup>9</sup> The income concept is called “arbetsinkomst” and includes income from short-term sickness and parental leave, but not UI-benefits or labour market training stipends.

<sup>10</sup> The measure is defined as one minus the ratio of long-run inequality and weighted annual inequality and takes on values between zero and one for a standard class of inequality measures. See Shorrocks (1978)

## International perspective

Income inequality rose in many countries during the 1990s through the mid 2000s. How did Sweden's rise of inequality compare to the changes in other advanced countries?

Table 3 gives our best estimate of the change in inequality among countries and of Sweden's rank in terms of the magnitude of the change. It records percentage point changes in earnings ratios from OECD and LIS data and changes in Gini coefficients from LIS data in the 1990s. Sweden had the 5<sup>th</sup> largest increase in earnings ratios among the 12 countries in the OECD data and among the 14 countries in the LIS data; and the fifth largest increase in Gini coefficients. Thus, Sweden's increase in inequality put it high in the ranking of countries by the magnitude of increased inequality.<sup>11</sup> Even so, however, inequality was sufficiently low in Sweden that the country remained one of the lowest inequality countries in the world. This is shown in the measures of inequality circa 2000 in table 4. In these measures Sweden ranges from 2<sup>nd</sup> to 4<sup>th</sup> in having lower income inequality. It has the 2<sup>nd</sup> or 3<sup>rd</sup> lowest 90/10 earnings ratio, behind Norway and Denmark in column 1, behind Norway in column 2 and behind Germany in column 3. It has the 3<sup>rd</sup> lowest Gini in column 4 and the 4<sup>th</sup> lowest Gini in column 5. It is third in the fraction of persons whose disposable incomes place them below 50 percent of the median income in columns 6 and 7.

To see the extent to which the narrow wage dispersion affect incentives to invest in skill in Sweden relative to other advanced countries, we examined OECD data on the relative earnings for workers with tertiary education for 22 countries. In 2004 earnings for those with tertiary education relative to average earnings was 1.28 in Sweden compared to 1.72 in the US. This placed Sweden third lowest in relative earnings for university graduates among the countries. For "tertiary-type A and advanced research programmes", the relative income ratio was 1.39 in Sweden compared to 1.81 in the US.<sup>12</sup> Other OECD data confirm this picture. Estimating log earnings equations for 21 OECD countries for 2001 Boarini and Strauss (2007, table 1) report a coefficient for tertiary education relative to secondary education for men of 0.26 in Sweden (2<sup>nd</sup> lowest in the countries covered) and of 0.21 for women (the lowest) compared to 0.65 for men and 0.64 for women in the US, which was the highest among the countries covered.

---

<sup>11</sup> Our data tell a different story than that of Smeeding (2002), who puts Sweden in the lower third or so of countries by increased inequality in the 1990s.

<sup>12</sup> OECD Science, Technology, and Industry Scoreboard 2007, table b.12.1 Relative earnings of the population with income from employment



In short, despite the rise in inequality during the period of crisis and recovery, Sweden remained one of the lowest inequality countries in the world, with an exceptionally lowest wage gap between university and high school graduates. Inequality rose greatly in hours of work and employment, but the high social safety net partially offset the effects of this on family incomes.

## **2. Attitudes toward inequality/incentives**

How do Swedes view the incentive and inequity components of inequality described in our introduction? Are Swedes more or less sensitive to those components compared to Americans and citizens in other countries, and if so, why? .

Table 5 records the responses of persons to questions relating to inequality<sup>13</sup> from the 1999 International Social Science Programme (ISSP) Social Inequality III survey.<sup>14</sup> By way of summary, the lines agree-disagree gives the difference between the percentages that strongly agree or that agree with a statement and the percentages that strongly disagree or that disagree with it. The upper four panels give the responses to statements about the incentive component of inequality: whether people get rewarded for effort; whether differences in income are necessary for national prosperity; whether people get rewarded for skill, and whether study requires additional pay as an incentive. The data show that proportionately fewer Swedes believe in the incentive effects of inequality than Americans. For instance, fewer Swedes than Americans agree or agree strongly the “people get rewarded for effort” and that people get “rewarded for skill”; and more Swedes than Americans disagree strongly with the statement that differences in income are necessary for prosperity. But Swedish responses are similar to those for other advanced countries. The odd country is the US, not Sweden.

The next three panels summarize responses to questions about the inequity component of inequality: whether inequality benefits the rich, whether differences in income are too large, and whether to get to the top one must be corrupt. In all of these cases, Swedes show more concern about the inequitable aspects of income inequality than do Americans, but the attitude of Swedes is again not peculiar. Indeed, proportionately fewer Swedes than persons in the composite of

---

<sup>13</sup> These economies are Australia, Austria, Canada, Denmark, France, Germany (West), Great Britain, Japan, New Zealand, Northern Ireland, Norway, Spain.

<sup>14</sup> The ISSP is a cross-national collaboration on surveys covering topics important for social science research, which has the virtue that it asks the same questions of persons in different countries, facilitating cross-country analyses. In addition to the US and Sweden, our analysis covers Australia, Austria, Canada, Denmark, France, Germany (West), Great Britain, Japan, New Zealand, Northern Ireland, Norway, Spain, as a group.

other countries agree that inequality exists because it benefits the rich; that the income differences in their country are too large; and that to get on top you have to be corrupt. But Swedes are closer in their views to others than they are to those of Americans.

Where Swedes and the citizens of the other countries differ most from Americans is in their belief that government should intervene to reduce income differences. The two panels at the bottom of table 5 show a huge difference between Swedes and Americans in the belief that government must reduce income differences and that rich people should pay more taxes. Again, the attitudes of Swedes more closely resemble those of citizens in the other advanced countries than those of Americans.<sup>15</sup>

What might cause the wide differences in attitudes between Swedes and persons in most other advanced economies from those in the US? There is growing evidence that attitudes toward fairness in economic transactions are hard-wired into human beings with people favoring egalitarian splits of incomes in some circumstances, such as the ultimatum game, but it is hard to imagine some genetic basis for differences in attitudes toward inequality. One appealing hypothesis is that the attitudes reflect to some extent economic reality: in the US the wide dispersion in earnings and high return to skills should lead more people to believe that people are rewarded for effort and skill (because they are) than in Sweden and other countries where the narrower distribution of earnings and lower returns to skill means in fact that people are rewarded less for skill and effort. The differences in attitudes might also be greatly influenced by social rhetoric – the US story of the land of opportunity versus the Swedish story of egalitarianism.

### **Changes in attitudes**

Did Swedish views about inequality change in the 1990s as inequality rose? To the extent that attitudes toward inequality respond to existing inequality, we would expect persons to become more tolerant toward inequality as it increases in society (“it is the way the world is”) On the one other side, increases in inequality in a society where people are committed to more egalitarian outcomes might generate more negative attitudes toward increased inequality and desire for government policies to reduce income differences more than in the past.

---

<sup>15</sup> As US income inequality has risen, however, the Syracuse University Maxwell Poll has reported increased belief that income inequality is a serious problem, and that government should do more to try to reduce it. <http://www.maxwell.syr.edu/campbell/Poll/PollHome.htm>

As a first step to seeing how attitudes in fact changes we contrast the responses of Swedes to the 1999 ISSP survey to their responses to the same questions on Stefan Svallfors's (1992) survey of Swedish attitudes toward inequality that later became part of the 1992 ISSP. Table 6 gives the results of this comparison.<sup>16</sup> Focusing on the difference between the proportion that agrees or agrees strongly and the proportion that disagrees or disagrees strongly with the statements, the data tell a clear story. Over the 1990s, proportionately more Swedes became concerned with the adverse effects of inequality than with the incentive effects of inequality. The difference in the proportion who view income differences as too large rises from 40 points to 60 points; the difference in the proportions who believe inequality benefits the rich rises from 31 points to 44 points; while the difference between those who think income differentials are needed for prosperity and those who do not falls from -9 points to -26 points. The proportion that agrees and disagrees that the rich should pay more taxes and that believe/do not believe that people study to earn money remain essentially constant, but the proportion that believes government should reduce income differences increases. In short, the rise in inequality reduced the proportion of Swedes attuned to the efficiency aspects of inequality and increased the proportion who favored policies to reduce inequality on these questions.

The 1991 and 2000 LNU surveys asked a different question on attitudes toward inequality: what people thought about "The idea of going in for a society where income differentials are small". On the basis of the ISSP results, we would expect that the proportion favoring a lower income differential society would rise, but the LNU data show a slight movement in the opposite direction. The fraction that thought that going for a small income differential society was very good fell modestly from 1991 to 2000 while the fraction who thought this was quite good and the fraction who thought it quite bad rose modestly.<sup>17</sup> The

---

16 This table reports statistics for those who gave explicit answers, eliminating "don't know" responses. This causes a modest difference in the 1999 percentages from those in table 5. The way we treat don't know answers does not affect the findings in either case.

<sup>17</sup> Here are the tabulations

The idea of going in for a society where income differentials is small is	Very good	Quite good	Neither good nor bad	Quite Bad	Very Bad
2000	.20	.32	.17	.20	.07
1991	.26	.29	.17	.18	.07
Change	-.06	.03	.00	.02	.00

different pattern in LNU than in the ISSP suggests that the precise wording of questions may cause different patterns of response across the surveys and thus makes us cautious about drawing any firm conclusions.

