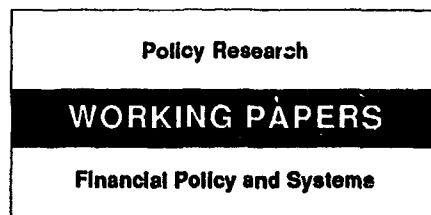


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Stock Market Development and Financial Deepening in Developing Countries

Some Correlation Patterns

Dong He
and
Robert Pardy

Correlation analysis of cross-sectional data from 32 countries for 1984-90 shows a significant relationship between stock market development and financial depth. But time-series data for 1978-90 show significant correlations only for Asian economies.

This paper — a product of the Financial Policy and Systems Division, Country Economics Department — is part of a larger effort in the department to promote the development of sound securities markets. Copies of this paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Priscilla Infante, room N9-005, extension 37665 (February 1993, 39 pages).

Programs to develop securities markets are now a common feature of World Bank financial sector loans. Stock market development in particular is receiving considerable attention, especially the legal and institutional underpinnings required for successful stock market development.

The financial underpinnings needed have received less study.

He and Pardy contribute to such a study by exploring the relationship between the degrees of financial depth and stock market development in an economy.

Using a simple indicator of stock market development and several indicators of financial depth, and using cross-sectional data from 32 developing countries for 1984-90, they find a strong correlation between the two factors.

Time-series data from 19 of these countries (for 1978-90) show similar correlations for most

Asian countries, but not for other countries in the sample. Also, the correlations of the Asian data are strongest after the mid-1980s.

He and Pardy test a “threshold hypothesis” that a certain level of financial depth may be necessary to allow stock market development to take off. They find that available data do not support the hypothesis.

The results suggest that financial depth is a significant factor in stock market development in most developing countries, but that country-specific factors (such as industrial policy and structure, foreign investment controls, and stock market regulatory and operational infrastructure) have an equally strong influence on stock market growth.

Case studies of economies in which stock market development has been successful would help elucidate the interplay between these factors.

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**Country Economics Department
The World Bank**

**STOCK MARKET DEVELOPMENT AND FINANCIAL DEEPENING
IN DEVELOPING COUNTRIES:
SOME CORRELATION PATTERNS**

Dong He and Robert Pardy

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I. Introduction

This paper is an empirical study of the relationship between the development of stock markets and the process of financial deepening. Specifically, it explores the correlation pattern between measures of stock market development and the development of the financial system in general.¹

Fostering stock market development has become an important element in the World Bank's financial sector operations. Structural adjustment loans now often contain conditions related to capital market development, and the Bank provides technical assistance to many member countries on the legal, regulatory and on other aspects of the institutional framework for the development of stock markets. Also, governments in many developing countries have adopted policies designed to promote stock market development.

But there may be a limit to the effectiveness of such policies when the financial depth of an economy is limited and industrial development is primitive (Cho, 1992). The development of the market requires well established industrial firms, sufficient savings and developed financial intermediaries, as well as well established legal, accounting, monitoring, and enforcement infrastructures.

The present paper seeks to explore the question of whether the degree of financial depth is a constraining factor in the development of stock markets. Its basic finding is that there is a significantly positive correlation between the level of stock market development and financial depth in a cross section of countries. Time series analysis shows that the

¹Andrew Sheng originally suggested this topic and he, Yoon Je Cho and Ross Levine provided helpful comments on earlier drafts of the paper. The research was undertaken by Dong He while a summer intern in CECFP under the guidance of Robert Pardy.

correlations are strong in the Asian economies but weak in other economies. We suggest that individual case studies should be helpful for us to understand the time path of the development of the stock markets in these economies. We also suggest some refinements to the measurement of stock market development. The paper is divided into six sections. Section II describes the data and variables used in the study, Section III reports the results of cross-sectional analysis and Section IV reports the results of time-series analysis. Section V offers some explanations for the observed patterns and Section VI provides some concluding remarks.

II. Data sources and compilation

The data sample includes 32 developing economies which are listed in the appendix. The sample is confined to the markets which are covered by the IFC Emerging Markets Data Base (EMDB), which includes 20 markets in the IFC's Composite Index and another 12 markets not in the IFC's Composite Index.

"Stock market development" and "financial depth" are multi-faceted concepts and there are a number of indicators which can be used to measure them. In this study, the ratio of market capitalization to GDP (MCY) is used as a measure of the degree of development of the stock market. Annual figures of market capitalization (as at end of year) are available in the EMDB from 1977 for the 20 markets in the IFC's Composite Index, and from 1982 for the other 12 markets not in the IFC's Composite Index. We use three indicators as base measures of the depth of the financial system. The data for the variables were retrieved from IFS data base.² The three variables are:

M1Y: The ratio of M1 to GDP. M1 is the sum of currency held outside of banks and demand deposits other than those of the central government (IFS line 34).

²The data for Taiwan are obtained from Statistical Yearbook of the Republic of China 1991, Directorate-General of Budget, Accounting and Statistics, Executive Yuan, Republic of China.

QMY: The ratio of Quasi-Money Liabilities of the monetary authorities and deposit money banks to GDP. Quasi-Money Liabilities comprise time, savings, and foreign currency deposits of resident sectors other than central government (IFS line 35).

DCPY: The ratio of Claims on the Private Sector by the Central Bank and Deposit Money Banks (domestic credit to the private sector) to GDP (IFS line 32d).

M1Y is commonly used as a measure of monetary depth, and QMY is used here as a measure of non-monetary financial depth. It would be more appropriate to include the quasi-liquid liabilities of both banks and non-banking financial institutions (NBFIs) in order to measure the overall financial depth of the economy. However, since data on the quasi-liquid liabilities of NBFIs are not readily available for most of the economies under study, only quasi-money is used. In addition, the ratio of claims on the private sector by the financial system to GDP is used both as a proxy for the size of bank assets and as an indicator of asset distribution since it excludes financial credit to the government and publicly owned enterprises (King and Levine, 1992). DCPY also measures the financing demands of the private sector.

We include the variable GNP per capita (GNPCAP) as an indicator of the general level of economic development. Relationships between this variable and other variables are discussed.

Also following King and Levine (1992), the problem of deflating stocks (Market Capitalization, M1, Quasi-Money, and DCP) - measured at the end of the period - by GDP flow - measured over the period - is mitigated by using the arithmetic average of this year's end-of-period and last year's end-of-period stock values. Thus, MCY in 1980 is the average of MC in 1979 and 1980, divided by GDP in 1980.

