New evidence on income and the velocity of money

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NEW EVIDENCE ON INCOME AND THE VELOCITY OF MONEY

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Time series and cross-country empirical results suggest that cash holding as a proportion of income rises, or equivalently that velocity falls, as income increases. Numerous cross sectional findings at many points in time, in several countries conclude oppositely. It is argued here that the former findings suffer from omitted variable bias by ignoring socio-demographic variables affecting the demand for cash balances. When one incorporates such demand shifters into the analysis the time series and cross-country findings are seen as consistent with the critically reexamined cross sectional result that velocity increases with income.

Many analyses of time series data find that the velocity of money declines with income or, equivalently, the income elasticity of demand for money is greater than unity (see Goldfeld (1973) for a recent review of the empirical evidence). Additional support for the time series findings has been reported by Perlman (1966), (1970) using cross-country comparisons of money holdings and income.

Cross-sectional findings for the U.S. and England, however, invariably conclude oppositely that money balances rise less than proportionately with income or wealth (Claycamp (1963), Graves (1973), (1976), Lampman (1962), Projector and Weiss (1966) and Spraos (1957)). Institutional and traditional theoretical objections to the time series finding, using the time series data, have been advanced by Tobin (1965).

The correct relation between income (or wealth) and velocity has important policy and portfolio implications. The equilibrium rate of inflation resulting from any given rate of increase in the money supply will depend on the relation between velocity and rising incomes over time. If velocity rises with real income rather than falling a higher rate of inflation will ensue from any given monetary policy than would be the case if velocity fell with income. Further, the time series findings have provided support for the portfolio hypothesis of increasing relative risk aversion advanced by Arrow (1965), (1971). Theoretical and intuitive considerations provide no strong support for this hypothesis (Graves (1973), Stiglitz (1969)) hence the robustness of the time series finding is an important issue.

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In resolving the conflict in velocity-income results among the various data sources one immediate approach presents itself. In any one country over time and in comparisons across countries a great deal of variation occurs in variables not usually considered and, furthermore, this variation is often correlated with income. Section I elaborates briefly on these omitted variables and their place in the analysis. In Section II, which incorporates socio-demographic variables into the time series analysis, it is seen that weak support for the cross-sectional findings is forthcoming, in spite of data limitations which result in very few degrees of freedom. Section III similarly brings the omitted variables into the cross country analysis and again velocity is seen to increase, *ceteris paribus*, with increasing income. Section IV reexamines the cross-sectional findings in light of the criticism that they may reflect transitory rather than permanent wealth or income. The empirical analysis does not support this criticism, rather indicating additional support for the position that velocity rises with increasing income. Section V concludes and summarizes the results.

I. SOCIO-DEMOGRAPHIC VARIABLES AND THE DEMAND FOR MONEY

The variables considered here — urbanization, age, education, income inequality, and household size — require some theoretical rationalization for their inclusion in the analysis. Even with such rationalization the influence of some of these variables is difficult to interpret as will become clear.

Urbanization is expected to exert several effects with the net impact being *a priori* ambiguous. For example, trading in larger cities where one is not known, greater precautionary balances due to unexpected shopping opportunities, and the probably greater amount of cash balances for transactions involving intermediate goods would be expected to increase the demand for money, while the greater accessibility to non-bank earning asset markets in urban areas would lead to reduced cash holdings since lower transactions costs would facilitate the holding of proportionally less cash. Empirically, both within and across countries, the former types of motivations are seen to dominate with greater urbanization being associated with lower velocity.

Median age serves as a proxy for the percent retired and enters the analysis under the presumption that retirees "cash out," acquiring more liquid portfolios with greater proportional money components. This expectation has been verified for cross-sectional data by Claycamp (1963) and is born out in the regression results of the following sections.