The ISSP surveys contain another set of questions that cast light on how attitudes toward inequality in Sweden have changed over time relative to attitudes in other countries during the 1990s rise of inequality. The ISSP ask respondents the pay they believe workers make in different occupations: “What do you think people in these jobs *actually earn*?” and what they believe people should make: “How much do you think people in these jobs *ought to earn*?” These questions were asked for nine occupations in 1987 and for eleven occupations in 1992 and 1999.<sup>18</sup> Responses about the earnings people actually earn provide one way of assessing whether perceptions of income differences reflect actual differences among countries and over time.<sup>19</sup>

To analyze these data, we calculated *for each individual* the standard deviation of the ln earnings that they said people *earned* across occupations and the standard deviation of the ln earnings they said people *should earn* across occupations. The standard deviation of ln earnings summarizes their responses into a single statistic that measures dispersion. Figure 5 displays the country averages of the standard deviations of the ln of “actual” and “should” earnings. Almost all of the data points fall below the 45 degree line. This indicates that regardless of the perceived level of dispersion of wages, respondents favor lower dispersion. A linear regression of the average standard deviation of the ln earnings that respondents believe should be paid in a country time period on the average standard deviation of the ln earnings they believe people are actually paid in a country time period fits the data reasonably well, with a slope of 0.61. This positive slope implies that as the perceived actual dispersion is larger, the dispersion people believe is appropriate rises but at a lower than for one for one rate.<sup>20</sup>

---

<sup>18</sup> The occupations are from the following list: Bricklayer; Doctor in general practice; Bank clerk; Shop owner; Chairman of a large company; Skilled worker in a factory; Farm laborer; Secretary; City bus driver; Unskilled worker in a factory; Cabinet minister.

<sup>19</sup> Asking respondents to report on earnings in specific occupations before asking them what they think people should make arguably grounds responses in reality more than questions about inequality in general.

<sup>20</sup> Further analyses that treat individuals rather than country averages as observations yield similar results for the 1999 ISSP and show no noticeable difference in the regression coefficients of the standard deviation of the ln pay that respondents say people should receive in an

The data points for Sweden (denoted with the large diamond) fit the regression line. Persons in Sweden perceive (correctly) that the country has lower difference in earnings among occupations than persons in most other countries perceive in their countries. But low dispersion of perceived earnings notwithstanding, Swedes seem to want to narrow occupational pay differences even more. The 1999 observation for Sweden lies above the 1991 observation (Sweden was not part of the 1987 ISSP survey). The higher dispersion for perceived actual pay fits with the reality of rising inequality in earnings shown in figure 1. The higher dispersion in the earnings that respondents think should be paid in the various occupations is, however, inconsistent with the responses about income inequality given in table 6, as it implies that as inequality rose so too did tolerance of inequality. The way in which we measure the desire to reduce inequality evidently produces different patterns of response across the surveys.<sup>21</sup>

### **Satisfaction with personal outcomes**

An alternative way to assess how increased inequality has impacted Swedish citizens is to relate their self-reported satisfaction with their living conditions, jobs, and wages or income before and after the economic recovery. People's feelings toward their personal situation may differ from attitudes toward what is happening in the economy as a whole. Ms A might be doing personally well but be troubled by inequality or unemployment in the country while Mr. B might be having personal economic difficulties while satisfied with economic conditions broadly.

Table 7 tabulates the responses to five questions on the 1991 and 2000 LNU surveys relating to the satisfaction of individuals with their own circumstances. The responses to questions about the individuals' personal situation or changes in situation or life satisfaction do not vary much over time. Responses relating to job satisfaction and satisfaction with wages show declines in well being and increased dispersion in these forms of personal well-being. There is a 10 percentage point drop in the proportion very satisfied with their job and a large shift in the distribution of responses on wage satisfaction from very/rather satisfied to very/rather dissatisfied. To see whether the reduction in job and wage satisfaction are related to objective

---

occupation on the standard deviation of the ln earnings they believe they actually receive between Sweden, the US, and other countries as a group.

<sup>21</sup> In calculations for the 1999 ISSP we have found that persons who are more concerned about the adverse effects of inequality and less concerned about the incentive effects in the questions report smaller dispersion of earnings that they think "should be paid" across occupations. Thus, there is no inconsistency in attitudes among persons within the survey. The problem is in the trend across surveys over time.

factors, we regressed them on the log of hourly wages and reported working conditions in 1991 and 2000, conditional on family conditions, age, gender, and education. The results, summarized in Table 8, show that wages are strongly related to wage satisfaction while measures of working conditions are closely linked to job satisfaction. The large coefficients on the log hourly wages combined with the rising standard deviation in the hourly wages could help explain the increased dispersion in the responses to the question about satisfaction with wages. The changes in the fraction of persons reporting different objective working conditions are, however, too small to explain much of the change in that variable on the basis of the estimated coefficients. Exploiting the longitudinal component of the LNU, we also examined changes in wage satisfaction and job satisfaction between 1991 and 2000 and obtained comparable results: a large coefficient on ln wages in the wage satisfaction equation that implies that increases in the standard deviation of ln wages contributed to the increased dispersion in wage satisfaction.<sup>22</sup>

Since unemployment is a major depressing factor on happiness, the surprise in table 7 is the stability in life satisfaction despite higher and longer unemployment between the two surveys.<sup>23</sup> We probe this finding further through multivariate regressions that link the level and duration of unemployment to how people assess their life situation/living conditions and their life satisfaction in 1991 and 2000, conditional on a variety of covariates. Table 9 summarizes the regression findings in terms of the coefficients on unemployment measured as a 0/1 variable and the coefficients on dummy variables for the duration of unemployment. Being unemployed has a sizeable adverse impact on both the persons' assessment of their life situation/living conditions and on their life satisfaction. There is no clear generalization to reach. Comparing the coefficients on unemployment in regressions 1 and 2 we see that unemployment has a larger impact in reducing the person's assessment of their living conditions in 2000 than in 1991. By contrast, in the life satisfaction regressions in columns 3 and 4 the impact of unemployment is lower in the 2000 survey than in the 1991 survey, which implies that the impact of unemployment on life satisfaction lessened.

The increase in the duration of unemployment suggests that comparisons of the unemployed in the two periods may be confounded by changes in the group that is unemployed.

---

<sup>22</sup> The coefficient in the wage satisfaction equation on change in log wages was 1.681 (0.125). Changes in job conditions had modest coefficients on the work conditions variables.

<sup>23</sup> The proportion of persons who were unemployed went from 7.0% in the 2000 LNU to 3.7% in the 1991 LNU and the duration of unemployment went from 0.46 of a year to 1.61 years

Regressions 5-8 give regression coefficients for the effect of being in the specified level of duration on the life situation/living conditions and life satisfaction measures. The impact of the duration of unemployment variables on life situation varies across the groups. There is a large drop in effect of unemployment on the person's own conditions for every group but those with less than 0.3 years of unemployment and a particularly large drop for those with two years or more of unemployment. The impact of the duration of unemployment variables on life satisfaction are smaller in 2000 than in 1991, implying a substantial drop in unhappiness with unemployment at all durations. The data seem to suggest that people adjusted to unemployment between 1991 and 2000, so that with the higher rates they were less impacted in their living conditions and in their life satisfaction, despite the longer durations of joblessness.

### **3. Inequality and Sweden's Position in Competitiveness**

Sweden's recovery from the early 1990s recession was sufficiently strong that by 2007-8 it ranked number 4 on the World Economic Forum's ranking of countries in global competitiveness. It was number 2 in the OECD's ranking of countries by investment in knowledge.

Did the increased inequality help the recovery and improve the country's high position in competitiveness?

#### **Inequality and recovery**

There are three criteria for assessing whether an increase in inequality is likely to be incentive increasing and thus a potential contributor to economic recovery.

First, the increase should affect observable incentives, such as returns to skill or wage differentials among firms or industries that signal workers to shift to the sectors with increased pay. If the increase shows up solely in higher returns to unmeasured factors (residuals) it is difficult for anyone to know what to do. Examining changes in mean earnings across groups by education, occupation, or industry shows that at least some of the increased inequality in Sweden in the 1990s was associated with changes among persons with observable characteristics. Studies of earnings patterns, (Gustavsson, 2006, Fredriksson and Topel 2007) find that the payoff to schooling increased over the 1990s, which creates an incentive for additional school going that appears to underlie the observed increased enrollment in higher education in the period

(Fredriksson and Topel, 2007).<sup>24</sup> Examining data by plant, Nordström Skans, Edin, and Holmlund (forthcoming) found that a trend rise in between plant wage inequality accounts for the entire increase in wage dispersion, which would presumably motivate workers to move from the lower wage to the higher wage plants.

Second, the increase should induce economic behavior that reduces the inequality. For instance, a rise in inequality to education should produce an increased investment in skills, and an increase in inequality among sectors or firms should induce workers to move where pay has increased. Nordström Skans, Edin, and Holmlund (forthcoming) report modest positive correlations between entry rates and wage changes and the standard deviation of wages within plants that suggest that the increases in wages across and within plants may have induced workers to shift toward work places with rising earnings relative to others.