III. Cross-Country Correlations between Period Averages of the Indicators of Financial Depth and Stock Market Development

This section presents correlations and graphs to highlight the relationship between indicators of financial depth and stock market development. There are two sample periods under consideration. One is from 1978 to 1990, and the sample for this period includes 20 economies which are constituents of the IFC's Composite Index. The other is from 1984 to 1990, and the sample for this period includes all 32 economies in the EMBD. Arithmetic averages are taken for all the five variables over these two periods respectively.

A. Correlations in the period 1984-1990

The levels of financial depth, GNP per capita and stock market development vary widely among the sample countries. But the level of stock market development has a much larger variation among the countries than the variations in financial depth. Table 1 presents the relevant uni-variate statistics³. This suggests that stock market development is affected to a greater degree by country specific factors than are measures of financial depth.

In the richer developing economies (as defined by GNP per capita), financial depth and the degree of stock market development are typically higher. Figures 1 and 2 show the distribution of MCY and QMY across the countries. In the figures, the countries are arranged in an ascending order from left to right according to the levels of GNP per capita. It is clear that there is a rising trend in the two variables. In this period, on average Malaysia, Kuwait, Taiwan, Jordan, Korea and Chile are the economies which have larger stock markets.

Countries with more developed stock markets (in terms of MCY) also have more financial depth as defined by the ratio of QMY to GDP or the ratio of M1 to GDP. But the

³All tables and graphs are placed at the end of the paper.

development of the stock market appears to be more associated with non-monetary financial depth than with monetary depth. Table 2 shows that the Pearson Correlation Coefficient is significantly positive at 0.1% level for M2MY, DCPY and GNPCAP, but not for M1Y (The Coefficient is significantly positive at 3% for M1Y). This is consistent with the supposition that the development of the stock market is accompanied by financial deepening. It is also worth noting that the correlation is the strongest between MCY and DCPY, which means that countries with more developed stock markets have financial systems that issue more credit to the private sector as a share of GDP than countries with less well developed stock markets. This implies that there may be a complementary rather than substitution relationship between stock market development and

financial intermediary growth. That is, a more developed stock market would allow firms to increase borrowing from financial intermediaries.

B. Correlations in the period 1978-1990

The same exercise as in the last sub-section is applied to the period 1978 to 1990, but to a smaller sample size (19), based on data from the IFC's Composite Index⁴.

This second data set confirms the two patterns previously identified: the variations in the level of the stock market development across the countries are much larger than the variations in the level of financial depth across the countries; and the correlation of MCY with DCPY is the strongest among all the variables. These results are shown in Tables 3 and 4.

On the whole, the correlations in the period of 1978-1990 are weaker than those in the period 1984-1990. The weaker correlations for the longer period may reflect the fact that

⁴The data series is much shorter for Zimbabwe and is excluded from our analysis even though it is included in the Composite Index.

in the late 1970s and the early 1980s the pattern of movement of the stock market is very different from that in the late 1980s.

Broadly speaking, there was a general upturn in the late 1980s in the size of the stock markets in the economies under study. Figures 3 to 6 show the movement of MCY over time in these 19 economies grouped according to geographical areas. It can be seen from these figures that the pattern of movement of Market Capitalization as a proportion of GDP varied widely among the 19 economies. In East Asian countries, the ratio remained relatively stable before the mid 1980s, but there were a sharp rise in Taiwan and Korea, and a moderate upturn in the Philippines from 1985. In South and South East Asia, the pattern of the movement of MCY in Malaysia was distinctively different from others. It had a higher starting point and it showed a discernible cyclical pattern. But the mid-1980s saw an upturn of the sizes of the stock markets in all five economies in this group. The pictures in the other two groups were more complicated.

The ratios had a much larger variation, especially in Latin America. But we can still see a general rise in the sizes of the markets since the mid-1980s in nearly all the economies in these two groups.

When the 1978-1990 period is divided into three sub-periods, the correlations in the period 1986-1990 are much more significant than in the two previous periods. This is evident from Table 5. We thus have to answer the question why there was a general upturn in the size of these markets after the mid-1980s and the correlations with the indicators of financial depth are more significant. Section V will provide some tentative explanations.

IV. Time-Series Correlations between the Indicators of the Development of the Stock Market and Financial Deepening

This section analyses the correlations between MCY and other variables over time in different economies. Since for the economies which are not included in the IFC's Composite

Index the data series available are too short, these economies are not dealt with in the following analysis and only IFC's Index economies are included.⁵ The 19 economies are grouped according to geographical areas and Tables 6 to 9 present the results of correlation analysis, while Figures 7 to 10 show the distribution of MCY, M1Y, QMY and DCPY over time in Korea, Malaysia, Chile and Greece, selected each from one group. For reference, Figures 11 and 12 show the distribution of the four variables in the United States and Japan from the early 1950s.

On the whole, the correlations in the Asian economies (except Pakistan and Philippines) are much stronger than in the other economies. In fact, the contrast between the Asian economies and the other economies is very dramatic. While the correlations are significant for most of the variables in Korea, Taiwan, India, Indonesia, Malaysia and Thailand, the correlations are not significant for most of the variables in other economies.

M1Y remained relatively stable over time in most of the economies, while the patterns of movement of the other three variables are more heterogeneous. In most of the Asian economies (except in Pakistan and Philippines), there was an upward trend in MCY, QMY and DCPY, and they were highly correlated. (In Indonesia, the stock market remained very small until 1989, although a slight upward trend in MCY can be observed). On the other hand, the upturn in MCY around 1986 was generally much more dramatic than the increase in the indicators of financial depth. In other economies, there was no consistent pattern of movement in these variables. In Brazil, Chile, Colombia, Greece, Jordan, and Philippines, while financial depth as measured by QMY has been increasing, there was no apparent trend in MCY, and there was no consistent pattern in the movement of DCPY either. For example, in Chile, the stock market declined continually in the early 1980s and the direction was reversed in 1985, and the direction of the movement of domestic credit to the private sector was exactly opposite.

⁵Zimbabwe is not included since the time series available is too short for statistical analysis.

The patterns of movement of the variables are very different over time in USA and Japan as well. In Japan, there was an upward trend in all four variables, although MCY had a much more dramatic increase in the 1980s. In the USA, there were an apparent upward trend in QMY and DCPY, and a downward trend in M1Y. There was an upward trend in MCY, but it was noticeably more volatile.