Education has an *a priori* ambiguous sign, although previous cross-sectional work (e.g., Claycamp (1963), Graves (1976)) indicates that more educated households hold higher proportions of corporate stock and other risky assets, reflecting perhaps greater familiarity with

sophisticated financial markets. The results for this variable presented in later sections are mixed, with strong support for the cross-sectional findings obtained in the time series data but with (insignificant) conflicting evidence in the cross-country data.

Household size, holding per capital real income constant, has a rather straightforward transactions and precautionary demand interpretation. Larger households will hold larger absolute money balances than will smaller households, but as a proportion of the larger household income money holdings are expected to be lower (see Graves (1976)). These qualitative findings are observed for both the time series and cross-country data in Sections II and III although in both cases the coefficients are not significantly different from zero (in part a reflection of multicollinearity in the regressions).

The degree of income inequality, available only for the cross country comparisons of Section II, has a similar transactions demand interpretation. With any nonlinear inventory relationship (e.g., the familiar square-root rule) greater income inequality within a country should lead, *ceteris paribus*, to a smaller per capita money holding.

Other possible interpretations of the expected importance of these variables could be advanced; however only one argument is of particular interest since the primary concern here is not in the effect of the variables *per se* but whether these variables correlate with the standard variables in such a way as to bias the coefficient of income in the regressions. The more troubling argument is that many of these variables are in fact better proxies for permanent income than is the imperfectly measured income variable which enters the regressions. However, the income figures prior to 1919 in the time series analysis are centered averages and examination of the more recent data indicates that consideration of business cycles would not materially affect the results. The broader measurement error argument that, for example, percent urban is actually picking up income effects if the latter were properly measured appears strained. Indeed, this interpretation has a tautological ring to it in that all potential demand-shifters are re-defined as better proxies for income; hence the income effect becomes essentially not subject to test. The question of permanent versus transitory effects is pursued in greater detail in Section IV which reexamines the cross-sectional results from this perspective. The empirical effect of income on velocity in the time series and cross country data, presuming the socio-demographic variables discussed in this section are demand shifters, is now considered.

II. TIME SERIES

In arriving at the data set used in this section decennial observations were extracted from the velocity of money series of Friedman and Schwartz (1963) and these data were merged with historical social,

economic, and demographic data from the Census available for those dates. The result was only ten observations covering the period 1870 to to 1960. However, even with so few degrees of freedom and with substantial multicollinearity, suggestive results were obtained. The data are listed in the Appendix along with means, standard deviations, and simple correlations for all variables analyzed.

In Table 1 the empirical time series analysis is presented ignoring socio-demographic variables. Of note is the consistently negative and generally significant coefficient on real per capita income indicating that velocity appears to fall with rising income. The rate of interest reduces the negative effect of income on velocity, as expected from earlier work. PDOT, the rate of inflation, has an unexpected sign due in part to the ten-year interval between observations. The coefficient on PDOT is however in no case significant nor does it affect the coefficient on income. Further, for Equation 6, Table 1 the PDOT coefficient is readily understandable: with nominal interest rates included in the regression a rise in the rate of inflation is equivalent to a decline in the real interest yield (see Lefton (1972)).

TABLE 1

Time Series Results Ignoring Socio-Demographic Variables.
Velocity of Friedman-Defined Money (VELMON) is the Dependent Variable.
Standard Errors in Parentheses. 10 observations.

Equation	Constant	Y29PC[a]	PDOT[b]	R[c]	D-W	F	R^2
1	4.19961	−.00236			1.20	12.49	.61
	(.53352)	(.00067)					
2	2.63229		−.04896		.55	.42	.05
	(.41732)		(.07526)				
3	.27604			.55825	1.48	8.60	.52
	(.81537)			(.19033)			
4	4.19767	−.00234	−.00425		1.20	5.47	.61
	(.57062)	(.00074)	(.05345)				
5	2.44104	−.00165		.31214	1.76	8.88	.72
	(1.18193)	(.00075)		(.19127)			
6	1.95851	−.00131	−.04496	.39414	1.97	5.98	.75
	(1.32272)	(.00086)	(.05139)	(.21596)			

[a] Y29PC = per capita income in 1929 dollars.

