S E D A P

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Abstract

It is well known that in the United States the education premium - the ratio of the earnings of university graduates to the earnings of high school graduates - has risen sharply in the last twenty years. Some Canadian economists and policy makers presume the same fact holds in Canada. Since so much of modern growth theory and micro and macroeconomic policy turns on the education premium it is important for social scientists and policy makers to know what has actually happened to the education premium. This paper argues that on the basis of available evidence over the last twenty years the premium has been constant or has fallen in Canada.

The Education Premium in Canada and the United States

1.   Introduction

It is very well known that in the United States the education premium - the ratio of the earnings of university graduates to the earnings of high school graduates - has risen sharply in the last twenty years. This fact has been so well-publicized that some prominent Canadian economists simply presume the same fact holds in Canada and even labour economists are perhaps not as clear as they might be about the extent of inter-country difference in this aspect of wage structure.[1] Since so much of modern growth theory and micro and macroeconomic policy turns on the education premium it is important for social scientists and policy makers to know what has actually happened to the education premium. This short paper argues that on the basis of available evidence over the last twenty years the premium has indeed risen sharply in the United States but it has been constant or has fallen in Canada.

We begin by looking at data drawn from the U.S. March Current Population Survey, 1981-1999, to show the reader what the fuss is all about. We then turn to an examination of "comparable" data for Canada. Part of this paper is absorbed with the issue of finding *comparable* Canadian data. Most would agree that the Canadian Survey of Consumer Finances provided data much like the U.S. CPS prior to 1998 - the last SCF was for the calendar year 1997. Currently it is unclear whether the most consistent time series is obtained by using SLID - the Survey of Labour Income Dynamics - or LFS - the Labour Force Survey - to extend the SCF-based earnings data beyond 1997. SLID is currently available for calendar years 1993 to 1998 and LFS earnings data is available for 1997-2000 so there is only one year - 1997 - when all three data sets overlap. We employ both SLID and LFS data to document what has happened to the education premium in Canada.[2]

2.   The Education Premium in the U.S.

We focus on the real weekly earnings of women and men, aged 25 to 64, who work "full-time," (that is, they typically work thirty or more hours per week), who are not self-employed and for whom the major source of income is wages and salaries. The "education premium", sometimes

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[1] Card, Kramarz and Lemieux (1999) study the relative wages of skilled and unskilled workers in the United States, Canada and France using data for the 1980s. They conclude that "... relative wages appear to be slightly less flexible in Canada than in the United States ..." (p. 869).

[2] In Robb et al. (2001), we discuss the strengths and weaknesses of extending the SCF with either SLID or LFS.

referred to as the "skill premium", is most often measured by the ratio of mean or median earnings of university graduates to the earnings of high school graduates. For reasons that will become clear shortly we break our samples into six educational groups - elementary (EL), some high school (HS1), completed high school (HS2), some post-secondary (PS1), post-secondary certificate or diploma (PS2) and university degree (baccalaureate, or higher, UN). Since the education question differs across surveys, or may change over time for a given survey, and the UN category appears to be the one measured most consistently across surveys and over time, we have found it helpful to work with another measure of the education premium. This is the ratio of the earnings of university graduates, UN, to the earnings of everyone else, NONUN.

Table 1, which is based on the U.S. CPS, lists real median weekly earnings for the seven education groups for the period 1981 to 1999.[3] For males, the median for completed high school (HS2) lies above the non-university (NONUN) median early in the data period but since the mid-1980s the two data series are quite close, and trend downwards by about 12 percent.[4] For females, HS2 and NONUN are close at the beginning of the data period while HS2 lies a bit below NONUN after 1990. Over the entire data period the two series trend upwards by an average of 13 percent. The medians for university trend sharply upwards. Between 1981 and 1999 male real earnings rose over 20 percent and female real earnings rose by 33 percent.

