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Les Maîtres du Monde: The G-7's Path to Prominence, 1885–1994

Henri Theil and Charles B. Moss

Purchasing power parity–based data for gross domestic products are used to assess the affluence of the G-7 countries in the period 1885–1994. A simple Cobb-Douglas model is developed for the eligibility to this Group of Seven.

Key Words: eligibility coefficient, income inequality, purchasing power parity

This short article is concerned with the G-7 countries: the United States, Japan, Canada, United Kingdom (UK), France, Germany, and Italy. Recent developments have raised the importance of meetings of the leaders of these countries such that some French speakers refer to them as "les maîtres du monde." [1]

We will use Angus Maddison's data to provide a historical background. Annual data for the seven countries are available for the period 1885–1994.[2] Gross domestic product (GDP) per capita for each country is available in 1990 Geary-Khamis dollars. Column 2 of Table 1 shows the GDP per capita for the seven countries jointly, obtained by weighting the figures for the individual countries proportionately to their populations. Column 3 gives the GDP per capita for the United States, whereas column 4 shows the results for the six other countries jointly. These three columns are illustrated in Figure 1, which uses a semilogarithmic scale.

Clearly, the per capita GDP of the United States exceeded that of the other six in every year, but this does not hold for each of the other six individually. Maddison's data (pp. 196–7) show that the UK values exceeded those of the United States in every year throughout the 19th century; it was only in the first decade of the 20th century that the United States started to exceed the UK in most years. From 1936 onward, the United States has been the undisputed winner among the G-7.

An Inequality Analysis

Column 5 of Table 1 presents the inequality, J, of the per capita GDPs of the G-7, defined as the natural log of the ratio of their arithmetic mean to the geometric mean;[3] both are weighted means with weights equal to the population shares of the seven countries. The value of J fluctuated around 0.1 from the mid-1880s until the early 1930s. It declined sub-

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[1] The expression is used in *L'Express* of 4 July 1996 (page 70). We prefer not to translate it because doing so would lead to a loss of alliteration.

[2] The figures for the last 2 years (1993 and 1994) are extrapolations. There are no annual data for Japan prior to 1885. All data have been corrected for border changes; thus, France is considered as including Alsace-Lorraine (also prior to World War I), Germany as the Federal Republic (with 1989 borders), and so on.

[3] For a justification of this inequality measure and for further references, see Theil and Seale 1994.