V. Some Tentative Explanations for the Observed Patterns

Two principal correlation patterns need explaining. First, while it is true that after 1986, in the economies which had higher income levels and higher financial depth, the stock markets were typically larger or more developed, it was hardly true before 1986. This is evident from the cross-country correlations between the indicator of the size of the stock market (MCY) and the indicators of financial depth and GNP per capita, which are positively significant more for the period 1986-1990 than for the two previous periods. Second, over time the correlations are not significant except for the Asian economies. While we observe that in most of the Asian economies there was an upward trend in all the variables, in the other economies the patterns of movement of the variables were more heterogeneous and there was no consistent pattern among them. These two points are discussed in turn below.

Explanations for the First Correlation Pattern

One possible explanation for this correlation pattern is that the mid-1980s was a turning point for the economies which had a higher subsequent growth of the size of the stock market. One such turning point could be that there was a threshold level of income or a threshold level of financial depth reached in the mid-1980s above which the development of the stock market took off. If this was the case, before the mid-1980s, the stock market would remain small and inactive even though the levels of income and financial depth had been rising. We would thus observe a poor correlation between stock market development and financial deepening across countries. Around the mid-1980s, when the thresholds of economic development and financial deepening were reached and the stock markets began to

take off, countries which had higher levels of economic development and financial deepening would generally have larger stock markets and we would observe a higher correlation between the variables.

If the threshold hypothesis were true, one might expect to observe about the same levels of financial depth and income in the economies where the stock markets had a general upturn in the mid-1980s. In reality, as measured in 1985, the levels of income and financial depth varied widely across the countries. This is evident from Figures 14 and 15 which show the levels of QMY and DCPY in 1985 and the level of GNP per capita in 1985 respectively. The patterns emerging from these figures do not seem to support the threshold hypothesis.

However, several difficulties make the threshold hypothesis almost untestable. One is that it is difficult to determine whether the upturn in the size of the market around the mid-1980s was actually a take-off. In order to identify the take-off points, to determine whether there exist threshold levels of income and financial depth and to identify what the threshold levels are, it is necessary to have a long enough time series. The time series we have are apparently too short for such an exercise. As a further test, it would be revealing to compare the levels of economic development and financial deepening in the developed economies at the time when there were a broad upturn in the size of their stock markets. But even for the developed economies, the test is difficult to conduct because of lack of data. Figure 13 shows the movement of MCY in the United States from 1929⁶. In 1929, the United States had a MCY of more than 60% and GNP per capita in 1982 constant prices was already US\$5834. It is thus necessary to trace back much earlier, probably back to the end of last century when the major developed economies had a rise of the stock market. But data are very difficult to obtain for that early period.

⁶ The figures of market capitalization before 1983 were those of the New York Stock Exchange, while the figures after 1983 were those of all United States.

A second difficulty lies in the measurement of the levels of income and financial depth. What are usually available are the *national* levels of income and financial depth. But it may be more appropriate to use the figures of levels of income and financial depth in the *city* where the stock market is located, since the financial centres where the stock markets are usually located tend to have much higher levels of income and better financial infrastructure than the national average. For example, when analyzing the causal factors behind the development of the stock market in India, it may be more appropriate to examine the economic situation in Bombay rather than in India as a whole.

A third difficulty, which is more fundamental, is that reaching the threshold levels may only be a necessary but not a sufficient condition for the rise of the stock market. This would imply that although some economies might have reached the threshold levels a long time back the stock market could have remained dormant for various other reasons, and on the other hand, the market could take off in response to other factors long after the threshold levels had been reached. Thus there is no reason why we should expect to observe about the same levels of financial depth and income in the economies where the stock market had a general upturn in the mid-1980s.

An alternative to the threshold hypothesis would be one which emphasizes institutional changes occurring in the mid-1980s. One such institutional change was a net increase of international capital flow into those Asian economies in which we observe the take-off of stock markets and more general financial deepening. This capital inflow first took the form of direct foreign investment. After the Plaza Accord of 1985, the price competitiveness of the NIEs (Korea, Taiwan, Hong Kong and Singapore) was very much strengthened, since their exchange rates in effect depreciated substantially against the Japanese yen and major European currencies. As a result, Japanese export-oriented industries began transferring manufacturing facilities to NIEs by direct investment. The volume of direct investment from Japan to NIEs increased nearly by five-fold during the period 1985-1988 (Watanabe, 1991). And since 1987, there has been a net increase of direct investment from these NIEs to the economies which belong to ASEAN (Indonesia, Malaysia, Philippines and Thailand), in

response to the relative decline of competitiveness in the NIEs. In 1988, the volume of direct investment from NIEs to ASEAN exceeded that from Japan to ASEAN (Watanabe, 1991). A consequence of these net capital inflows appears to be stimulation of the equity markets. The sharp rise of the stock markets in Korea and Taiwan was around 1986, while the big boom of the markets in Indonesia, Malaysia, Philippines and Thailand began in about 1988, coinciding in each case with the upturn in foreign investment.

Another channel of capital inflow is through portfolio investment in the form of country funds. For example, in 1984, the first country fund, the Korea Fund, Inc., was listed on the New York Stock Exchange, with an initial value of \$60 million. Since then, many local, regional, and global funds have been launched in international markets. Favorable treatment with regard to taxation and foreign exchange control was implemented in some of the countries and consequently these funds became very popular among international investors. Since it is more likely that these investors would invest in the equity markets of those economies which had better financial infrastructures, and conversely, the development of the equity markets would tend to increase the demand for other financial services, the development of the financial markets in general and equity markets in particular would tend to go hand in hand in these countries.

Explanations for the Second Correlation Pattern

The lack of correlations between MCY and indicators of financial depth in most of the non-Asian economies over time may be due to two reasons. One is the effect of inflation. Table 10 shows the period averages of annual rates of inflation in the 20 economies under study. It is clear that the rates of inflation were much higher in Latin American economies. High inflation tends to introduce distortions and instability into our variables, since these variables are calculated by taking the averages of year-end values of stock variables and then dividing by a flow variable. In addition, high inflation could have opposite effects on MCY and QMY. While domestic equity investments can be more attractive in an environment of high inflation, quasi-money assets (which are generally fixed interest instruments) are likely

to be less attractive.⁷ The power of correlation analysis could be reduced as a result of these distortions.