It is clear then that in the U.S., over our data period, real earnings decline more quickly or rise more slowly for lower education levels. Since there has been a marked increase in average years of education over the data period it is possible that the slow or negative growth in the real earnings of the less educated could be attributed to a shift over time across education groups. So, for example, in 1981, 9 percent of males had only an elementary education and 11 percent had some high school but had not completed high school. By 1999 these numbers had dropped to 4 and 8 percent. For females, the corresponding numbers are (6,10) to (3,6). If it were true that those in the lower education groups were drawn from successively lower sections of the ability distribution, over time median real earnings might fall for these groups. For our data period, however, the percentage with a university degree rose only slightly for males (25 to 28 percent). For females, it oscillated between 20 and 25 percent. By concentrating on the university-non-university classification not only can we cope more easily with different data sets, as noted above, but we hope we are also less exposed to the criticism that changes in earnings ratios are driven largely by the changing composition of our sample.[5] The last two columns of Table 1 show university earnings ratios measured two ways - relative to high school completed (UN/HS2) and

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[3] The BLS changed the way in which the data were processed in 1988 and released two data files for this year. In the context of the present paper the two sets of 1988 earnings numbers are very close and we report the averages of the medians in Table 1.

[4] Note that there are two columns for UN and NONUN. The first is real weekly earnings; the second is an index of this time series with the number for 1981 set equal to 100.

[5] Of course, the composition of the non-university sample has changed a great deal.

relative to non-university (UN/NONUN). Although the two series vary somewhat year to year the trends in them over our data period are very similar for both sexes.

Accordingly, the CPS-lines in Figures 1a and 1b graph the ratio of median earnings for university graduates relative to median earnings for non-university, that is, the last column of Table 1. For U.S. females the earnings ratio rises from 1.5 in 1981 to nearly 1.8 in 1998. For males, the end point is about the same but the ratio starts lower in 1981 at 1.3. It is clear then that in the U.S., for both sexes, the education premium has risen sharply. Does the earnings structure in Canada resemble the U.S. in this respect?

3. Using the SCF to Study the Education Premium in Canada

Statistics Canada's Survey of Consumer Finances was very similar in structure and content to the U.S. Current Population Survey. Between 1981 and 1997, with the exception of 1983, the SCF produced annually public use files on individuals' incomes and characteristics. While many of the questions differed between the SCF and CPS it is possible to extract Canadian samples much like the U.S. data sets analysed above.

Tables 2a and 2b are the Canadian counterparts of Table 1. Figures 1a and 1b graph time series earnings ratios for both countries. For Canadian males, real earnings fall for all education groups and, at roughly the same rate. For Canadian females, UN is remarkable stable and NONUN rises by about 10 percent. It is not surprising, therefore, that the university-education premia shown in the last two columns of these tables do not exhibit an upward trend over the 1981-1997 period; indeed, UN/NONUN trends downward for females.

In an important sense the paper could end here. On the basis of these two surveys - the CPS for the U.S. and the SCF for Canada - the education premium has increased markedly in the U.S. but has been very stable or perhaps even declined slightly in Canada. As time goes by, however, the gap between the termination of the SCF (1997) and the latest CPS data (currently 1999) will grow. Therefore, it seems, to us at least, important to try to extend the Canadian data beyond 1997, the last year of SCF data. Is this possible?

4. Extending the SCF - SLID and LFS

Longitudinal data sets are rare in Canada. In the late 1980s and early 1990s Canadian researchers clamoured for a longitudinal data set like the Panel Study on Income Dynamics (PSID) in the U.S. In response Statistics Canada introduced the Survey of Labour Income Dynamics. A group of individuals and families were interviewed for the first time in 1994 about their incomes in 1993 and they were followed for another five years. The people they married were introduced into the panel and as some members of the panel attrited new people were added to the cross-sections. Thus some of the people in SLID data sets are members of a panel and

others are not. While some of the questions asked in SLID are quite different from those in the SCF, SLID is the survey that was and is still intended as a replacement for (improvement over) the SCF. The wage and salary information in the SCF should be the same as that in SLID. Both surveys asked people to report wages and salaries from all jobs including any tips or gratuities or overtime. SLID has been conducted every year since 1994 and earnings data are currently available for calendar years 1993-1998. A second wave started by reporting 1996 incomes and components so currently we have access to complete information on the first wave and three years of data on the second wave.