Table 1. Summary Measures for the G-7

	Per Capita GDP			Inequalities				
Year	All G-7	USA	Other Six	All G-7	Between Groups	Average Within Group	Among Six	U.S. Population Share
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1885	2,365	3,269	2,069	0.1098	0.0209	0.0888	0.1180	24.7
1886	2,403	3,295	2,106	0.1008	0.0201	0.0807	0.1076	25.0
1887	2,463	3,372	2,155	0.1006	0.0203	0.0803	0.1075	25.3
1888	2,468	3,284	2,187	0.1068	0.0167	0.0901	0.1210	25.6
1889	2,538	3,416	2,233	0.1120	0.0184	0.0935	0.1261	25.8
1890	2,574	3,396	2,284	0.0997	0.0161	0.0836	0.1131	26.1
1891	2,587	3,471	2,271	0.1069	0.0186	0.0884	0.1200	26.3
1892	2,655	3,732	2,265	0.1086	0.0261	0.0824	0.1123	26.6
1893	2,611	3,482	2,292	0.0993	0.0182	0.0810	0.1108	26.9
1894	2,635	3,318	2,381	0.0900	0.0114	0.0786	0.1078	27.1
1895	2,744	3,648	2,405	0.0986	0.0183	0.0804	0.1106	27.3
1896	2,744	3,509	2,454	0.1033	0.0134	0.0899	0.1240	27.5
1897	2,815	3,774	2,447	0.1113	0.0199	0.0914	0.1264	27.7
1898	2,918	3,784	2,583	0.0934	0.0154	0.0779	0.1081	27.9
1899	3,038	4,056	2,640	0.1090	0.0197	0.0893	0.1242	28.1
1900	3,064	4,096	2,657	0.1028	0.0201	0.0828	0.1154	28.3
1901	3,166	4,469	2,647	0.1064	0.0298	0.0766	0.1071	28.5
1902	3,147	4,426	2,633	0.1156	0.0295	0.0861	0.1207	28.7
1903	3,216	4,556	2,672	0.1095	0.0312	0.0783	0.1101	28.9
1904	3,187	4,415	2,684	0.1059	0.0272	0.0788	0.1110	29.1
1905	3,293	4,648	2,732	0.1132	0.0312	0.0821	0.1161	29.3
1906	3,491	5,085	2,823	0.1119	0.0386	0.0733	0.1040	29.5
1907	3,557	5,071	2,917	0.1038	0.0340	0.0698	0.0093	29.7
1908	3,372	4,566	2,863	0.0892	0.0241	0.0651	0.0929	29.9
1909	3,562	5,023	2,932	0.0990	0.0324	0.0666	0.0953	30.1
1910	3,539	4,970	2,915	0.1017	0.0319	0.0697	0.1001	30.3
1911	3,652	5,052	3,038	0.0967	0.0290	0.0677	0.0973	30.5
1912	3,765	5,207	3,128	0.0977	0.0292	0.0685	0.0987	30.6
1913	3,845	5,307	3,192	0.0997	0.0292	0.0705	0.1020	30.9
1914	3,567	4,805	3,008	0.0955	0.0247	0.0708	0.1027	31.1
1915	3,668	4,870	3,121	0.0916	0.0223	0.0693	0.1008	31.3
1916	3,985	5,465	3,302	0.0881	0.0289	0.0592	0.0865	31.6
1917	3,900	5,254	3,265	0.0846	0.0258	0.0587	0.0863	31.9
1918	3,980	5,666	3,178	0.1020	0.0386	0.0634	0.0935	32.2
1919	3,864	5,687	2,995	0.0903	0.0478	0.0426	0.0629	32.3
1920	3,801	5,559	2,956	0.0893	0.0464	0.0429	0.0635	32.5
1921	3,702	5,329	2,915	0.0726	0.0423	0.0303	0.0449	32.6
1922	3,911	5,546	3,115	0.0752	0.0387	0.0366	0.0544	32.7
1923	4,095	6,171	3,078	0.0950	0.0568	0.0382	0.0569	32.9
1924	4,251	6,240	3,264	0.0911	0.0493	0.0418	0.0626	33.2
1925	4,371	6,290	3,415	0.0862	0.0437	0.0425	0.0637	33.2
1926	4,443	6,610	3,360	0.0951	0.0539	0.0412	0.0617	33.3
1927	4,542	6,584	3,515	0.0948	0.0463	0.0485	0.0729	33.5
1928	4,632	6,577	3,651	0.0854	0.0407	0.0447	0.0673	33.5
1929	4,805	6,907	3,741	0.0900	0.0442	0.0458	0.0689	33.6
1930	4,458	6,220	3,564	0.0880	0.0364	0.0516	0.0778	33.7