The other reason for the lack of correlation could be that the time period under consideration is relatively too short. Since share prices can be very volatile in a short time-span, market capitalization can also be very volatile. Thus the relationship between financial deepening and stock market development is unlikely to be stable in the short term. This would suggest that it is necessary to use a longer time period for the data series in order for the short-term fluctuations to be canceled out. However, Figure 13 shows that MCY in the United States had very large cyclical movements over a period of more than 60 years. The correlations between MCY and the indicators of financial depth in USA were unlikely to be high even for this 60 year data series⁸. It is thus difficult to form a conclusive view.

VI. Concluding Remarks

Results from correlation analysis on cross-sectional data for the period 1978-1990 show that there is a significantly positive correlation between the indicator of stock market development, Market Capitalization as a proportion of GDP, and indicators of financial depth. Breakdown of the time period shows that the correlations are strongest during the late 1980s, which may be explained by the fact that there was a substantial increase in foreign investment in that period into the equity markets of those economies which had better developed financial infrastructure.

⁷Although this argument is plausible in theory, it is not supported by all country experiences. Careful examination of the figures depicting the movements of financial variables over time reveals that the directions of movements of these variables were sometimes opposite to what this argument would predict. This could be the result of other mechanisms which offset the effects of inflation but we have identified no consistent pattern.

⁸It can be seen from Figure 12 that the correlations in the period 1951-1991 were very poor in the United States.

However, results from correlation analysis on time-series data show that apart from the Asian economies, the correlations are not significant. Hyper-inflation in the Latin American economies may have reduced the power of correlation analysis because of the distortions it introduced into the variables we constructed. Also the time series available are for a relatively short period and stock price volatility may have distorted the findings.

The results of cross-sectional and time-series analysis can be reconciled in that there might be bounds of variation of MCY. Although over time MCY fluctuated widely and there was poor correlation with the indicators of financial depth, these variations were bounded to a certain extent so that the means of MCY in that period of time still reflected the relative size of the market. Thus cross-sectionally, we can still observe high correlations between MCY and other indicators of financial depth. That is to say, in the economies which had better developed financial system, although the stock market fluctuated widely thus making the correlations over time poor, the means of MCY in these economies were still higher because the stock markets were larger and better developed.

A threshold hypothesis of stock market development proves to be difficult to test due to several factors. It is thus difficult to tell at one particular time whether one economy has fulfilled the necessary conditions for the development of its stock market. All we can say is that when an economy is well equipped with financial infrastructure it may have a better chance of attracting new capital into its equity market.

This paper has established some stylized facts concerning the relationship between the development of the stock market and the process of financial deepening. It would be helpful for future research in identifying the conditions for the development of the stock market if a wider range of data was considered. Firstly, detailed case studies would be useful for identifying country-specific factors which may affect the course of development of the stock market. For example, examination of the general financial conditions should be supplemented by considering the role of industrial structure, foreign investment and stock market regulatory policies. Secondly, indicators of the development of the stock market such as

market capitalization should be supplemented by others such as turnover ratio, market concentration ratio, as well as primary market data such as the volume of initial public offerings and rights issues. In addition, the overall significance of the stock market could be indicated by the share of the output and profits contributed by companies listed on the stock exchanges in those of the whole economy.

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Country List

ARG	Argentina	MYS	Malaysia
BGD	Bangladesh	MEX	Mexico
BRA	Brazil	MAR	Morocco
CHL	Chile	NGA	Nigeria
COL	Colombia	PAK	Pakistan
CRI	Costa Rica	PER	Peru
CIV	Cote d'Ivoire	PHL	Philippines
EGY	Egypt	PRT	Portugal
GDC	Greece	LKA	Sri Lanka
IND	India	OAN	Taiwan, China
IDN	Indonesia	THA	Thailand
JAM	Jamaica	TTO	Trinidad/Tob.
JOR	Jordan	TUR	Turkey
KEN	Kenya	URY	Uruguay
KOR	Korea	VEN	Venezuela
KWT	Kuwait	ZWE	Zimbabwe

Table 1 Uni-variate Statistics
for Variables Averaged over the Period 1984-1990

Variables	N	Mean	Std Dev	Coe. of Variation	Minimum	Maximum
MCY	32	0.137	0.175	1.277	0.004	0.680
M1Y	32	0.159	0.106	0.667	0.049	0.472
QMY	32	0.269	0.188	0.699	0.044	0.752
DCPY	32	0.306	0.201	0.657	0.063	0.924
GNPCAP	32	2055	2746	1.336	168	15177

Table 2 Correlation Analysis for the period 1984-1990

Pearson Correlation Coefficients / Prob > R under H ₀ : Rh ₀ =0 / N=32	
	MCY
M1Y	0.397 0.0245
QMY	0.704 0.0001
DCPY	0.839 0.0001
GNPCAP	0.552 0.0010

**Table 3 Uni-variate Statistics
for Variables Averaged over the Period 1978-1990**

Variables	N	Mean	Std Dev	Coe. of Variation	Minimum	Maximum
MCY	19	0.134	0.160	1.194	0.006	0.565
M1Y	19	0.161	0.109	0.677	0.060	0.466
QMY	19	0.244	0.164	0.672	0.031	0.584
DCPY	19	0.305	0.162	0.531	0.110	0.617
GNPCAP	19	1821	1206	0.662	298	4266

Table 4 Correlation Analysis for the Period 1978-1990

Pearson Correlation Coefficients / Prob > R under H ₀ : R _{h0} =0 / N=19	
	MCY
M1Y	0.513 0.0246
	QMY
QMY	0.630 0.0039
	DCPY
DCPY	0.774 0.0001
	GNPCAP
GNPCAP	0.242 0.3183

Table 5 Correlation Patterns in Three Sub-periods

Pearson Correlation Coefficients / Prob $> |R|$ under $H_0: \rho_0=0$ / Number of observations

	1978-1980	1981-1985	1986-1990
	MCY	MCY	MCY
MIY	0.322	0.482	0.593
	0.2072	0.0366	0.0095
	17	19	18
QMY	0.358	0.399	0.748
	0.1580	0.0904	0.0004
	17	19	18
DCPY	0.464	0.542	0.886
	0.0603	0.0166	0.0001
	17	19	18
GNPCAP	0.192	0.099	0.467
	0.4757	0.6971	0.0509
	17	18	19