It is less well known that the Labour Force Survey began collecting earnings information in January 1997. LFS earnings questions are designed to minimize non-response by allowing respondents to report earnings at the time of the survey in a way that is easiest for them. Those paid by the hour are asked to report an hourly wage rate that includes tips, commissions and bonuses. Unfortunately, neither the questionnaire nor the guidelines produced by Statistics Canada mention overtime earnings. The later questions on hours worked distinguish actual hours worked from usual hours and overtime hours. Those not paid by the hour can report their earnings weekly, bi-weekly, semi-monthly, monthly or yearly. From the earnings and hours information collected Statistics Canada calculates an hourly wage rate. Multiplying this wage rate by usual hours worked per week one can obtain an estimate of weekly earnings. For salaried employees this should be close to SCF or SLID estimates of weekly earnings. For those paid by the hour LFS may lie below SCF and SLID because overtime earnings may not be included. In addition, LFS earnings estimates ignore earnings from secondary jobs whereas SCF and SLID asked respondents to report *all* earnings. LFS earnings questions are asked at the first interview and then updated in subsequent interviews only if the person changed jobs.

Unlike SCF and SLID, the LFS does not ask questions about weeks worked in the previous calendar year so one cannot obtain annual earnings from the LFS. But by using reported weeks worked in the SCF and the SLID one can produce estimates of weekly earnings for all three data sets. We feel these estimates of weekly earnings offer the best chance at a relatively consistent time series of earnings, 1981 to date.

It is, of course, important not only to achieve consistency in earnings but also in education categories. In earlier work we have discussed this issue at length with regard to the SCF (see Bar-Or et al. (1995), Burbidge, Magee and Robb (1997)). The SCF education question changed in 1988 and it is well known that it is impossible to arrange education categories so that there is no break in the time series for these two years. Tables 3a and 3b illustrate this point; we see bigger changes 1988-1989 than in any other pair of years. We are indebted to Jean Fares of the Bank of Canada for pointing out to us that it is possible to set up the six education categories we have in this paper to achieve comparability between the SCF and the LFS. To do this one uses the *summary* education question in the SCF to create EL, HS1, HS2, PS1, PS2 and UN, and the education question in the LFS maps naturally into these six categories. Inspection of Tables 3a and 3b show that for the one overlap year we have - 1997 - the percentages are very close. One

might be tempted then to guess that the SCF time series of earnings by education could be accurately extended by using the LFS. But Tables 2a and 2b, which report median weekly earnings by education, for the SCF, SLID and the LFS raise some doubt. Given our earlier discussion it is not surprising to see that LFS median earnings tend to be lower than SCF or SLID estimates, particularly for males. Still, earnings *ratios* may be measured consistently across the three data sets. Inspection of the three Canadian data series in Figures 1a and 1b offer some support for this view. The only outliers are the first three years of SLID data for females. Interestingly, this anomaly would disappears if were to graph UN/HS2 rather than UN/NONUN (see Table 2b).

Thus, from the point of view of the focus of this paper - the behaviour of education premium in the U.S. and Canada - it probably does not matter whether one uses the LFS or SLID to extend the SCF.[6] For males, the Canadian education premium has recently been at or near 1.40, 0.37 below the 1999 number for the U.S.[7] For females, the education premium has trended downwards from about 1.65 to 1.50. By contrast, the U.S. premium starts at 1.50 in 1981, crosses the Canadian line in the mid-eighties and rises to about 1.75 in 1999.

5.   Conclusions

The Canadian and U.S. economies are similar in many ways but the behaviour of the real earnings of university graduates relative to the real earnings of other educational groups is completely different. Further research is needed to better understand why the behaviour of relative earnings across education groups is so different. But however our understanding is advanced by this research it is quite possible that economic models and policies that are appropriate for the U.S. may be quite inappropriate for Canada.

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[6] For a more thorough analysis see Robb et al. (2001).

[7] Georges Monette of York University pointed out to us that one cannot treat a time series of cross-sectional numbers in the same way as a time series on panel data. Time series of medians or means or other statistics from panel data are bound to be smoother than the corresponding time series from cross-sectional data sets.