Third, the increase should be associated with improved national economic outcomes. Lindquist (2005) and Nahum (2005) suggest that the moderate increases in skill differentials and inequality have helped raise economic growth and efficiency in Sweden. Lindquist related the increased income inequality between high and low skilled workers in Sweden to changes in relative demand due to the presence of capital-skill complementarity in production. Nahum finds that inequality within Swedish counties has a positive relation with the ensuing growth of the county's economy. While these studies have to make bold assumptions for their estimates, their different data and methodologies suggest that at least some of the rise in inequality helped economic recovery.

On the other hand, it is difficult to see how increased inequality in hours worked can be incentive creating. Some of this increase is associated with sickness absenteeism. While workers who are not employed or who work relatively few hours may be doing productive work in the household, it is difficult to imagine that this compensates for the absence of market work. It also makes little sense for persons on sickness absence doing household work to be paid the benefits of someone truly incapacitated. Reductions of the inequality in hours worked would more likely be output enhancing.

---

<sup>24</sup> Our estimated earnings equations from the 1991 and 2000 LNU surveys also found that the earnings of university graduates increased relative to that of less educated workers. We also found that the relative earnings of experienced workers fell, which increased equality but it is unclear if this is a reduction in skill prices or in institutionally determined seniority.



## Sweden in the knowledge economy

The “doubling” of the global labor force, due to China, India, and the ex-Soviet bloc joining the world economy pressured advanced countries to invest heavily in higher education and research and development and in high tech industries. A priori, some analysts might expect that Sweden’s low inequality and modest gross wage premium to tertiary education would provide insufficient incentive for investments in schooling so that the country would lag behind in the supply of highly educated persons compared to economies with higher premium, and that this would keep the country from the front ranks of the R and D and technology frontier. To be sure, the relatively low cost of highly skilled Swedish workers would increase firm’s demand for these workers but the firms would face a supply constraint and fall behind countries like the US where the premium to university training is much higher. Nothing could be further from the truth.

Panel A of Table 10 shows that Sweden is in the top rank of countries in investment in knowledge. It is number one in the world in R and D spending over GDP, number one in software investment/GDP, and number 7 in higher education spending over GDP. Summing the three measures, the OECD’s “investment in knowledge” indicator places Sweden in 2<sup>nd</sup> spot behind the US.

The data on educational attainment in panel B suggest that the OECD measure of higher education spending understates Sweden’s success in university education, particularly in science and engineering (S & E). Sweden is 4th in the world (after Japan, Korea, and Canada) in degrees granted per 25-34 year olds. Sweden is 2<sup>nd</sup> among OECD countries (behind Korea) in the share of degrees awarded in science and engineering. Its S&E share of degrees is more than twice the US share. At the doctorate level, Sweden is number one in PhDs and in science and engineering PhDs granted per young person. If the US had the Swedish rate of S&E PhDs per young person, it would be producing over 100,000 doctorates graduates in those disciplines.

What motivates so many young Swedes to invest in higher education? Even after the 1990s-mid 2000s increase in earnings inequality, pay differences between highly educated workers and less educated workers were lower in Sweden than in the US and most other countries at both the tertiary and advanced research programmes level. The increased earnings differential between university graduates and high school graduates in the 1990s and the high unemployment during and after the recession contributed to the *growth* of university enrollments in Sweden (Fredriksson and Topel 2007) but cannot account for the concentration on science and

engineering or the extraordinary proportion of persons obtaining PhDs in science and engineering.

One factor that helps compensate for the lower labor market differentials is a low cost of attending university. Students are eligible for grants and loans, whose repayment is income contingent, to help them through the student years. Indeed, for graduate studies the norm is that the students are eligible to a wage at the level of living wage. But OECD estimates of internal rates of return to tertiary education (Baorini and Strauss, 2007, figure 11) show that while this improves Sweden's ranking in returns and lowers the return to the US, it still leaves Sweden in the bottom third of countries by rate of return. There are no readily available estimates of the return to graduate training across countries to see how Sweden fits on that margin.

Panel C in table 10 records measures of the output of Sweden's investment in scientific and engineering activity and research and development. In terms of research output, Sweden ranks second (after Switzerland) in terms of scientific articles published per capita. Citation indices per article place Sweden 4<sup>th</sup> in the world in the prominence of its published research. Finally, Sweden has a high number of patents measured per million inhabitants. When the share of Swedish companies with innovative activity is compared internationally, Swedish companies are above the average of EU countries.

Much of Sweden's investment in R and D is due to activities of the Swedish multinational firms, such as Ericsson, who conduct much of their research and development in the country while locating the bulk of production outside the country. This would appear to be an economic response to the country's large supply of undergraduate and graduate degree recipients particularly in science and engineering, and their relatively low cost but still leaves open the question of the country has overcome the low pecuniary returns to induce so many young persons to obtain advanced research and other degrees.

Finally, it is Sweden's exemplary position in these and other measures of technological prowess, innovation, higher education and training, and business sophistication that underlies its position as the 4<sup>th</sup> top country in the World Economic Forum's Global Competitiveness Report. By contrast, the Competitiveness Report gives Sweden lower marks for its high taxes and such labor market factors as flexibility of wage determination and hiring and firing practices. To some extent, however, these desirable and less desirable aspects of the welfare state are intertwined: high taxes fund investments in higher education and research and development that buttress innovativeness.

#### **IV. Conclusion**

This study has examined the pattern of change and correlates of Sweden's national effort to produce egalitarian labor market outcomes and the interplay between the level and change in inequality and attitudes toward inequality. It has found:

1) That earnings and income inequality increased after the early 1990s recession, with smaller increases in income for persons at the bottom of the income distribution than for those higher in the distribution. Government safety net programs buttressed disposable income for those with low incomes during the 1990s recession.

2) Despite the increase in inequality, Sweden remained one of the most egalitarian economies in the world. The rise in inequality raised earnings for identifiable groups and seems to have contributed to economic recovery.

3) The low level of inequality and labor market returns to skill notwithstanding, Sweden moved to the top of the league tables in knowledge intensive activities. Five times as many Swedes obtained PhDs in science and engineering as Americans relative to the population and Sweden was world leader in R&D/GDP. These achievements highlight the ability of Sweden to overcome some of the incentive problems of a welfare state.

With respect to attitudes

4) Swedes are more attuned to the inequity face of inequality than to the incentive face of inequality than are Americans, but Swedish attitudes are similar to those of persons in most other countries.

5) Proportionately more Swedes expressed concern over the inequity of inequality after the rise in inequality in the 1990s than in the past, but there are sufficient differences in changes among measures of attitudes to rule out any firm conclusions about how the recession and recovery affected how people feel toward inequality.

6) Swedes expressed greater dissatisfaction with wages and conditions at work during the 1990s but the rise in unemployment did not reduce overall subjective well being, seemingly because individuals adapted to higher levels unemployment.

Perhaps the most intriguing question that emerges from our analysis is how Sweden managed to reach the top of world tables in the proportion of young persons gaining PhDs and bachelor's degrees and in competitiveness with only a moderate increase in earnings inequality and low return to tertiary education. Could it be that limited pecuniary incentives motivate

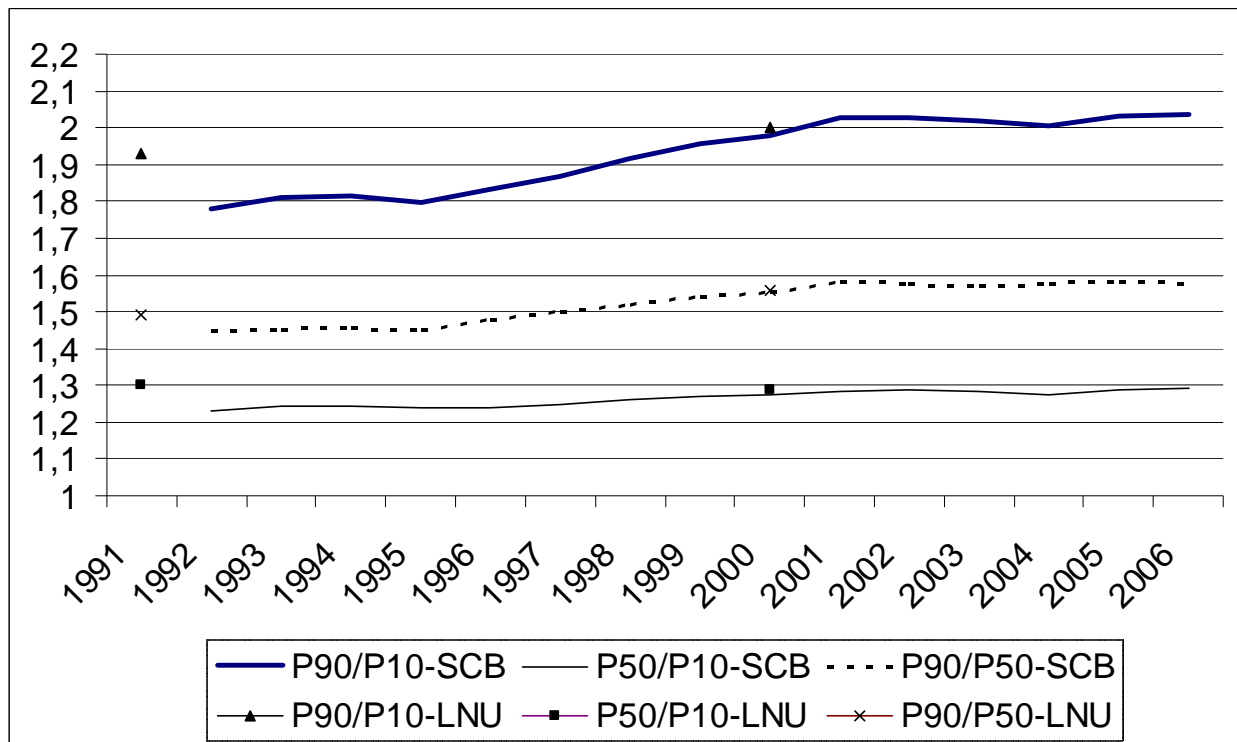
Swedes to distinguish themselves in other productive ways? Or could it be that in a highly egalitarian society seemingly small changes in inequality can motivate people more than they might in an economy with a wider dispersion of overall earnings? Whichever, Sweden did well in the inequality front in its recovery from the early 1990s economic disaster.