Table 6 Correlation Analysis for the Economies in East Asia 1978-1990

Pearson Correlation Coefficients / Prob $> |R|$ under $H_0: \rho_0=0$ / Number of Observations

	Korea MCY	Philippines MCY	Taiwan MCY
M1Y	-0.228 0.4145 15	0.448 0.0943 15	0.898 0.0001 14
QMY	0.727 0.0022 15	0.353 0.1963 15	0.787 0.0008 14
DCPY	0.62873 0.0121 15	-0.479 0.0710 15	0.931 0.0001 14
GNPCAP	0.886 0.0001 14	0.380 0.1625 15	0.912 0.0001 14

Table 7 Correlation Analysis for the Economies in South Asia 1978-1990

	India MCY	Indonesia MCY	Malaysia MCY	Pakistan MCY	Thailand MCY
M1Y	0.238 0.4563 12	0.629 0.0213 13	0.708 0.0068 13	0.641 0.0101 15	-0.244 0.4005 14
QMY	0.696 0.0119 12	0.739 0.0039 13	0.599 0.0306 13	-0.617 0.0142 15	0.683 0.0069 14
DCPY	0.657 0.0202 12	0.813 0.0007 13	0.731 0.0045 13	0.351 0.1997 15	0.767 0.0006 14
GNPCAP	0.800 0.0018 12	0.212 0.4860 13	0.930 0.0001 13	0.528 0.0433 15	0.887 0.0001 14

Table 8 Correlation Analysis for the Economies in Latin America 1978-1990

Pearson Correlation Coefficients / Prob > | R | under $H_0: \rho_0=0$ / Number of Observations

	Argentina MCY	Brazil MCY	Chile MCY	Colombia MCY	Mexico MCY	Venezuela MCY
M1Y	-0.318 0.3136 12	0.585 0.0982 9	-0.096 0.7557 13	0.707 0.0222 10	-0.003 0.9916 12	-0.604 0.0376 12
QMY	-0.603 0.0378 12	-0.420 0.2599 9	0.205 0.5008 13	-0.833 0.0028 10	-0.529 0.0769 12	0.375 0.2295 12
DCPY	0.233 0.4659 12	0.767 0.0160 9	-0.500 0.0818 13	-0.875 0.0009 10	0.412 0.1837 12	-0.648 0.0226 12
GNPCAP	0.074 0.8181 12	-0.257 0.4458 11	0.387 0.1909 13	-0.539 0.0703 12	-0.364 0.2453 12	-0.637 0.0258 12

Table 9 Correlation Analysis for the Economies in Europe/Mideast/Africa 1978-1990

Pearson Correlation Coefficients / Prob > | R | under $H_0: \rho_0=0$ / Number of Observations

	Greece MCY	Jordan MCY	Nigeria MCY	Portugal MCY	Turkey MCY
M1Y	0.700 0.0053 14	0.388 0.2126 12	0.109 0.7220 13	-0.504 0.0789 13	-0.627 0.0291 12
QMY	-0.284 0.3247 14	0.123 0.7042 12	0.425 0.1474 13	-0.245 0.4199 13	0.485 0.1102 12
DCPY	-0.264 0.3615 14	0.238 0.4564 12	0.222 0.4655 13	-0.744 0.0035 13	0.002 0.9960 12
GNPCAP	0.126 0.6664 14	-0.962 0.0021 6	0.066 0.8312 13	0.896 0.0001 13	0.629 0.0283 12

Table 10 Annual Rate of Inflation
(period averages, %)

Country	1979-1980	1981-1985	1986-1989
Latin America			
Argentina	145.26	382.39	1191.63
Brazil	58.06	153.86	1056.40
Chile	36.21	21.49	19.42
Colombia	23.01	22.39	25.05
Mexico	20.67	62.38	75.78
Venezuela	13.67	11.12	38.84
Averages for the area	49.48	108.94	401.19
East Asia			
Korea	20.47	7.34	5.45
Philippines	14.36	21.36	7.93
Taiwan	11.51	4.09	2.21
Averages for the area	15.45	10.93	5.20
South Asia			
India	6.71	9.35	8.41
Indonesia	14.13	9.74	7.40
Malaysia	5.06	4.69	1.80
Pakistan	8.78	7.20	6.78
Thailand	12.51	4.99	3.89
Averages for the area	9.44	7.19	5.66
Europe/Mideast/Africa			
Greece	18.82	20.67	17.41
Jordan	10.76	5.4	9.66
Nigeria	14.46	19.75	25.87
Portugal	20.98	23.30	11.33
Turkey	71.38	38.43	54.48
Zimbabwe	9.74	15.11	12.89
Averages for the area	24.36	20.44	21.94