[b] PDOT = previous ten year average annual rate of wholesale price increase.

[c] R = interest rate on American railroad bonds adjusted to make them comparable to U.S. Government long-term bond rate for early years; U.S. Government long-term bond rate for later years.

The equations in Table 1 do appear to suggest the conclusion that money is a superior good. However, as indicated in Table 2, confidence in this conclusion is not warranted. Perhaps the most startling equation of this table is the first which includes percent urban as a regressor along with real per capita income. With the inclusion of PURB, higher income is seen to result in greater velocity and the Durbin-Watson statistic indicating less serial correlation suggests improved model specification. The income effect is nearly significant in spite of the few degrees of freedom and high multicollinearity. Qualitatively similar results obtain throughout Table 2, with the other independent variables taking on their expected signs in all cases. Of course, the high correlations among the regressors preclude accurate appraisal of the significance of the variables, although PURB is in all cases significantly different from zero. However, the qualitatively robust positive sign on income in all of the regressions of Table 2 supports the view that the cross-sectional findings are correct. Rising income over time appears to be associated with rising velocity, not falling velocity as previously inferred. Of course, with only ten observations and a time trend common to all variables it is very difficult to draw firm conclusions from these data.

III. CROSS-COUNTRY RESULTS

Perlman (1966), (1970) examines the liquid asset holdings of forty-seven countries (nearly all of which were observed in two time periods, 1952-56 and 1957-61) and concludes that "differences among countries in liquid asset portfolios can be explained by the use of those variables entering into a capital theory model of the demand for assets and, what is more striking, that the actual coefficients of the explanatory variables are within a plausible range of those found in national time series studies" (1970, p. 299).

The results in Table 3 are essentially those reported by Perlman. *C* and *D* (*CD* being their sum) are currency and demand (including time and savings) deposits where the latter are in fact very inclusive — only deposits tied to a price index or an exchange rate are excluded. Following Perlman the assets are here expressed as number of weeks of income held, on average, in each form. For the countries as a whole the mean number of weeks of income held in currency plus the various deposit types was 22 weeks.

The regressions in Table 3 would appear to lend powerful support to the contention that velocity falls with rising income. A one percent increase in income is associated with a .3 to .4 percent increase in the number of weeks of income held in the form of currency plus deposits. Since a coefficient of zero on this variable would indicate that the number of weeks of income held was independent of income — that the income elasticity of demand for *CD* was unity — the income elasticity of demand

TABLE 2

Time Series Results including Socio-Demographic Variables.
Velocity of Friedman-Defined Money (VELMON) is the Dependent Variable.
Standard Errors in Parentheses. 10 observations.

Equation	Constant	Y29PC	PURB[a]	MEDAGE[b]	SCH[c]	HOUSIZE[d]	D-W	F	R^2
1	7.54782	.00355	−15.9605				2.16	25.56	.88
	(.90272)	(.00154)	(4.0294)						
2	12.5453	.00162		−.44562			1.61	11.93	.77
	(3.7418)	(.00186)		(.19844)					
3	9.7588	.00392	−13.4253	−.14645			2.08	16.25	.89
	(3.0163)	(.00166)	(5.2973)	(.19006)					
4	7.1924	.00125	−12.1554	−.22192	.08893		3.25	32.68	.96
	(2.0826)	(.00136)	(3.3888)	(.12308)	(.02830)				
5	4.13725	.00145	−12.0896	−.18482	.09183	.40598	3.20	21.05	.96
	(19.8282)	(.00199)	(3.8012)	(.27570)	(.03667)	(2.6167)			

[a] PURB = percentage of U.S. population living in urban areas

[b] MEDAGE = median age of the population

[c] SCH = school enrollment rates per hundred

[d] HOUSIZE = population per household

TABLE 3

International Liquidity Comparisons, ignoring Socio-Demographic Variables.
(The Perlman regressions with slightly different data*).
Standard Errors in Parentheses.