## References

- Aaberge Rolf, Anders Björklund, Markus Jäntti, Mårten Palme, Peder J. Pedersen, Nina Smith and Tom Wennemo (2002), "Income Inequality and Income Mobility in the Scandinavian Countries Compared to the United States", *The Review of Income and Wealth*, vol. 48(4): 443-469.
- Björklund Anders and Richard Freeman (1997), "Generating Equality and Eliminating Poverty - The Swedish Way", in R B Freeman, R Topel and B Swedenborg eds. *The Welfare State in Transition - reforming the Swedish model*, The University of Chicago Press, Chicago.
- Björklund Anders and Markus Jäntti (1997) "Intergenerational Income Mobility in Sweden Compared to the United States", *American Economic Review*, Vol. 87, No. 5, pp: 1009-1018.
- Björklund Anders, Tor Eriksson, Markus Jäntti, Oddbjörn Raaum & Eva Österbacka, (2002) "Brother Correlations in Earnings in Denmark, Finland, Norway, and Sweden compared to the United States". *Journal of Population Economics*, vol. 15: 757-772.
- Boarini, Romina and Hubert Strauss (2007) "The Private Internal Rates of Return to Tertiary education OECD, ECONOMICS DEPARTMENT WORKING PAPERS NO. 591
- Burkhauser Richard and John G. Poupore (1997), "A Cross-National Comparison of Permanent Inequality in the United States and Germany", *The Review of Economics and Statistics* 79: 10-17.
- Devroye Dan and Richard Freeman "Does Inequality in Skills Explain Inequality of Earnings Across Advanced Countries? November 2002 Paper No CEPDP0552:
- Fredriksson Peter and Robert Topel (2007) chapter 2 in Freeman, R, B. Swedenborg, R Topel (eds) Reforming the Welfare State: Recovery and Beyond in Sweden
- Gustavsson, Magnus (2006). "The Evolution of the Swedish Wage Structure: New Evidence for 1992-2001", *Applied Economics Letters*, vol. 13: 279-286.
- Gustavsson, Magnus (2007), "The 1990s Rise in Swedish Earnings Inequality - Persistent or Transitory?", *Applied Economics*, Vol. 39(1), 25-30.
- Lindquist, Matthew J/ 2005. "Capital-Skill Complementarity and Inequality in Sweden," *Scandinavian Journal of Economics*, Blackwell Publishing, vol. 107(4), pages 711-735, December.
- Nahum Ruth Aida "Income Inequality and Growth: A Panel Study of Swedish Counties 1960-2000" [http://ideas.repec.org/p/hhs/uunewp/2005\\_008.html](http://ideas.repec.org/p/hhs/uunewp/2005_008.html)
- Nordström Skans, Oskar, Per-Anders Edin, and Bertil Holmlund (forthcoming) "Wage dispersion between and within plants: Sweden 1985–2000", forthcoming in Lazear E & K Shaw (red) *An International Comparisons of the Structure of Wages*, University of Chicago Press.
- Shorrocks Anthony (1978), "Income Inequality and Income Mobility", *Journal of Economic Theory*, 19: 376-393.
- Smeeding Timothy (2002) Globalization, Inequality and the Rich Countries of the G-20: Evidence from the Luxembourg Income Study (LIS) Luxembourg Income Study Working Paper Series Luxembourg Income Study (LIS), Working Paper No. 320 July 2002

Svallfors Stefan (1992) ***ATTITUDES TO INEQUALITY - A SWEDISH SURVEY 1991***  
*Åsikter om ojämlikhet i Sverige 1991* SSD\_0297

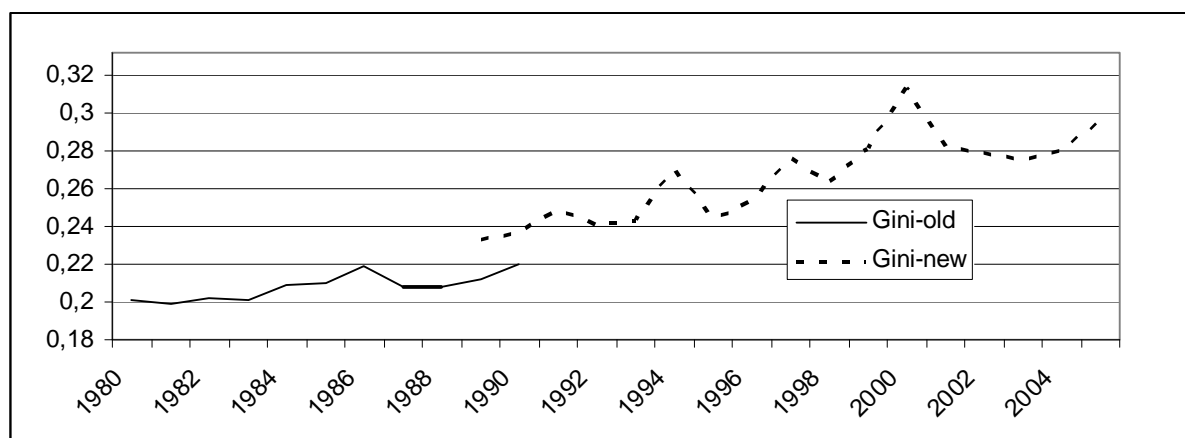
Figure 1. Hourly earnings inequality 1992-2006 according to Statistics Sweden and 1991 and 2000 according to the Level of Living Survey



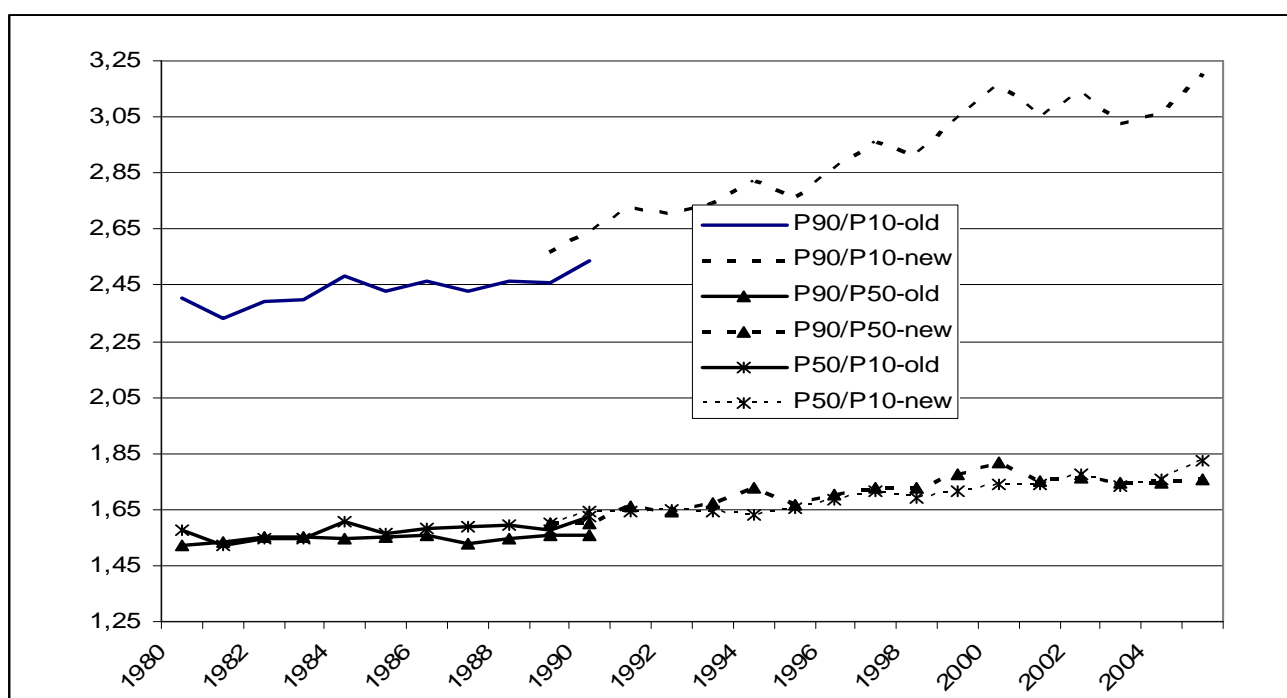
Source: Statistics Sweden and own computations from the Level of Living Survey (LNU). The former is based on monthly fulltime equivalent monthly earnings report from employers. The latter is based on home interviews with individuals. Each of the data sources has their own pros and cons.