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Table 1: Median Weekly Earnings by Education (1997 dollars): U.S. Males and Females, Aged 25-64; CPS

Year	EL	HS1	HS2	PS1	PS2	UN Number	UN 1981~100	NONUN Number	NONUN 1981~100	Earnings Ratios X 100 UN/HS2	Earnings Ratios X 100 UN/NONUN
						MALES					
1981	427	529	641	678	678	814	100	611	100	127	133
1982	448	528	640	688	672	832	102	608	100	130	137
1983	425	526	631	681	697	852	105	619	101	135	138
1984	429	505	618	684	698	889	109	594	97	144	150
1985	431	507	631	703	713	890	109	603	99	141	148
1986	422	497	634	704	704	929	114	619	101	147	150
1987	415	508	625	725	706	951	117	621	102	152	153
1988	405	509	626	708	731	923	113	600	98	147	154
1989	399	473	623	697	722	934	115	598	98	150	156
1990	396	449	591	709	709	945	116	579	95	160	163
1991	362	442	566	680	680	906	111	566	93	160	160
1992	352	429	560	660	704	924	114	550	90	165	168
1993	342	427	556	641	684	919	113	556	91	165	165
1994	333	417	542	625	667	938	115	542	89	173	173
1995	351	405	536	611	689	941	116	547	90	176	172
1996	341	399	541	614	655	942	116	531	87	174	177
1997	318	404	558	615	673	923	113	542	89	165	170
1998	341	436	568	644	681	946	116	568	93	167	167
1999	333	419	556	648	705	982	121	556	91	177	177
						Females					
1981	252	284	339	387	438	509	100	339	100	150	150
1982	259	284	352	400	416	523	103	346	102	149	151
1983	258	290	370	409	460	557	109	362	107	151	154
1984	268	297	357	431	476	565	111	360	106	158	157
1985	260	287	367	431	464	585	115	371	109	159	158
1986	269	293	379	440	470	610	120	379	112	161	161
1987	255	296	380	435	503	625	123	380	112	164	164
1988	251	301	382	448	508	613	120	388	114	160	158
1989	249	291	374	461	498	623	122	374	110	167	167
1990	253	276	369	449	521	614	121	378	112	166	162
1991	236	283	362	453	515	634	125	368	109	175	172
1992	229	264	374	440	506	641	126	382	113	171	168
1993	235	265	363	449	497	641	126	385	114	177	166
1994	238	271	367	447	498	656	129	379	112	179	173
1995	237	263	365	426	496	648	127	375	111	178	173
1996	246	265	354	423	492	650	128	374	110	184	174
1997	236	280	365	423	500	654	128	385	114	179	170
1998	227	265	379	435	492	681	134	381	112	180	179
1999	241	278	371	463	503	678	133	389	115	183	174

Table 2a: Median Weekly Earnings by Education (1997 dollars):
Canadian Males Aged 25-64; SCF, SLID and LFS

Year	EL	HS1	HS2	PS1	PS2	UN Number	UN 1981~100	NONUN Number	NONUN 1981~100	Earnings Ratios X 100 UN/HS2	UN/NONUN
						SCF					
1981	683	738	794	808	856	1063	100	761	100	134	140
1982	665	744	792	793	846	1057	99	761	100	133	139
1983											
1984	689	720	767	816	824	1047	98	746	98	137	140
1985	666	714	783	818	828	1051	99	756	99	134	139
1986	689	715	770	795	837	1048	99	758	100	136	138
1987	686	711	775	809	810	1016	96	755	99	131	135
1988	691	724	757	800	830	1025	96	756	99	135	136
1989	688	698	748	758	789	1046	98	744	98	140	141
1990	676	688	738	776	816	1019	96	750	99	138	136
1991	651	683	722	767	798	1049	99	735	97	145	143
1992	657	690	743	766	810	1035	97	745	98	139	139
1993	659	673	711	721	781	1017	96	727	96	143	140
1994	648	689	717	751	811	1014	95	748	98	141	136
1995	599	684	715	724	774	984	93	721	95	138	136
1996	610	661	692	710	781	995	94	723	95	144	138
1997	588	673	695	712	769	962	90	729	96	138	132
						SLID					
1993	606	668	726	721	790	997	724	724	95	137	138
1994	669	641	719	765	801	1011	745	745	98	141	136
1995	618	625	712	743	785	1002	733	733	96	141	137
1996	654	637	710	748	784	988	729	729	96	139	136
1997	658	654	706	707	784	1005	728	728	96	142	138
1998	661	656	725	743	793	1047	747	747	98	144	140
						LFS					
1997	577	600	672	680	750	961	90	680	89	143	141
1998	575	614	669	686	759	949	89	694	91	142	137
1999	565	592	662	701	749	936	88	687	90	141	136
2000	572	610	685	687	752	954	90	693	91	139	138