Dependent Variable	Constant	Ln Y	PDOT	R	d.f.	F	R^2
Main Sample							
Ln C	1.69761	.01292	−1.32776		89	4.69	.10
	(.25002)	(.04171)	(.45258)				
Ln D	−.76300	.58680	−2.12187		89	70.22	.61
	(.33610)	(.05607)	(.60841)				
Ln CD	.70238	.40489	−1.83078		89	53.29	.54
	(.27617)	(.04607)	(.49991)				
Small Sample**							
Ln C	2.49785	−.04266		−.08554	41	2.95	.13
	(.36421)	(.05015)		(.03757)			
Ln D	.27875	.49052		−.08026	41	49.15	.71
	(.36810)	(.05068)		(.03797)			
Ln CD	1.60996	.33843		−.09175	41	38.21	.65
	(.29938)	(.04122)		(.03088)			

*I was unable to exactly duplicate the Perlman data from the sources given in 1970. The results are also transformed differently, natural logarithms being used here, while Perlman employs base 10. In all cases, qualitative results are virtually unaffected.

**The small sample reflects the unavailability of data on interest rates for about half of the countries of the total sample.

for broadly-defined cash balances is found by adding 1 to the coefficient of *Ln Y* in the regressions of Table 3. Hence, a rising income evidently is associated very significantly (*t*-values of about 8) with a falling velocity.

But again all is not what it at first seems. Indeed, Perlman noted that inclusion of dummy variables for whether the country was European, Asian, or Latin American markedly altered the positive effect of income on *CD* balances. He employed a variable measuring the percent of people living in cities of greater than 20,000 but did not pursue in depth the question of omitted social and demographic variables underlying the dummy variables.

Yet one would expect, and in fact observes, important social and demographic differences between the various countries of this sample. The inhabitants of the European countries are older on average, better educated, less concentrated in agriculture and have smaller families than

their counterparts in Latin America or Asia. Further, the former countries tend to have more equal income distributions as measured by Gini coefficients.

Table 4 incorporates these socio-demographic considerations into the analysis, examining for brevity only the case of LnCD dependent (the results for C alone provide little support for the luxury good argument). One of the striking observations in this table is that inclusion of median age alone reveals an (insignificant) estimated income effect of only about one-fourth of its previously estimated magnitude. Including percent literate, an education proxy, in the regression show the estimated income effect to be only one-tenth of its former value although clearly insignificantly different from zero. Inclusion of the other socio-demographic variables discussed in Section I reverses the qualitative impact of income on the demand for proportional cash balances. The coefficient on income is, however, in no case significantly different from zero (due, in part, to the multicollinearity evidenced in the simple correlations given in the Appendix for these data).[1]

IV. CROSS-SECTIONAL RESULTS

The numerous cross-sectional studies already cited strongly indicate that increasing wealth or income leads to smaller average cash balances, equivalently that velocity rises with measured values of these variables. However this evidence may be questioned since it may reflect behavior based on transitory rather than permanent income or wealth.

A preliminary inquiry into this issue was undertaken by forming wealth cohorts from cross-sectional data, initially ignoring age and education.[2] The results are presented in Table 5 where "Liqpro" is liquid asset proportion and "Stkpro" is the proportion of wealth in corporate stock. These findings suggest that it is not merely high fixed transactions costs which prevent the less-wealthy from holding lower proportions of their wealth in cash form, since the proportion of wealth in liquid form continues to decline with increasing wealth even among the highest wealth cohorts. Indeed, since liquid assets are here more broadly defined than even Friedman money (including all savings deposits and U.S. Savings bonds in addition to checking deposits) this result is all the

1. The rate of interest is not in these equations because to do so would result in an important loss of sample size. This omission makes no qualitative difference and, of course, PDOT should pick up some of the interest rate effect. An anonymous referee has correctly noted that the changing transaction technology and variety of money substitutes over time have been ignored in the text analysis. If one can regard a simple time trend as capturing the net effect of all omitted exogenous variables which are correlated with income, the effect of income on velocity holding time constant is .0038 which is similar to the effect found in Equations 1 and 3 in Table 2.