Table 1. Continued

Year (1)	Per Capita GDP			Inequalities				U.S. Population Share (9)
	All G-7 (2)	USA (3)	Other Six (4)	All G-7 (5)	Between Groups (6)	Average Within Group (7)	Among Six (8)	
1931	4,133	5,698	3,340	0.0783	0.0334	0.0449	0.0677	33.6
1932	3,818	4,914	3,263	0.0567	0.0195	0.0372	0.0561	33.6
1933	3,867	4,783	3,403	0.0486	0.0133	0.0353	0.0531	33.6
1934	4,042	5,120	3,497	0.0571	0.0168	0.0403	0.0607	33.6
1935	4,240	5,473	3,619	0.0608	0.0198	0.0410	0.0616	33.5
1936	4,598	6,211	3,786	0.0702	0.0286	0.0417	0.0627	33.5
1937	4,786	6,438	3,955	0.0697	0.0276	0.0420	0.0632	33.5
1938	4,748	6,134	4,050	0.0597	0.0200	0.0397	0.0598	33.5
1939	5,069	6,568	4,313	0.0520	0.0205	0.0315	0.0473	33.5
1940	5,237	7,018	4,335	0.0624	0.0271	0.0354	0.0533	33.6
1941	5,690	8,215	4,401	0.0941	0.0459	0.0482	0.0728	33.8
1942	6,214	9,753	4,400	0.1322	0.0755	0.0567	0.0857	33.9
1943	6,820	11,532	4,381	0.1763	0.1125	0.0639	0.0969	34.1
1944	6,962	12,348	4,153	0.2244	0.1431	0.0813	0.1237	34.3
1945	6,223	11,722	3,341	0.3232	0.1904	0.1328	0.2024	34.4
1946	5,313	9,207	3,276	0.2345	0.1287	0.1059	0.1613	34.4
1947	5,323	8,896	3,438	0.2012	0.1088	0.0923	0.1410	34.5
1948	5,515	9,075	3,637	0.1808	0.1005	0.0803	0.1227	34.5
1949	5,633	8,954	3,877	0.1628	0.0841	0.0788	0.1204	34.6
1950	6,037	9,573	4,159	0.1575	0.0835	0.0740	0.1134	34.7
1951	6,467	10,338	4,397	0.1546	0.0879	0.0666	0.1023	34.8
1952	6,691	10,596	4,587	0.1423	0.0844	0.0579	0.0891	35.0
1953	6,916	10,810	4,803	0.1345	0.0792	0.0553	0.0853	35.2
1954	6,953	10,549	4,988	0.1216	0.0675	0.0541	0.0836	35.3
1955	7,304	10,948	5,296	0.1159	0.0635	0.0524	0.0813	35.5
1956	7,465	10,970	5,518	0.1063	0.0568	0.0495	0.0770	35.7
1957	7,616	10,981	5,731	0.0964	0.0509	0.0455	0.0710	35.9
1958	7,620	10,746	5,856	0.0857	0.0443	0.0414	0.0647	36.1
1959	7,952	11,145	6,137	0.0807	0.0428	0.0378	0.0593	36.2
1960	8,238	11,193	6,546	0.0676	0.0346	0.0330	0.0520	36.4
1961	8,525	11,285	6,925	0.0567	0.0287	0.0280	0.0442	36.7
1962	8,878	11,796	7,189	0.0525	0.0295	0.0230	0.0363	36.7
1963	9,199	12,137	7,493	0.0478	0.0280	0.0199	0.0314	36.7
1964	9,685	12,687	7,934	0.0435	0.0265	0.0170	0.0269	36.8
1965	10,092	13,316	8,206	0.0447	0.0282	0.0165	0.0262	36.9
1966	10,583	14,017	8,569	0.0421	0.0292	0.0129	0.0205	37.0
1967	10,880	14,225	8,912	0.0351	0.0263	0.0088	0.0140	37.0
1968	11,424	14,719	9,480	0.0293	0.0233	0.0060	0.0095	37.1
1969	11,911	15,028	10,072	0.0235	0.0192	0.0043	0.0068	37.1
1970	12,147	14,854	10,544	0.0172	0.0141	0.0031	0.0050	37.2
1971	12,425	15,158	10,803	0.0171	0.0137	0.0033	0.0053	37.3
1972	12,964	15,846	11,250	0.0171	0.0141	0.0030	0.0048	37.3
1973	13,653	16,607	11,894	0.0160	0.0133	0.0027	0.0042	37.3
1974	13,589	16,362	11,935	0.0148	0.0119	0.0029	0.0046	37.4
1975	13,451	16,060	11,889	0.0136	0.0108	0.0028	0.0045	37.5
1976	14,039	16,773	12,393	0.0141	0.0110	0.0031	0.0049	37.6