**Figure 2. Inequality of annual disposable income 1980-2005.**

a) Gini coefficient



b) P90/P10, P90/P50, P50/P10 ratios.

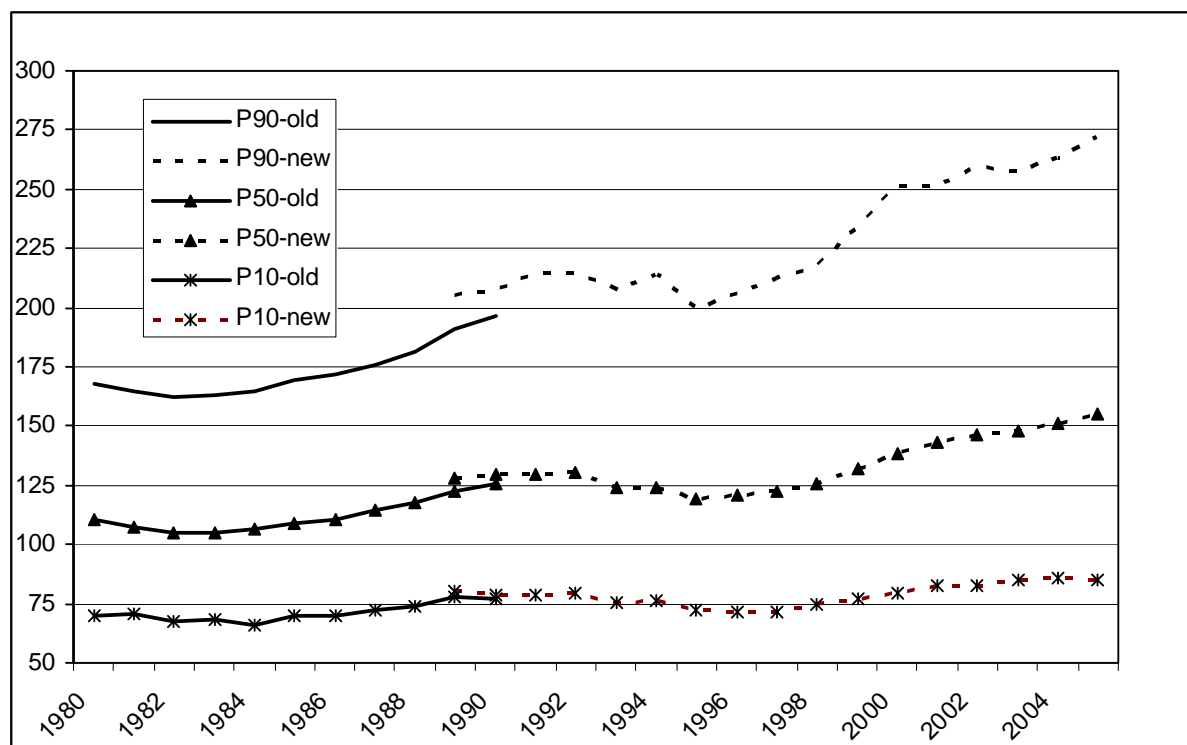


Note: Old refers to the more narrow income concept used before the major 1991 tax reform. The individual is the unit of analysis, and the household the unit of income. Income includes capital gains, which were particularly high in 1994 and 2000 due to changes in tax rules. Statistics



Sweden's equivalence scales are applied. Source: special tabulations by Kjell Jansson for the authors.

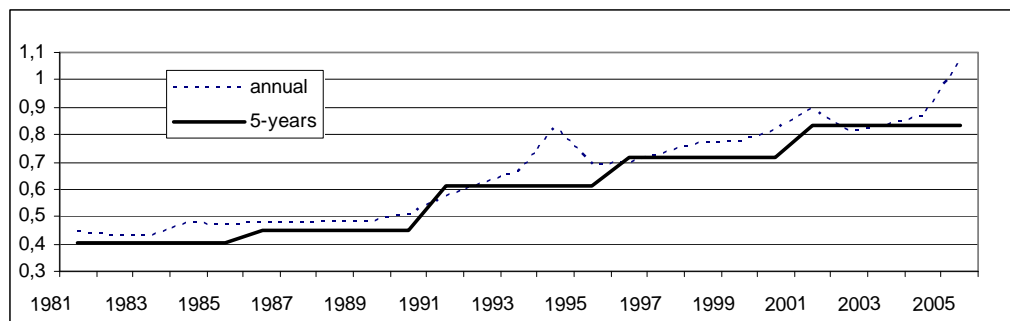
**c) . Real disposable income at the median (P50), 10<sup>th</sup> (P10) and 90<sup>th</sup> (P90) percentile of the distribution 1980-2005 in 2006 year's prices.**



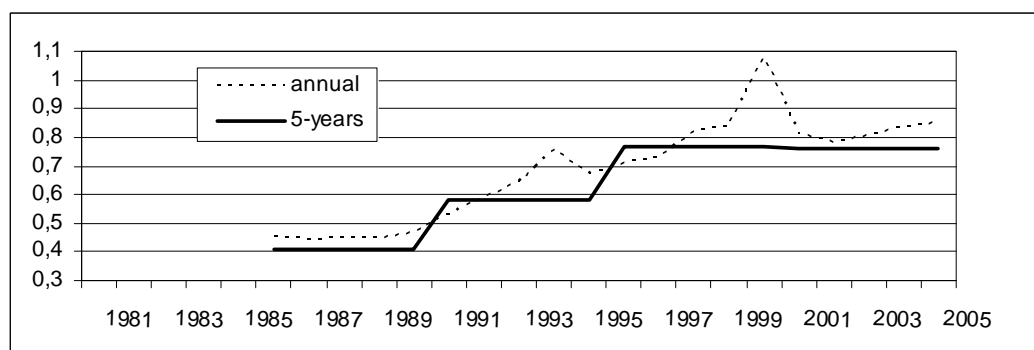
Note: “Old” is based on the more narrow income concept used before the 1991 tax reform. The individual is the unit of analysis, and the household the unit of income. Income includes capital gains, which were particularly high in 1994 and 2000 due to changes in tax rules. Statistics Sweden's equivalence scales are applied. Source: special tabulations by Kjell Jansson for the authors.

Figure 3. Coefficient of variation of annual and 5-year average earnings 1981-2005, four cohorts of men.