Figure 1 MCY across Countries
Averages for the period 1984-1990

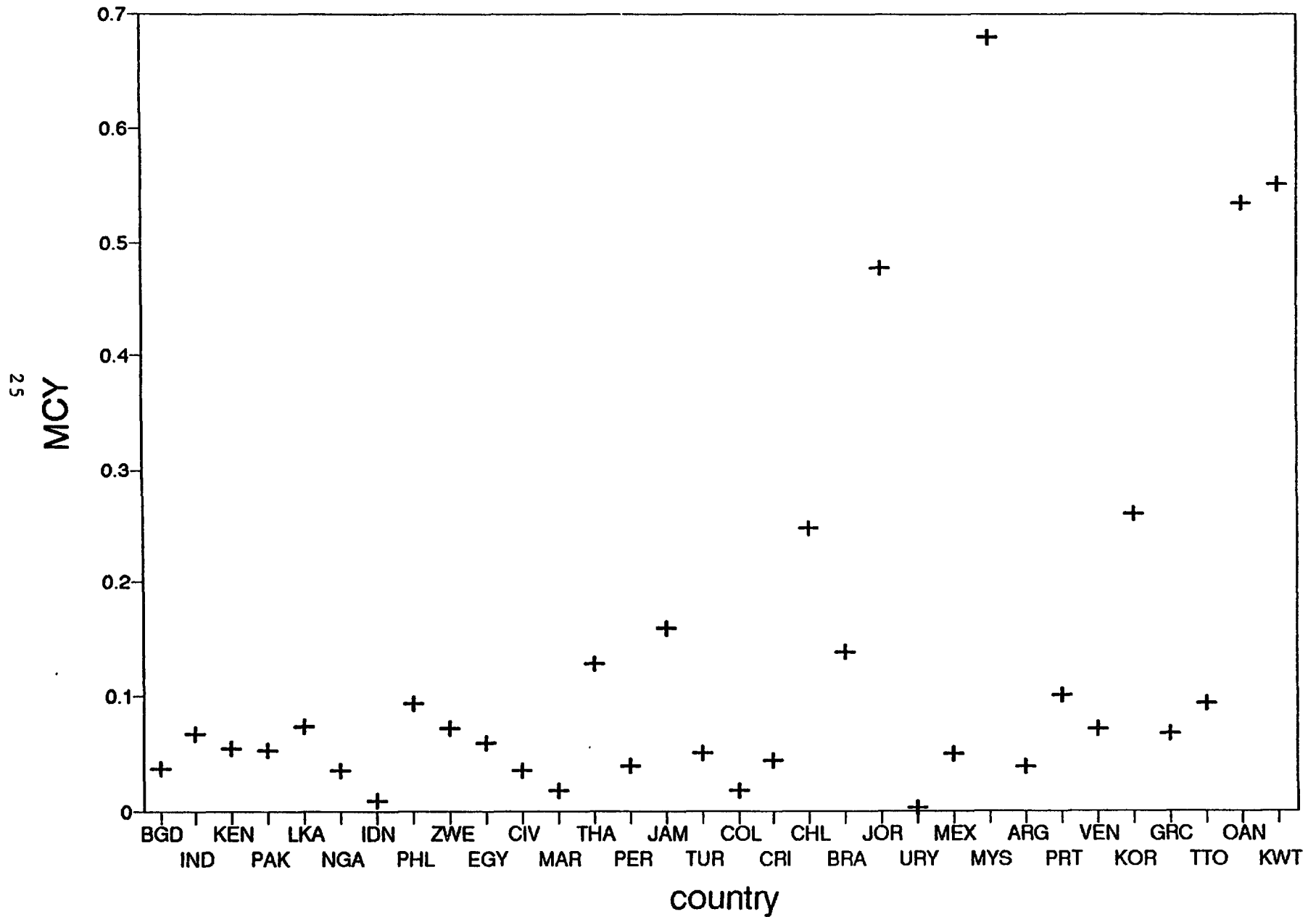


Figure 2 QMY across Countries
Averages for the period 1984-1990

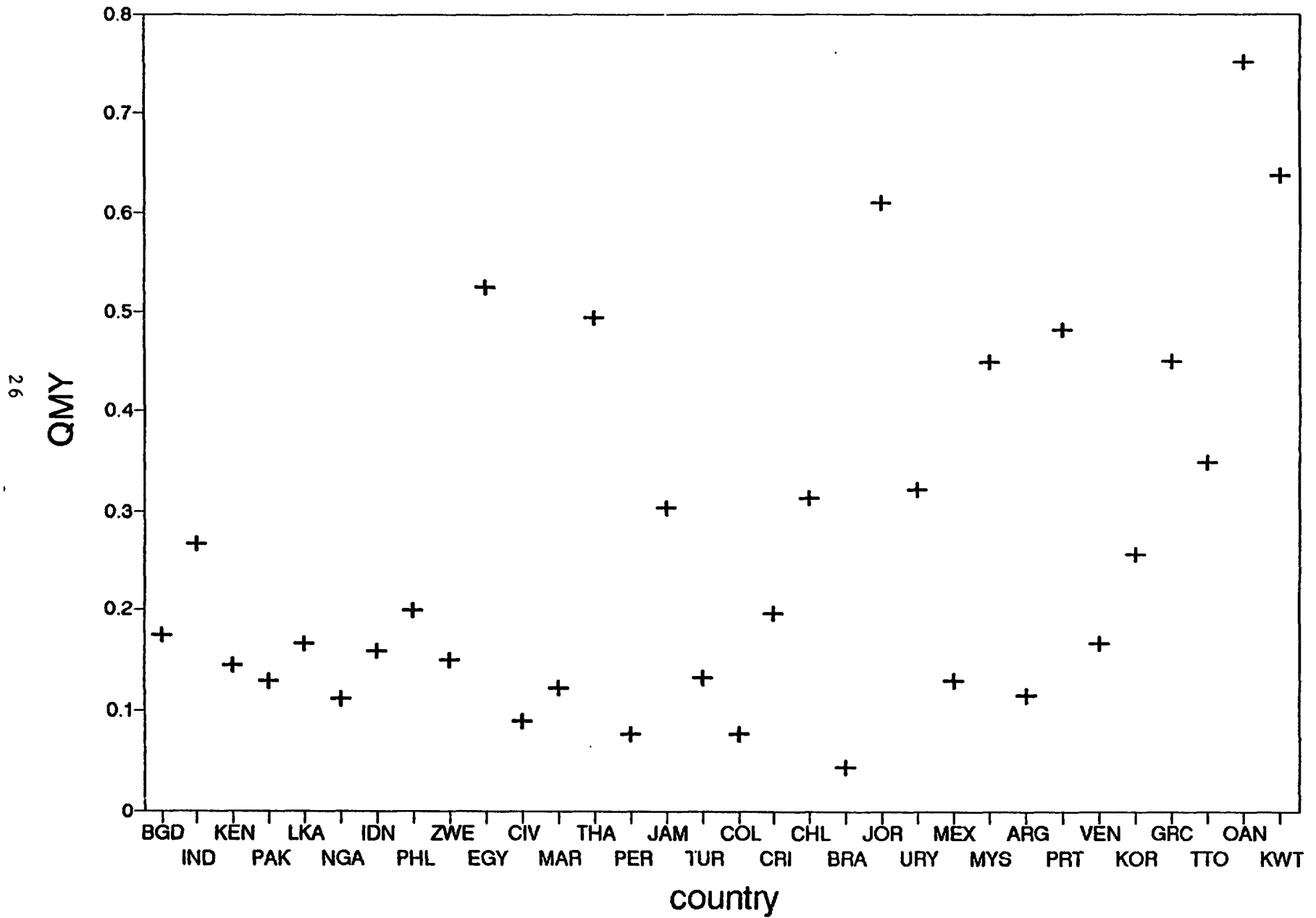
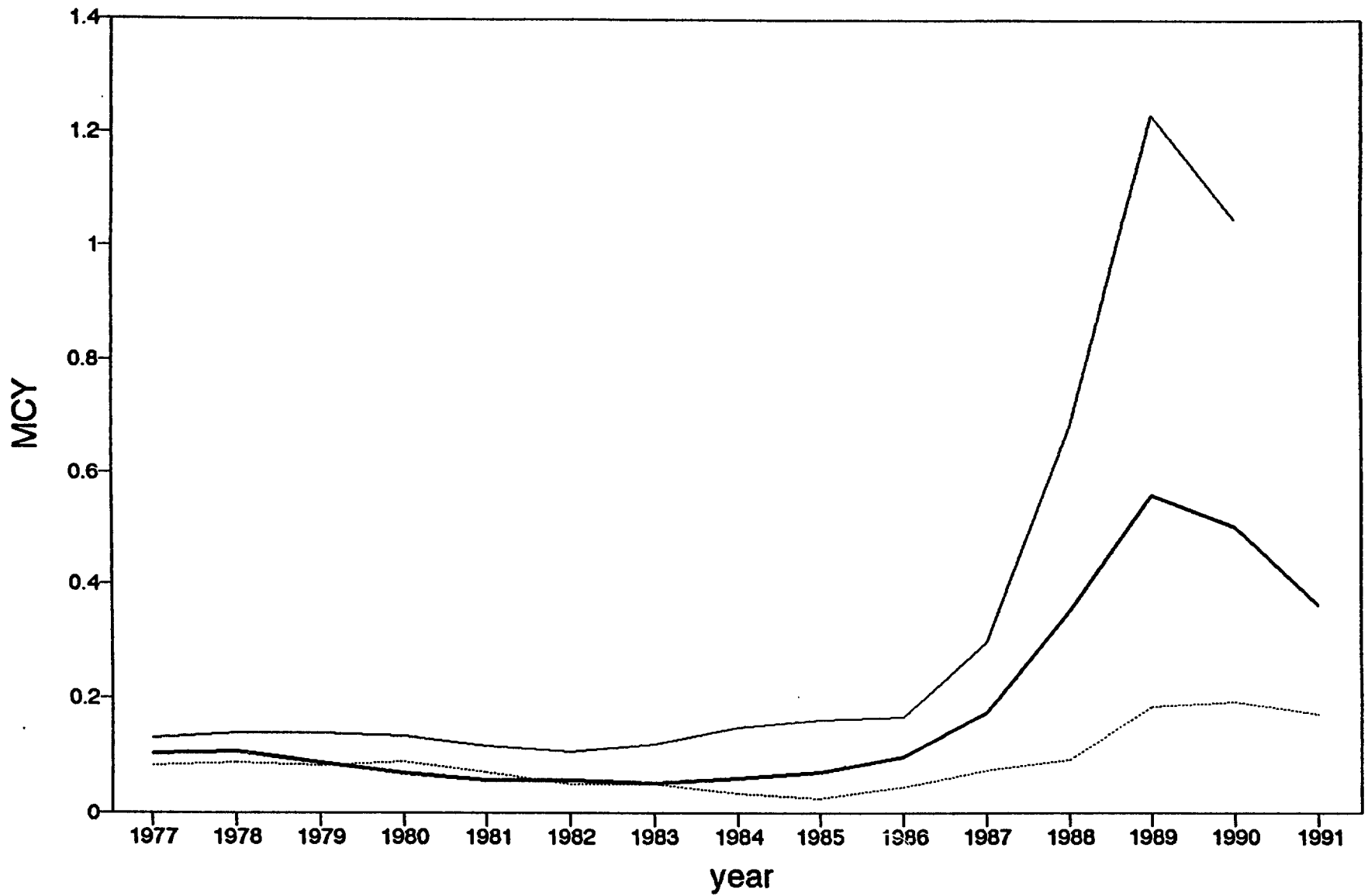