Table 1. Continued

Year (1)	Per Capita GDP: All G-7 (2)	Per Capita GDP: USA (3)	Per Capita GDP: Other Six (4)	Inequalities: All G-7 (5)	Inequalities: Between Groups (6)	Inequalities: Average Within Group (7)	Inequalities: Among Six (8)	U.S. Population Share (9)
1977	14,544	17,461	12,778	0.0146	0.0117	0.0029	0.0047	37.7
1978	15,083	18,168	13,205	0.0150	0.0122	0.0028	0.0045	37.8
1979	15,539	18,489	13,730	0.0131	0.0106	0.0025	0.0040	38.0
1980	15,576	18,270	13,914	0.0111	0.0089	0.0021	0.0035	38.2
1981	15,782	18,569	14,051	0.0115	0.0094	0.0022	0.0035	38.3
1982	15,649	18,027	14,163	0.0086	0.0070	0.0016	0.0027	38.5
1983	16,013	18,547	14,420	0.0091	0.0076	0.0015	0.0025	38.6
1984	16,686	19,597	14,844	0.0110	0.0093	0.0017	0.0027	38.8
1985	17,147	20,050	15,300	0.0105	0.0088	0.0016	0.0026	38.9
1986	17,532	20,426	15,678	0.0099	0.0085	0.0015	0.0024	39.0
1987	17,986	20,880	16,121	0.0093	0.0081	0.0012	0.0019	39.2
1988	18,669	21,463	16,860	0.0083	0.0071	0.0012	0.0020	39.3
1989	19,106	21,783	17,365	0.0074	0.0062	0.0012	0.0019	39.4
1990	19,404	21,866	17,806	0.0065	0.0051	0.0014	0.0022	39.4
1991	19,360	21,366	18,051	0.0054	0.0034	0.0020	0.0033	39.5
1992	19,459	21,558	18,086	0.0058	0.0037	0.0021	0.0034	39.5
1993	19,553	21,972	17,964	0.0068	0.0049	0.0019	0.0031	39.7
1994	19,940	22,569	18,206	0.0071	0.0056	0.0015	0.0026	39.7

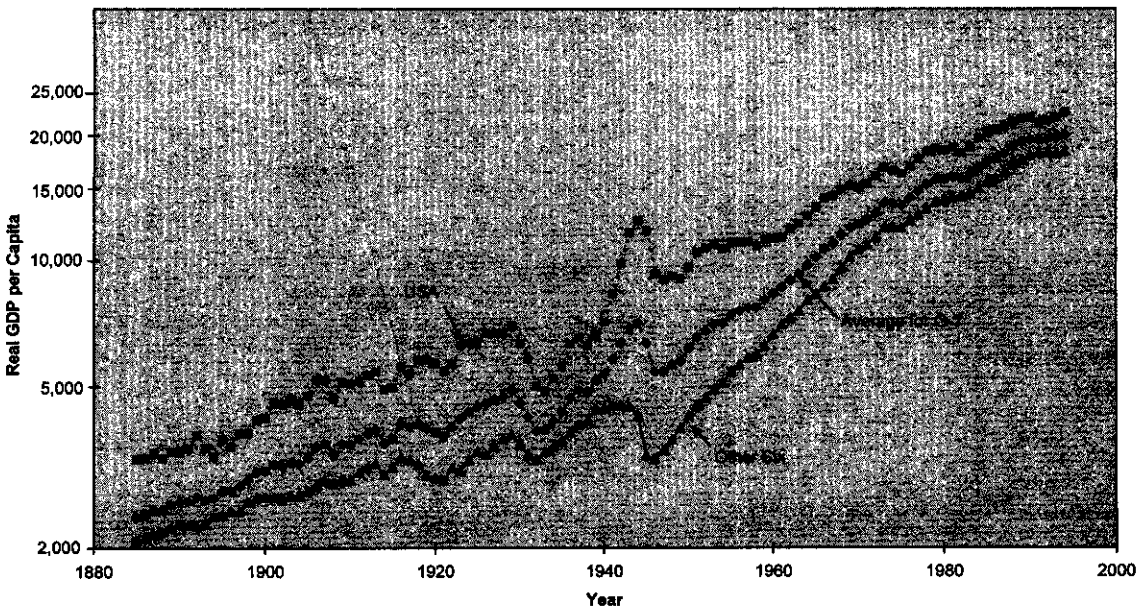

Figure 1. Average G-7 Real GDP Per Capita

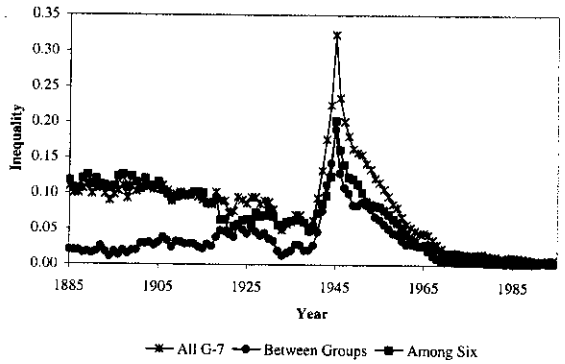

Figure 2.

stantially during the Great Depression but went up during World War II even faster. The all-time high is $J \approx 0.32$ in 1945, which reflects the different fates of winners and losers. Development after 1945 amounts to a sharp decline, resulting in values of $J < 0.01$ after 1985. Of course, such small values mean that the G-7 have nearly equal per capita GDPs. A picture of J is presented in Figure 2.