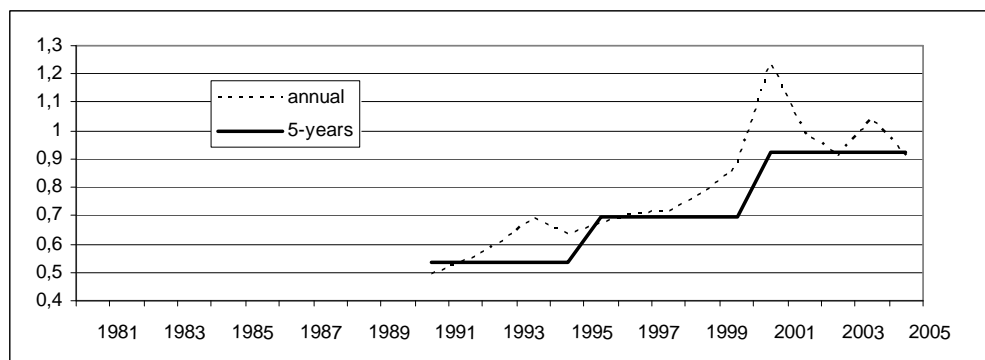
a) Men born 1950



b) Men born 1955



c) Men born 1960



d) Men born 1965

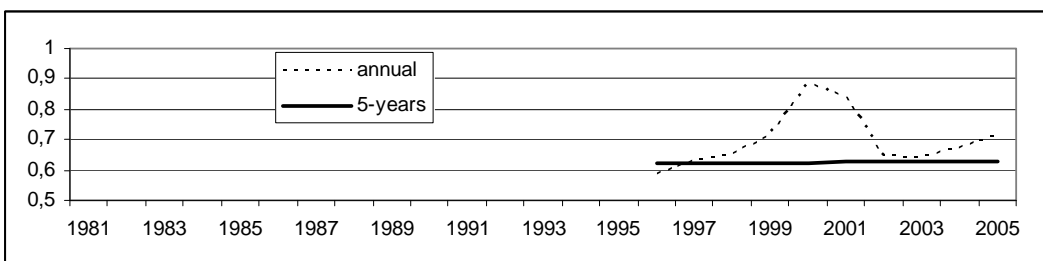
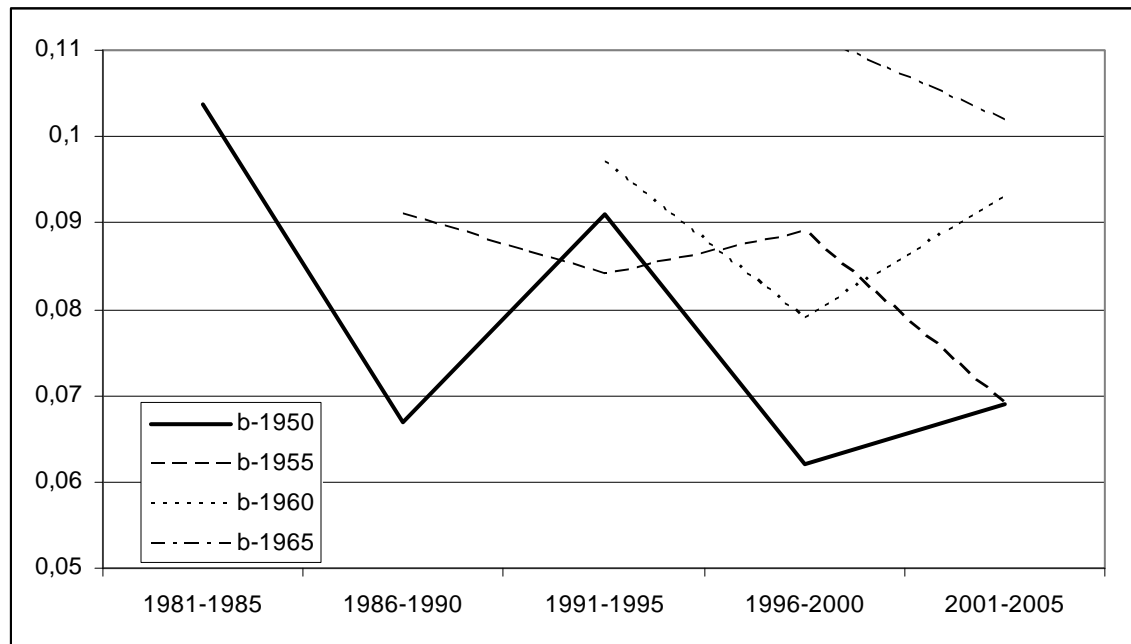
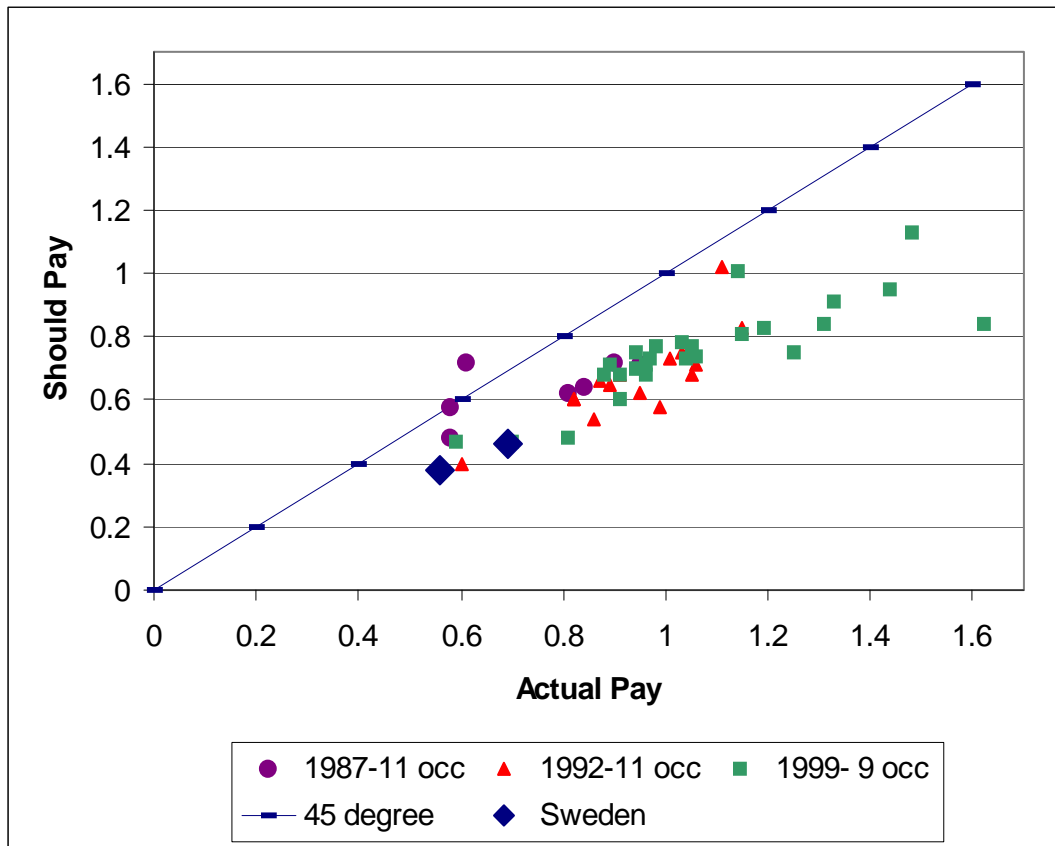


Figure 4. Earnings mobility by periods of five years for cohorts of men born 1950, 1955, 1960 and 1965.



**Figure 5: Dispersion of ln earnings that “should be paid “in different occupations and the dispersion of ln perceived actual earnings, by country, 1987, 1992, 1999 ISSP**



The regression line:  $SD(\ln \text{ Shld}) = .11 + .61 SD(\ln \text{ Actual}) + YDs + .15 \text{ ComD}$   $N=52$   
(.06) (.07)

where LnShld is the natural log of the earnings that respondents believe should be paid in an occupation, lnActual is the natural log of the earnings that respondents believe is paid in an occupation, YD are two year dummies; and ComD is a dummy for countries which were communist in 1987: East Germany, Hungary, Poland. The standard deviations are averages of standard deviations reported by all respondents from the country.

Source: Tabulated from ISSP, 1987, 1992, 1999. Sweden data are from the 1991 Svallfors study and the 1999 ISSP.

**Table 1: The distribution of working hours, 1990 and 1999**

	Individuals							
	All, 19-65 years		19-24 years		25-54 years		55-65 years	
	1990	1999	1990	1999	1990	1999	1990	1999
Mean	1650	1510	1170	770	1825	1690	1340	1350
Coeff. of var.	.51	.63	.72	1.07	.41	.51	.69	.74
Proportions								
0 hours	.099	.179	.114	.309	.059	.122	.249	.287
1-1000 hours	.100	.102	.329	.336	.070	.074	.058	.049
1001-1500 hrs	.113	.080	.151	.121	.092	.069	.164	.089
1501-2000 hrs	.155	.158	.110	.087	.172	.179	.119	.130
2001-2500 hrs	.449	.407	.273	.129	.508	.468	.355	.377
2501+ hrs	.080	.075	.021	.016	.098	.088	.055	.066
N	4423	4458	622	559	3054	3005	747	894

Source: own computations from the Level of living surveys.

**Table 2 Percentage of household disposable income net of taxes by different source, by decile groups 1991, 1995, 2001 and 2005.**

Decile Group	Earnings for employees and self-employed				Capital				Pensions			
	1991	1995	2001	2005	1991	1995	2001	2005	1991	1995	2001	2005
1	21.3	33.8	33.7	27.1	5.0	-9.0	-19.2	-1.7	43.6	25.4	40.4	29.6
2	18.0	24.1	21.8	24.2	4.6	2.4	1.1	1.5	50.6	32.2	43.2	43.3
3	32.4	30.5	26.8	26.7	4.4	2.0	0.9	1.5	39.0	35.3	44.2	47.1
4	43.8	38.0	39.8	38.8	4.6	2.7	2.1	1.5	31.1	32.5	37.0	40.4
5	53.6	50.0	56.1	53.6	5.5	3.3	2.4	1.9	23.7	27.8	25.5	29.8
6	62.4	57.7	63.1	64.0	5.3	4.0	2.6	2.4	18.9	23.8	21.8	22.8
7	65.6	61.3	70.0	69.5	5.9	4.1	2.6	2.5	16.8	23.3	16.9	19.8
8	70.7	67.1	73.4	75.1	5.8	4.5	3.5	3.0	14.4	20.0	14.7	15.8
9	72.2	69.3	78.7	77.3	7.1	5.4	3.7	4.0	13.3	18.7	12.0	14.2
10	65.5	67.2	63.8	57.6	19.7	14.8	22.8	29.2	10.1	15.1	10.4	11.4
<b>All</b>	<b>57.7</b>	<b>56.1</b>	<b>60.2</b>	<b>58.1</b>	<b>8.5</b>	<b>5.5</b>	<b>6.7</b>	<b>8.8</b>	<b>20.7</b>	<b>22.9</b>	<b>20.5</b>	<b>22.1</b>