Table 2b: Median Weekly Earnings by Education (1997 dollars)
Canadian Females Aged 25-64; SCF, SLID and LFS

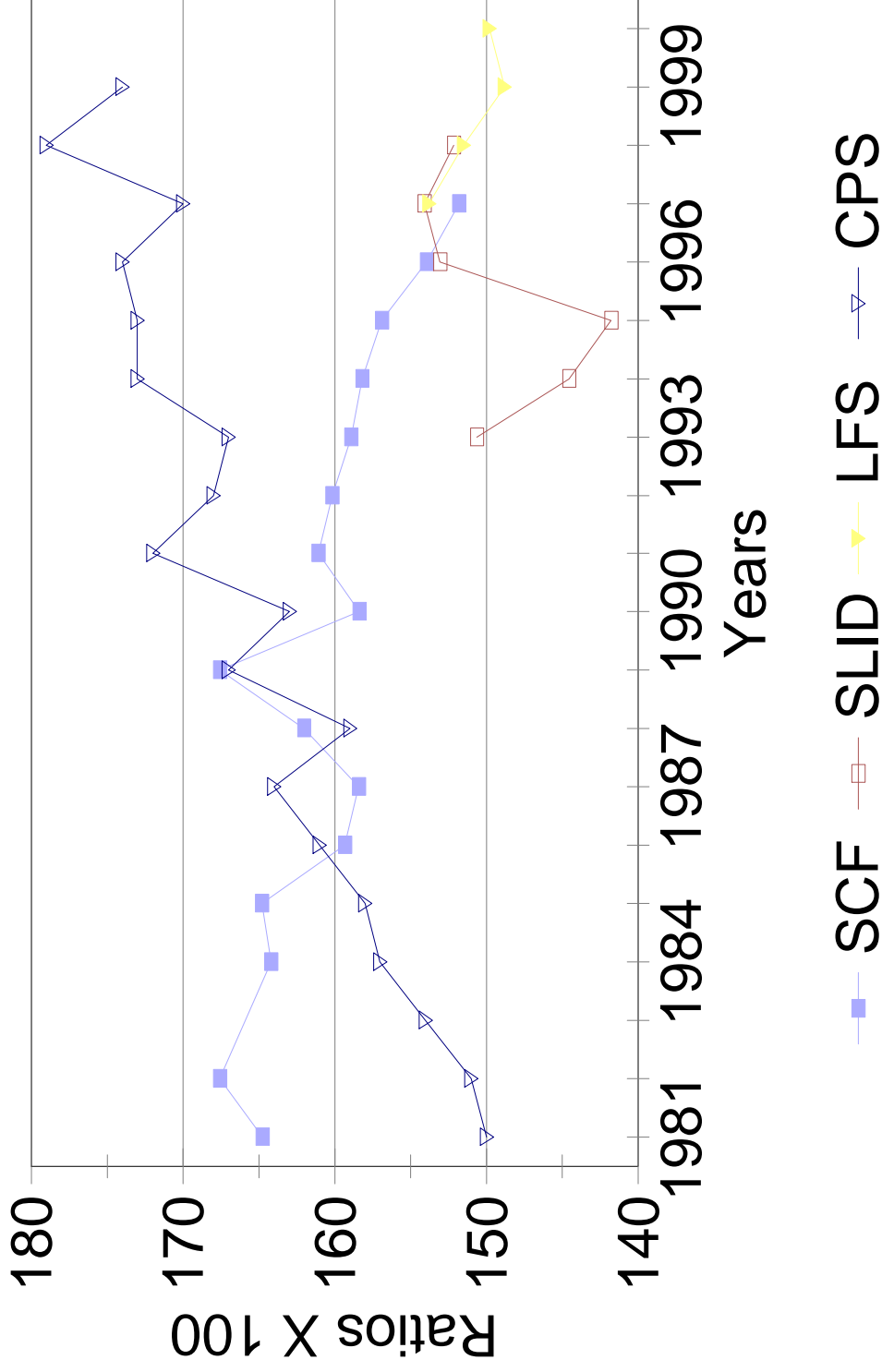| Year	EL	HS1	HS2	PS1	PS2	UN Number	UN 1981~100	NONUN Number	NONUN 1981~100	Earnings Ratios X 100 UN/HS2	UN/NONUN
						SCF					
1981	366	429	492	524	561	776	100	471	100	158	165
1982	380	427	482	515	551	786	101	469	100	163	168
1983											
1984	366	430	488	511	574	775	100	472	100	159	164
1985	363	414	481	513	552	773	100	469	100	161	165
1986	371	418	494	530	554	768	99	482	102	155	159
1987	364	418	493	508	558	762	98	481	102	155	158
1988	387	416	480	508	546	768	99	474	101	160	162
1989	350	418	488	476	535	796	103	475	101	163	168
1990	409	403	493	508	554	776	100	490	104	157	158
1991	357	420	497	522	546	807	104	501	106	162	161
1992	376	430	517	517	563	828	107	517	110	160	160
1993	407	418	496	508	549	793	102	499	106	160	159
1994	368	406	507	533	550	802	103	507	108	158	158
1995	379	431	497	516	549	794	102	506	107	160	157
1996	404	430	508	511	547	782	101	508	108	154	154
1997	384	432	504	558	556	788	102	519	110	156	152
						SLID					
1993	339	459	524	555	565	802	532	532	113	153	151
1994	358	448	498	547	577	771	533	533	113	155	145
1995	366	428	504	539	585	764	539	539	114	152	142
1996	363	410	498	531	556	793	518	518	110	159	153
1997	325	410	498	530	556	795	516	516	110	159	154
1998	343	414	512	542	560	804	528	528	112	157	152
						LFS					
1997	360	400	495	519	554	769	99	500	106	155	154
1998	355	396	495	525	552	762	98	503	107	154	151
1999	351	383	487	539	548	750	97	504	107	154	149
2000	349	387	489	532	550	752	97	502	107	154	150