Figure 3 East Asia
The Movement of MCY over time

27



— Korea Philippines - - - Taiwan

Figure 4 South Asia
The Movement of MCY over time

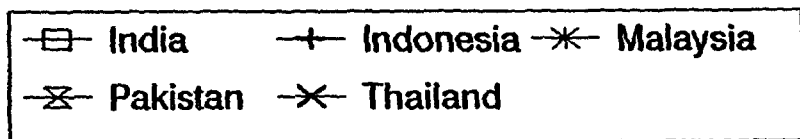
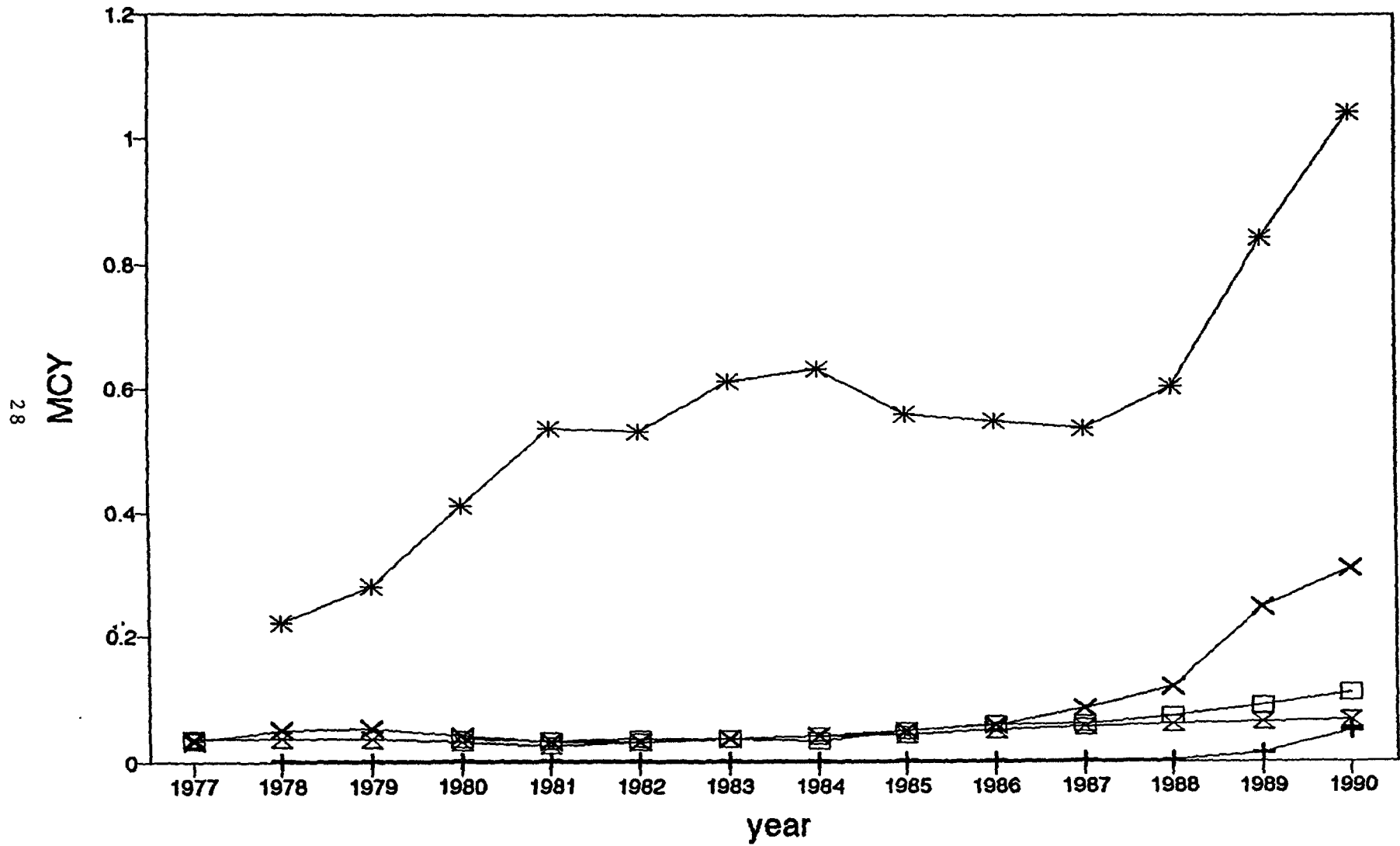