Decile group	Sickness, parental leave, UI and LMP benefits				Universal taxfree benefits				Means-tested taxfree benefits			
	1991	1995	2001	2005	1991	1995	2001	2005	1991	1995	2001	2005
1	<b>9.1</b>	<b>16.7</b>	11.8	11.7	<b>9.8</b>	<b>16.0</b>	18.2	19.8	<b>11.2</b>	<b>17.1</b>	15.2	13.5
2	<b>7.5</b>	<b>16.2</b>	10.0	9.4	<b>6.4</b>	<b>10.3</b>	10.8	10.2	<b>12.8</b>	<b>15.0</b>	13.1	11.4
3	<b>9.2</b>	<b>13.4</b>	9.9	8.2	<b>7.1</b>	<b>6.9</b>	7.7	5.9	<b>7.9</b>	<b>11.9</b>	10.4	10.6
4	10.5	12.6	10.6	11.2	6.3	6.1	6.4	5.5	3.6	8.2	4.1	2.7
5	10.6	10.7	10.0	8.8	4.9	4.7	4.8	4.7	1.6	3.5	1.1	1.1
6	8.5	8.8	8.2	6.7	3.9	4.0	3.6	3.7	1.0	1.8	0.7	0.4
7	7.9	7.4	7.3	5.2	3.1	2.7	3.0	2.5	0.6	1.3	0.2	0.5
8	7.0	5.8	6.1	4.2	1.8	1.9	1.9	1.8	0.3	0.7	0.3	0.2
9	5.8	5.1	4.1	3.4	1.3	1.4	1.3	1.1	0.2	0.1	0.2	0
10	3.8	2.2	2.4	1.3	0.7	0.6	0.5	0.5	0.1	0.1	0.2	0
All	7.2	7.8	6.4	5.3	3.4	3.9	3.7	3.5	2.5	3.8	2.5	2.3

Source: Statistics Sweden, special tabulations done by Kjell Jansson for the authors. Note: relevant taxes are subtracted for taxable income sources.

**Table 3: Changes in Inequality, 1985-89 to 2000, OECD data, and 1987-2000 LIS**

<b>Countries with increasing inequality</b>	<b>OECD 90/10</b>	<b>LIS 90/10</b>	<b>LIS Gini</b>
New Zealand	0.38	--	--
US	0.36	-0.26	0.33&
Netherlands	0.3	0.04	-0.08
UK	0.15	0.8	0.42
<b>Sweden</b>	<b>0.14 (5)</b>	<b>0.25 (5)</b>	<b>0.34 (5)</b>
Italy	0.12	0.01	0.01
Australia	0.11	--	--
Germany	0.01	0.09#	.07#
Ireland		0.33	_0.03
Belgium		0.21	0.45
Canada		0.06	0.19
Austria		0.28	0.43
Spain		0.12*	0.37*
Switzerland		-0.25a	-0.33a
France	-0.12	--	--
Norway*	-0.13	-0.12	0.28
Finland	-0.14	0.31	0.038
Japan	-0.15		

**Source:** P90/10 from OECD, 2004, table 3.2, where the data with \* are from 1995-99 for Austria, Belgium, Denmark, Portugal are for 1990-94; Data for Spain and Greece from Martins, Pereira (2004) , table 1 Luxembourg Income Study (LIS) obtained from <http://www.lisproject.keyfigures.htm> (November 9, 2005). **OECD, Employment Outlook, 2004** Pedro Martins and Pedro T Pereira.” 'Does Education Reduce Wage Inequality? Quantile Regression Evidence from 16 Countries', with Labour Economics, 11(3), 355\_371, 2004, **table 1 Gini Coefficient Source**, Luxembourg Income Study (LIS) obtained from <http://www.lisproject.keyfigures.htm> (November 9, 2005). **UNDP Human Development**



**Report 2005, table 15**

Note: # 1987 approximated by average of 1984 and 1989

**Table 4: Earnings and Income Inequality in Sweden and other advanced economies and Percent of Persons in Relative Poverty, around 2000**

	90/10 Ratios		Gini Coefficients			Fraction in relative poverty	
	Earnings (OECD)	Disposable Income (LIS)	Earnings (M & P)	Disposable Income (UN HDR)	Disposable Income (LIS)	All (LIS)	Kids (LIS)
Norway	1,96	2,80	2,21	25,8	25,1	0,064 (2)	0,034(2)
Denmark	2,16*	3,15	2,39	24,7	--	--	--
<b>Sweden</b>	<b>2,23 (#3)</b>	<b>2,96 (#2)</b>	<b>2,08 (#2)</b>	<b>25,0 (#3)</b>	<b>25,2 (#4)</b>	<b>0,065(#3)</b>	<b>0,042(#3)</b>
Belgium	2,28*	3,31	--	25,0	27,7	0,080 (7)	0,067 (4)
Finland	2,36	2,9	2,53	26,9	24,7	0,054 (1)	0,028 (1)
Italy	2,40	4,48	2,67	36,0	33,3	0,127 (11)	0,166 (11)
Switzerland	2,69	3,34	2,53	33,1	28,0	0,077 (5)	0,089 (6)
Holland	2,85	2,98	2,83	30,9	24,8	0,073 (4)	0,098 (8)
Germany	2,87	3,29	1,45	28,3	26,4	0,083 (8)	0,090 (7)
Spain	--	4,78	--	--	34,0	--	--
Australia	2,94	--	--	35,2	--	--	--
Japan	2,99	--	--	24,9	--	--	--
France	3,07	--	--	32,7	--	--	--
UK	3,45	4,59	3,33	36,0	34,5	--	--
Austria	3,56*	3,37	2,28	30,0	26,6	0,077 (5)	0,078 (5)
Canada	3,65	3,95	--	33,1	30,2	0,114 (9)	0,149 (9)
Portugal	3,76*	--	4,58	38,5	--	--	--
Ireland	3,97	4,56	4,74	35,9	32,3	0,165 (12)	0,172 (12)
USA	4,59	5,45	3,45	40,8	36,8	0,170 (13)	0,219 (13)

Source: OECD, 2004, table 3.2, where the data with \* are from 1995-99 for Austria, Belgium, Denmark, Portugal are for 1990-94; Data for Spain and Greece from Martins, Pereira (2004), table 1 Luxembourg Income Study (LIS) from <http://www.lisproject.keyfigures.htm> (November 9, 2005). M&P, from Pedro

Martins and Pedro T Pereira.” 'Does Education Reduce Wage Inequality? Quantile Regression Evidence from 16 Countries', with Labour Economics, 11(3), 355\_371, 2004, table 1 Gini and relative poverty, Luxembourg Income Study obtained from <http://www.lisproject.keyfigures.htm> (November 9, 2005).  
UNDP Human Development Report 2005,

**Table 5: Attitudes of Swedes, Americans, and Persons in other Advanced Countries toward the Incentive and Inequity Components of Inequality, 1999**

	People get rewarded for effort For effort				Differences in income necessary for prosperity		
	Sweden	US	Others		Sweden	US	Others
Strongly agree	3	11	5		3	4	4
Agree	31	50	35		17	20	16
Neither	36	22	25		29	27	22
Disagree	20	9	25		31	31	35
Strongly disagree	5	2	7		15	8	17
Don't know	6	6	3		5	9	6
<b>Agree-Disagree</b>	<b>9</b>	<b>50</b>	<b>8</b>		<b>-26</b>	<b>-15</b>	<b>-32</b>

	People get rewarded for skill				Study requires additional pay		
	Sweden	US	Others		Sweden	US	Others
Strongly agree	3	15	6		19	21	27
Agree	35	55	43		50	37	44
Neither	37	16	23		16	13	11
Disagree	15	7	20		11	18	12
Strongly disagree	4	1	5		2	4	4
Don't know	6	6	3		3	7	3
<b>Agree-Disagree</b>	<b>19</b>	<b>62</b>	<b>24</b>		<b>56</b>	<b>36</b>	<b>55</b>

	Inequality benefits rich				Differences in income are too large				To get on top must be corrupt		
	Sweden	US	Others		Sweden	US	Others		Sweden	US	Others
Strongly agree	16	12	24		29	23	36		4	4	8
Agree	42	32	44		41	38	41		14	12	20
Neither	21	24	14		18	20	12		29	22	20
Disagree	13	16	11		8	9	7		24	35	30
Strongly disagree	3	4	3		2	3	1		16	21	18
Don't know	8	11	4		1	7	3		13	6	5
<b>Agree-Disagree</b>	<b>42</b>	<b>24</b>	<b>54</b>		<b>60</b>	<b>49</b>	<b>69</b>		<b>-22</b>	<b>-40</b>	<b>-20</b>

	Govt must reduce differences				Rich should pay more taxes		
	Sweden	US	Others		Sweden	US	Others
Strongly agree	23	10	25		16	20	25
Agree	35	22	35		59	39	50
Neither	22	24	16		22	30	19
Disagree	12	23	14		1	1	1
Strongly disagree	6	14	6		0	1	1
Don't know	3	7	5		2	8	4
<b>Agree-Disagree</b>	<b>40</b>	<b>-5</b>	<b>40</b>		<b>74</b>	<b>57</b>	<b>73</b>

Source: Tabulated from ISSP, 1999 Social Inequality III

**Table 6: Changes in Attitudes Toward Inequality in Sweden, 1991-1999**

	<b>Income diffs</b>			<b>Income diffs</b>			<b>Inequality benefits</b>	
	<b>Too large</b>			<b>needed for prosperity</b>			<b>rich</b>	
	1991	1999		1991	1999		1991	1999
Strongly agree	24	28		5	3		21	17
Agree	35	42		25	17		32	44
Neither	22	18		31	29		25	22
Disagree	14	8		30	31		17	14
Strongly disagree	5	2		9	15		5	3
<b>Agree -Disagree</b>	<b>40</b>	<b>60</b>		<b>-9</b>	<b>-26</b>		<b>31</b>	<b>44</b>