Table 3a: Percentage Distributions Across Education Categories: Canadian Males Aged 25-64; SCF, SLID and LFS

Year	EL	HS1	HS2	PS1	PS2	UN	NONUN
SCF							
1981	19	27	20	8	12	14	86
1982	17	26	20	9	12	15	85
1983							
1984	15	25	22	9	14	16	84
1985	14	25	22	9	15	16	84
1986	13	26	23	9	14	16	84
1987	13	25	22	8	15	16	84
1988	11	24	24	9	16	16	84
1989	10	19	20	8	30	14	86
1990	8	19	20	7	31	14	86
1991	8	18	21	7	30	15	85
1992	7	17	21	7	31	17	83
1993	7	17	20	7	33	16	84
1994	6	15	20	7	33	19	81
1995	6	15	20	7	34	18	82
1996	5	14	19	7	36	18	82
1997	5	13	20	7	36	18	82
SLID							
1993	5	13	15	12	36	20	80
1994	4	12	15	12	36	20	80
1995	4	11	14	12	37	21	79
1996	5	11	17	12	35	20	80
1997	4	11	16	13	36	20	80
1998	4	10	15	13	37	21	79
LFS							
1997	5	14	19	7	36	18	82
1998	5	13	19	7	37	18	82
1999	5	13	20	7	37	18	82
2000	5	13	20	7	37	18	82

Table 3b: Percentage Distributions Across Education Categories: Canadian Females Aged 25-64; SCF, SLID and LFS

Year	EL	HS1	HS2	PS1	PS2	UN	NONUN
				SCF			
1981	12	25	25	9	17	12	88
1982	11	24	26	9	17	13	87
1983							
1984	9	22	26	9	18	16	84
1985	8	22	27	9	19	16	84
1986	7	22	28	10	19	16	84
1987	8	22	26	9	20	15	85
1988	7	21	27	9	20	16	84
1989	6	17	24	8	31	14	86
1990	5	17	25	8	32	13	87
1991	5	14	25	8	32	15	85
1992	4	13	25	8	33	16	84
1993	4	13	24	8	35	16	84
1994	4	11	23	8	36	19	81
1995	4	11	23	8	36	18	82
1996	3	10	21	8	37	20	80
1997	3	10	21	8	38	20	80
				SLID			
1993	3	9	17	11	41	19	81
1994	3	8	17	11	41	20	80
1995	3	7	15	12	41	22	78
1996	3	8	20	11	38	20	80
1997	3	8	19	11	39	20	80
1998	3	7	17	11	40	22	78
				LFS			
1997	3	10	22	8	38	19	81
1998	3	10	22	8	38	19	81
1999	3	10	22	8	38	20	80
2000	3	9	22	8	38	20	80