2. These data are from the 1962 *Survey of Financial Characteristics of Consumers* and are fully described by Projector and Weiss (1966).

TABLE 4

International Liquidity Comparisons Incorporating Socio-Demographic Variables.
Standard Errors in Parentheses. CD dependent variable.

Equation	Constant	Ln Y	PDOT	MEDAGE[a]	LITERAT[b]	MALFARM[c]	GINI[d]	HOUSE[e]	d.f.	F	R^2
1	1.02302	.08647	−1.70904	.06444					88	60.30	.67
	(.24180)	(.06704)	(.42686)	(.01099)							
2	1.15548	.03919	−1.89927	.05887	.00380				87	45.92	.68
	(.26293)	(.07664)	(.45143)	(.01181)	(.00302)						
3	1.76450	−.00345	−1.91925	.05574	.00246	−.00454			86	37.17	.68
	(.58211)	(.08469)	(.45079)	(.01209)	(.00322)	(.00387)					
4	2.45681	−.12928	−1.91493	.06023	.00333	−.00619	−.00251		72	26.63	.69
	(.86771)	(.12816)	(.50060)	(.01478)	(.00359)	(.00577)	(.00608)				
5	3.08899	−.08747	−1.69790	.04312	.00316	−.00466	−.00215	−.12428	61	20.38	.70
	(1.41779)	(.13259)	(.53528)	(.02373)	(.00383)	(.00634)	(.00686)	(.14291)			

[a] MEDAGE = Median age.

[b] LITERAT = percent of population that is literate.

[c] MALFARM = percent of male labor force devoted to agriculture.

[d] GINI = Gini coefficient of income inequality (larger numbers imply more unequal income distribution).

[e] HOUSE = Number of people per household.

TABLE 5

Wealth Cohort Analysis of Survey of Financial Characteristics of Consumers Cross-Sectional Data

Wealth Class	Number of Observations	Mean Value (LIQPRO)	Mean Value (STKPRO)	Mean Value (WEALTH)
0-499	472	.970	.016	178
500-999	181	.872	.048	718
1000-1499	111	.824	.050	1,194
1500-2499	130	.817	.064	1,963
2500-3499	102	.742	.113	3,002
3500-4999	100	.662	.116	4,179
5000-6999	106	.637	.142	5,866
7000-9999	100	.578	.176	8,388
10000-14999	138	.498	.162	12,317
15000-24999	121	.457	.224	19,293
25000-39999	112	.402	.264	31,638
40000-59999	74	.366	.347	49,106
60000-89999	79	.318	.384	72,788
90000-129999	52	.167	.483	108,780
130000-179999	58	.204	.368	150,199
180000-279999	60	.150	.423	226,260
280000-419999	63	.115	.548	348,819
420000-619999	52	.143	.599	499,491
620000-999999	50	.109	.558	787,624
1000000-1799999	34	.073	.589	1,316,891
1800000-23362800	44	.045	.670	4,463,094

more surprising. A regression using the cohort mean values for dependent and independent variables yields the following:

$$\text{Liqpro} = .49223 - \underset{(.00006)}{.00015}\,(\text{Wealth}) \qquad R^2 = .24$$

where wealth is in thousands of dollars.

The preceding results are subject to one serious flaw for the purpose of meaningful comparison with the time series and cross-country findings. It could be argued that the low financial wealth groups in Table 5 in fact represent younger and better educated individuals.

Hence, in spite of their low current financial wealth, the permanent wealth of such individuals may actually be greater than that of those in the higher financial wealth groups.