As in Figure 1, it is instructive to extend the inequality analysis to two groups of countries: the United States (a one-country group) and the other six. It is easy to show that J is the sum of two components, $J_G + \bar{J}$, where J_G is the inequality between the two groups (United States vs. other six) and $\bar{J}$ is the average within-group inequality (a weighted average with weights equal to the population shares of the two groups). We show J_G and $\bar{J}$ in columns 6 and 7, respectively, of Table 1. The latter dominates the former prior to 1919, whereas the reverse has been true since 1942. Both decline sharply toward the end of the period. Therefore, the per capita GDPs of the other six converged to that of the United States, and they also converged to each other.[4]

The last column of Table 1 contains the population share of the United States among the G-7 in percentage form. It increases from almost 25% to almost 40%, which reflects the fact that the United States is an immigration country.

Who Is Eligible?

Theil and Seale noted that the G-7 is not a club of the richest countries. Norway, Switzerland, and Australia all have per capita GDPs exceeding that of Italy in 1990 (Italy is the least affluent of the G-7), but those three countries have populations well below that of Canada (which has the smallest population among the G-7). Thus, Theil and Seale argue that the G-7 is the club of the most populous countries among those that satisfy a minimum standard of affluence. In other words, to qualify as a member of the G-7 a country should be both sufficiently rich and sufficiently large; if a country fails in either respect, it does not qualify.

In this section, we pursue a slightly different approach. Affluence and size could be substitutes for each other. A country could be less affluent than Italy, but its population could be much larger so that it would merit a seat. To formalize this idea, we imagine that each nation produces an output called eligibility and written as E, and that it uses two inputs for this purpose: population (P) and GDP per capita (G). Let the technology be Cobb-Douglas with a constant return to scale, $E = P^{\delta}G^{1-\delta}$, where $0 < \delta < 1$. We measure population and GDP per capita in units equal to the U.S. values so that the United States has unitary eligibility. Below are shown the implied eligibilities of each G-7 country in 1970 and 1990, based on the specification $\delta = .2$.

	1970	1990
United States	1.000	1.000
Japan	0.608	0.761
Canada	0.527	0.585
UK	0.592	0.589
France	0.619	0.630
Germany	0.658	0.670
Italy	0.535	0.579

Our comments are as follows:

(1) The specification $\delta = .2$ is a bit arbitrary, but the reader can easily experiment

[4] Column 8 of Table 1 shows the inequality among the other six, whereas column 7 gives the *average* within-group inequality. The inequality within the other group is of course zero (because this group consists of only one country).

with different numerical values. It is clear, however, that δ should be small, because the relative variation of G among the G-7 is so much smaller than that of P. In particular, $\delta = .5$ (which is equivalent[5] to the statement "We have an X-billion dollar economy!") is out of the question.

(2) The figures for 1970 indicate that Canada (the least populous country) and Italy (the least affluent) would not be elected if the critical value were set at $E = 0.55$. This agrees with the fact that these two countries were not invited for the meetings in the 1970s prior to those of the G-7. However, both would be included at $E = 0.55$ for 1990.

(3) How does a very populous but poor country such as India fare under this criterion? Answer: very poorly, because $\delta = .2$ yields an Indian value of $E = 0.150$ in 1970 and $E = 0.135$ in 1990. Basically, the present composition of the G-7 indicates to the rest of the world that if a country has a very low per capita GDP, its government should devote its energies to domestic rather than global problems even when the population is large.[6] Such countries are not among the "maîtres du monde."

[5] For $\delta = .5$, the Cobb-Douglas formulation amounts to an E equal to the square root of the country's total GDP on a purchasing power parity basis. Because the square-root transformation is monotonic, this proves the equivalence.

[6] Problems of a different kind arise in the analysis of communist or formerly communist countries. China provides an example: an article in *The Economist* of 30 April 1994 (p. 78) discusses per capita GDP values for this country in 1990 ranging from $1,000 to $2,600. These problems continue: a later article in the same journal (12 October 1996, p. 35) mentions that the World Bank lowered China's 1994 GDP per capita, measured on a purchasing power parity basis, from $2,500 to $1,800.

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