Figure 1a: Cdn and US Earnings Ratios Males; SCF, SLID, LFS and CPS
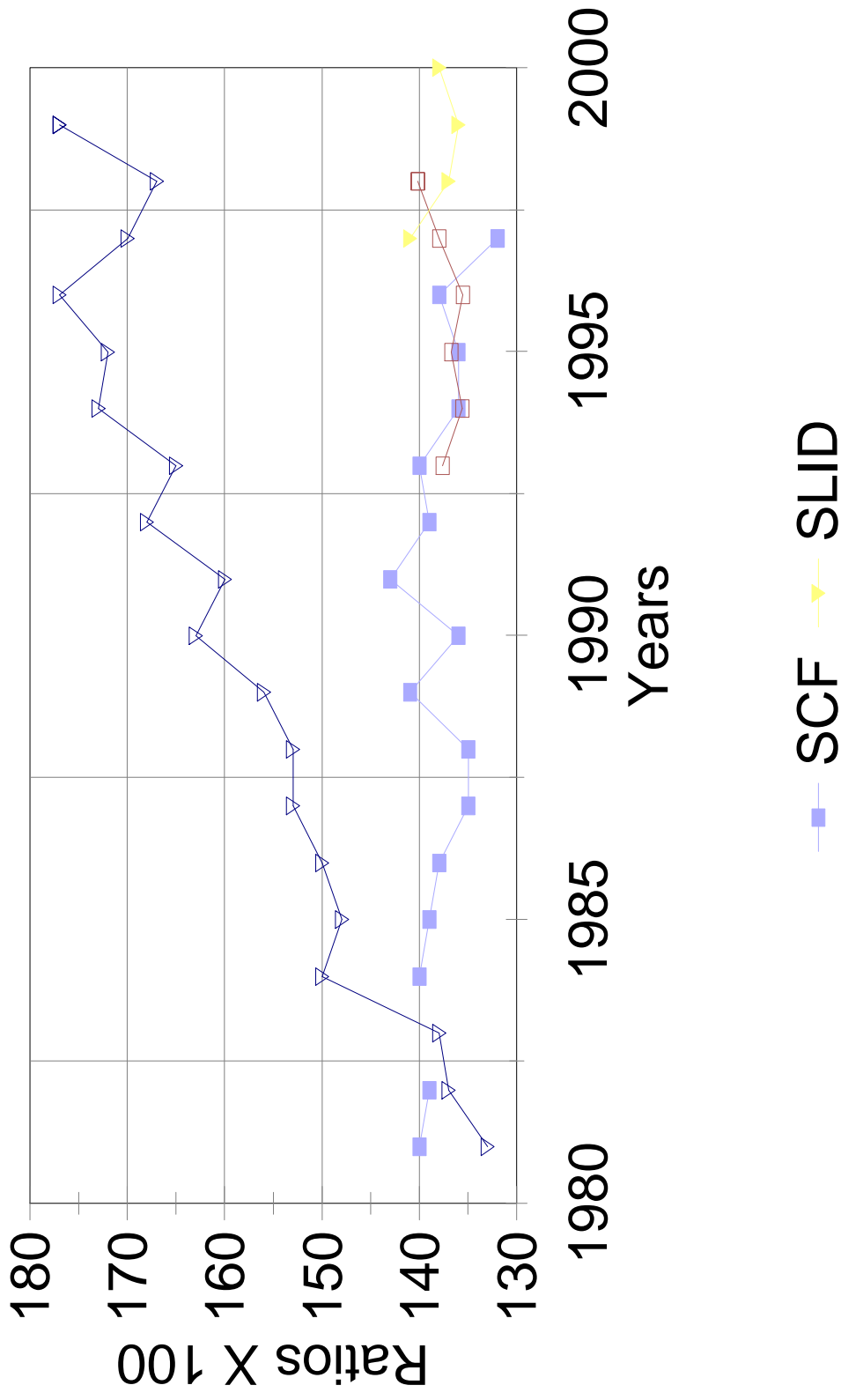
Figure 1b: Cdn and US Earnings Ratios Females; SCF, SLID, LFS and CPS

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