To examine this possibility in greater detail, age-education-wealth cohorts were formed with three age and education groups and 15 wealth classifications. The age and education categories are as follows:

A_1 = 20 - 39 years old (the young group)

A_2 = 40 - 59 years old (the middle age peak earning years)

A_3 = 60 and over (the old and retired)

E_1 = 0 - 19 years of formal education (sum of husband and wife[3])

E_2 = 20 - 24 years of formal education (this includes two high school graduates and other such combinations)

E_3 = 25 and over years of formal education

Table 6 presents the wealth classifications in the first column with the number of observations in each cohort being displayed in the remainder of the table. Mean values for liquid asset proportion, age, education and wealth were calculated for each cohort containing observations (119 of the 135 age-education-wealth cohorts contain one or more observations, most many more). A regression on these means yielded

$$\underset{}{\text{Liqpro}} = \underset{}{.67908} + \underset{(.00206)}{.00169\ (\text{Age})} - \underset{(.00004)}{.00020\ (\text{Wealth})} - \underset{(.00466)}{.00849\ (\text{Education})} \qquad R^2 = .214$$

Two things are noteworthy about this regression result. First, the wealth coefficient remains significantly negative, indicating increasing velocity as financial wealth (or income) rises. Second, the results actually conflict with the notion that a more inclusive permanent wealth measure would yield declining velocity with increased wealth. That is, surely a younger and more highly educated individual would have greater permanent wealth, holding financial wealth constant. But the preceding regression results argue that if anything such an individual would hold relatively *less* liquid assets, not more as would be inferred from the unrevised Friedman and Perlman empirical results.

3. Results were similar for head's education alone, however, the sum of the two better represents family wealth since the value of spouse home or market production is included. If education is viewed as a taste shifter rather than as a wealth proxy *per se*, then the sum still is appropriate if portfolio decisions are democratically, rather than chauvinistically, made.

TABLE 6

Age-Education-Wealth Cohorts; Number of Observations per cell

Wealth	(A_1, E_1)	(A_2, E_1)	(A_3, E_1)	(A_1, E_2)	(A_2, E_2)	(A_3, E_2)	(A_1, E_3)	(A_2, E_3)	(A_3, E_3)
0-399	42	42	19	102	49	6	43	13	3
400-799	7	11	11	32	26	3	27	9	1
800-1499	1	18	11	25	31	6	29	21	0
1500-2499	5	14	7	13	26	4	19	17	1
2500-3999	2	14	11	7	24	8	18	23	3
4000-5999	0	13	7	7	21	2	17	22	2
6000-9999	0	10	16	7	25	6	10	25	3
10000-14999	1	10	10	14	24	10	11	34	3
15000-24999	0	8	13	2	18	8	16	27	8
25000-39999	0	6	8	4	13	7	11	33	10
40000-89999	0	5	12	1	16	2	8	57	18
90000-179999	0	4	5	3	14	6	5	46	13
180000-419999	0	0	2	0	7	15	6	47	28
420000-999999	0	0	3	0	7	12	3	35	27
1000000 and up	0	0	3	0	3	4	1	28	26

V. SUMMARY AND CONCLUSIONS

In this paper the empirical evidence which has been taken to imply that the velocity of money declines with income is shown to suffer from omitted variable bias. Inclusion of social and demographic variables affecting the demand for money reveals that the velocity of money may actually rise with income. This finding is consistent with the ubiquitous cross-sectional finding that money is a normal, but not a superior, good. Further, the cross-sectional results were found to be robust to choice of permanent versus transitory wealth.