	<b>Rich should pay</b>			<b>Government should</b>			<b>People study to</b>	
	<b>More taxes</b>			<b>reduce income diffs</b>			<b>earn money</b>	
	1991	1999		1991	1999		1991	1999
Strongly agree	14	16		17	24		25	20
Agree	62	60		36	36		47	52
Neither	23	22		18	22		14	16
Disagree	1	1		19	13		12	11
Strongly disagree	0	0		10	6		2	2
<b>Agree -Disagree</b>	<b>75</b>	<b>75</b>		<b>24</b>	<b>31</b>		<b>48</b>	<b>49</b>

Source: Tabulated from ISSP 1992, 1999 where the 1992 ISSP is based on Svallfors 1991

**Table 7: Satisfaction with Living Conditions, Job, and Wages, 19-65 year olds**

	Satisfaction with							
	Overall life			Job		Wages		
	1991	1999		1991	1999		1991	1999
Very good/satisfied	41	43		43	33		10	9
Rather good/satisfied	53	51		45	50		45	38
Neither good/satisfied nor bad/dissatisfied	4	4		9	11		22	22
Rather bad/ dissatisfied	2	2		2	5		17	21
Bad/very dissatisfied	1	1		1.	2		7	10
<b>Good/satisfied- Bad/dissatisfied</b>	<b>91</b>	<b>91</b>		<b>85</b>	<b>76</b>		<b>31</b>	<b>16</b>

	Change in your Situation				Daily life source of personal satisfaction	
	1991	1999			1991	1999
Improved	52	56		Yes, most often	58	57
More/less same	35	31		Yes, sometimes	35	36
Deteriorated	13	13		No	07	07
<b>Improved – Deteriorated</b>	<b>39</b>	<b>43</b>		<b>Yes-No</b>	<b>86</b>	<b>86</b>

Source: Based on questions: a)“We have now been through a lot of questions about your living conditions in different areas. How do you yourself view your own conditions? By and large, do you think that your situation is very good, rather good, rather bad, or very bad? b)“If you look back over the last ten years, do you think that your living conditions during this time have deteriorated, improved, or remained more or less the same? c) “Do you usually feel that your daily life is a source of personal satisfaction?” d)“On the whole, how satisfied are you with your present job?” e) “How satisfied are you with your present wages (income from work)? The questions were asked to those employed “last week”, i.e., either employee or self-employed during the week preceding the interview.

The sample sizes ranged from 3473 to 4527 depending on the year and question.

**Table 8. Regression Coefficients (std errors) for the effect of working conditions, log wage, and demographic variables on job and wage satisfaction. 19-65 years of age.**

Sample mean (standard deviation)			Job satisfaction		Wage satisfaction	
Variable	1991	2000	1991	2000	1991	2000
Job satisfaction	4.248 (.804)	4.040 (.873)	-	-	-	-
Wage satisfaction	3.317 (1.074)	3.092 (1.160)	-		-	-
<b>Log hourly wage</b>	<b>4.344 (.290)</b>	<b>4.700 (.310)</b>	<b>.110 (.056)</b>	<b>.132 (.059)</b>	<b>1.243 (.076)</b>	<b>1.460 (.076)</b>
Years of education	11.6 (3.14)	12.7 (3.14)	-.011 (.005)	-.021 (.006)	-.037 (.007)	-.039 (.007)
Influence over job tasks	.466	.490	.141 (.028)	.240 (.031)	.075 (.038)	.026 (.041)
Learn new things at the job	.485	.472	.281 (.028)	.237 (.032)	.016 (.038)	.056 (.041)
Heavy lifting	.169	.154	-.024 (.038)	-.105 (.045)	-.171 (.052)	-.166 (.059)
Sweaty at job	.227	.229	-.069 (.034)	-.040 (.040)	.028 (.047)	-.160 (.052)
Mentally demanding	.493	.518	-.163 (.027)	-.247 (.031)	-.171 (.038)	-.366 (.040)
Monotonous job	.182	.190	-.509 (.038)	-.471 (.042)	-.068 (.052)	-.122 (.055)
Repetitive movements	.411	.461	-.040 (.030)	-.026 (.033)	-.040 (.041)	.050 (.042)
Age	39.8	41.2	.0031 (.0014)	.0008 (.0016)	-.0012 (.0019)	-.0121 (.0020)
Male	.500	.509	-.120 (.029)	-.041 (.033)	-.148 (.040)	.086 (.043)
Married/cohab	.719	.723	.061 (.041)	.021 (.044)	-.065 (.056)	-.046 (.057)
Divorced	.058	.058	.020 (.068)	-.000 (.077)	-.236 (.093)	-.086 (.100)
Widowed	.010	.015	.174 (.141)	.132 (.134)	-.059 (.195)	.054 (.174)
Any kids	.686	.690	-.025 (.038)	-.023 (.041)	-.167 (.052)	-.102 (.053)
N	3265	2963	3264	2961	3264	2961
Adj. R sq.			.1520	.1302	.0941	.1778

**Table 9: Regression coefficients (std errors) for estimates of the effect of unemployment and duration of unemployment on life situation/living conditions and life satisfaction, 19-65 years of age.**

Proportion in Group		Coefficients (std errors) on unemployment measure				
Measure of Unemployment	1991	2000	1991 Life situation/ living conditions	2000 Life situation/ living conditions	1991 Life satisfaction	2000 Life satisfaction
<b>Regressions with unemployment status</b>			(1)	(2)	(3)	(4)
Dummy for Unemployment	.037	.070	-.249 (.053)	-.293 (.039)	-.212 (.049)	-.126 (.038)
Adj R sq			.0579	.0604	.0408	.0321
<b>Regressions with dummy variables for duration of unemployment</b>			(5)	(6)	(7)	(8)
< 0.3 year	.02298	.0264	-.099 (.066)	-.232 (.065)	-.150 (.062)	-.099 (.062)
0.3 – 0.6 years	.0067	.0117	-.439 (.122)	-.266 (.091)	-.224 (.114)	-.076 (.087)
0.6 – 1.0 years	.0022	.0064	-.620 (.206)	-.416 (.124)	-.243 (.193)	-.004 (.119)
1.0 – 2.0 years	.0038	.0079	-.297 (.164)	-.159 (.109)	-.385 (.153)	-.141 (.104)
> 2 years	.0013	.0174	-1.086 (.267)	-.409 (.075)	-.664 (.250)	-.234 (.072)
Adj R sq			.0615	.0608	.0411	.0321

Source: Each regression included dummy variables for whether the worker was full time or part time, self-employed, self-employed, helper in family, retired, housework, other and age, male. The life situation/living conditions outcome is based on question: a) “We have now been through a lot of questions about your living conditions in different areas. How do you yourself view your own conditions? By and large, do you think that your situation is very good, rather good, rather bad, or very bad? The life satisfaction question is “Do you usually feel that your daily life is a source of personal satisfaction?”



**Table 10: Sweden compared to US, OECD, and EU in “knowledge economy” 2004****A) OECD Investment in Knowledge**

	RD/GDP (rank of 18)	Software (rank of 18)	Higher Ed (rank of 18)	Investment In Knowledge (rank of 18)
Sweden	3.98 (1)	1.54 (1)	0.93 (7)	6.44 (2)
US	2.74 (4)	1.46 (2)	2.36 (1)	6.56 (1)
OECD	2.41	1.08	1.42	5.10
EU	2.02	0.80	0.79	3.62

**B) Young Persons in Higher Education**

	Bachelors/ 25-34 (rank of	SE Share of Bachelor's (rank of 30)	PhDs/age (rank of 34)	SE PhDs/age (rank of 31)
Sweden	42.3 (4)	31.7(2)	3.1 (1)	1.6 (1)
US	39.1(7)	14.7	1.3 (11)	0.3 (22)
OECD	31.0	21.2	1.3	0.5
EU19	--	23.4	1.4	0.6

**C) Scientific Output**

	Scientific Articles Per Capita (rank of 38)	Relative Prominence of cited articles (rank of 39)	Patents/ million (rank of 32)
Sweden	1143 (2 )	0.86 (5)	72.3 (5)
US	726 (31)	1.03 (2)	55.1 (8)
OECD	441	--	43.9
EU19	573	0.74	32.4*

Source: OECD Science, Technology, and Industry: Scoreboard 2007

unless otherwise stated; A) Figure A1.1 Investment in Knowledge as percent of GDP 2004

B) OECD, Factbook 2007, tertiary attainment for age group 25-34, p 180; Figure B1.2 S&E degrees as a percentage of total new degrees, Figure B1.1 Graduate rates at the doctorate level

C) Figure D.5.1 Scientific articles per million population 2003 Figure D1.4 Triadic Patent families per million population Figure D5.2 Relative Importance of scientific literature

Note: \*= EU25; Figure A2.1 R&D intensity compares R and D over GDP in 33 countries, Sweden ranks 1 while the US ranks 7<sup>th</sup>. In this compilation, the Swedish RD/GDP ratio is nearly twice that for the EU and 70% higher than the OECD average.