A conservative reading of the regression results presented here would allow the velocity of money to be independent of income. This reading is particularly conservative in view of Meltzer's (1963) finding that "the 'luxury' proposition holds only when money is defined to include time or savings deposits." Since money is here broadly defined, if one prefers a narrower definition of money, the case that velocity rises with income becomes even more compelling. However this view suggests that the rate of inflation resulting from a given monetary policy would depend only on the rate of growth of money and of income, but not on changing asset behavior as income changed. In portfolio theory, such a conservative reading would imply constant relative risk aversion — the asset proportions selected would be independent of wealth. This "homogeneity risk postulate" in the face of wealth changes is consistent with the Bernouilli utility function put forward as plausible in the eighteenth century. Should the reader find the introduction or interpretation of any of the variables here to be contrived, such a conservative reading of the data might be warranted. If so, considerable simplicity and streamlining of monetary and portfolio theory would be forthcoming.

APPENDIX

The Time Series: Supplementary Information

1) Data List:

YEAR	VELMON	Y29PC	PDOT	R	PURB	MEDAGE	SCH	HOUSIZE
1870	4.12	223	4.5	7.32	.257	20.2	48.4	5.09
1880	4.97	327	−2.6	5.00	.282	20.9	57.8	5.04
1890	2.93	396	−1.8	3.95	.351	22.0	54.3	4.93
1900	2.53	496	.0	3.29	.397	22.9	50.5	4.76
1910	2.20	608	2.5	3.58	.457	24.1	59.2	4.54
1920	2.20	688	12.0	5.32	.512	25.3	64.3	4.34
1930	1.70	772	−4.4	3.29	.562	26.5	69.9	4.11
1940	1.51	916	−.8	2.26	.565	29.0	74.8	3.77
1950	1.43	1233	10.2	2.32	.640	30.2	78.7	3.52
1960	1.69	1424	1.7	4.01	.699	29.5	88.6	3.35

2) Means and Standard Deviations:

	Mean	Standard Deviation
VELMON	2.53	1.18
Y29PC	708.30	389.97
PDOT	2.13	5.40
R	4.03	1.52
PURB	.47	.15
MEDAGE	25.06	3.65
SCH	64.65	13.12
HOUSIZE	4.34	.64

3) Simple Correlations:

	YEAR	VELMON	Y29PC	PDOT	R	PURB	MEDAGE	SCH	HOUSIZE
YEAR	1.000	−.876	.972	.223	−.667	.995	.985	.942	−.987
VELMON		1.000	−.781	−.224	.720	−.888	−.865	−.683	.826
Y29PC			1.000	.264	−.580	.966	.956	.961	−.983
PDOT				1.000	.188	.251	.256	.154	−.249
R					1.000	−.632	−.689	−.519	.609
PURB						1.000	.971	.929	−.977
MEDAGE							1.000	.931	−.988
SCH								1.000	−.962
HOUSIZE									1.000

The Cross-Country Data: Supplementary Information

1) Means and Standard Deviations:

	Mean	Standard Deviation
C	5.90	2.61
D	16.39	12.56
CD	22.29	13.48
Y	509.47	502.51
PDOT	.065	.095
R	4.59	1.22
MEDAGE	23.25	6.27
LITERAT	73.75	24.41
MALFARM	42.12	22.23
GINI	23.42	11.50
HOUSIZE	4.19	1.25

2) Simple Correlations

	C	D	CD	Y	PDOT	R	MEDAGE	LITERAT	MALFARM	GINI	HOUSIZE
C	1.000	.259	.435	.047	−.239	−.336	.394	−.055	−.221	−.283	−.396
D		1.000	.982	.682	−.275	−.151	.759	.676	−.670	−.574	−.442
CD			1.000	.644	−.302	−.222	.784	.641	−.667	−.587	−.485
Y				1.000	−.197	−.054	.747	.707	−.812	−.606	−.497
PDOT					1.000	.062	−.182	.027	.090	.034	.247
R						1.000	.078	.330	−.074	−.059	.152
MEDAGE							1.000	.769	−.796	−.721	−.612
LITERAT								1.000	−.821	−.578	−.353
MALFARM									1.000	.710	.542
GINI										1.000	.456
HOUSIZE											1.000

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