Figure 5 Latin America
The Movement of MCY over time

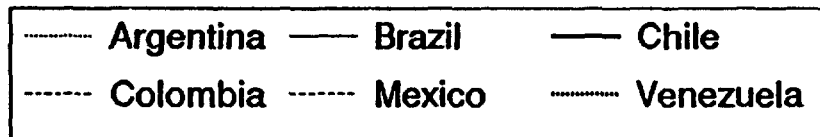
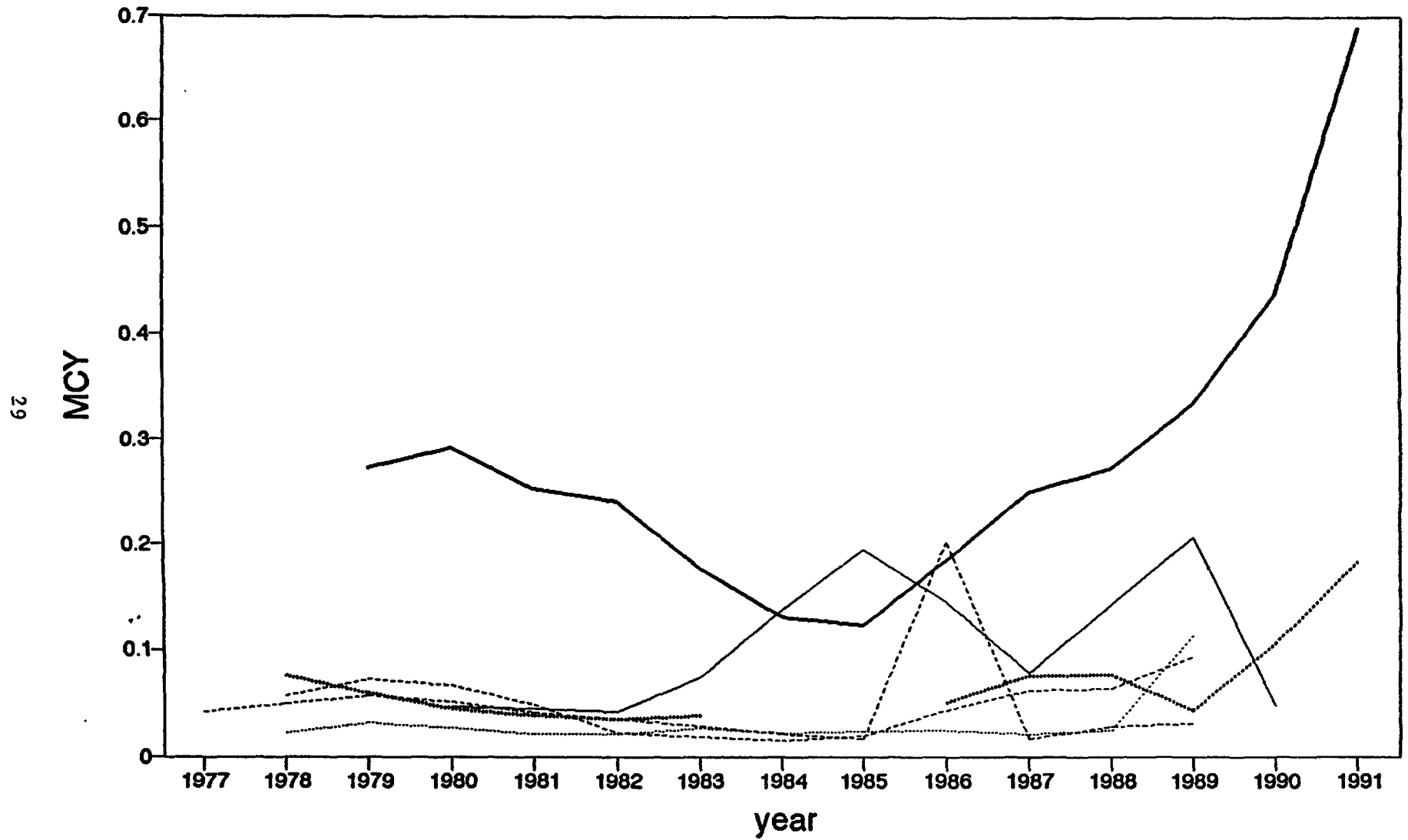


Figure 6 Europe / Mideast / Africa
The Movement of MCY over time

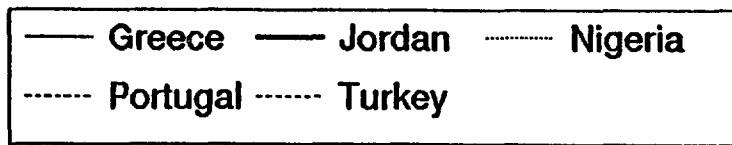
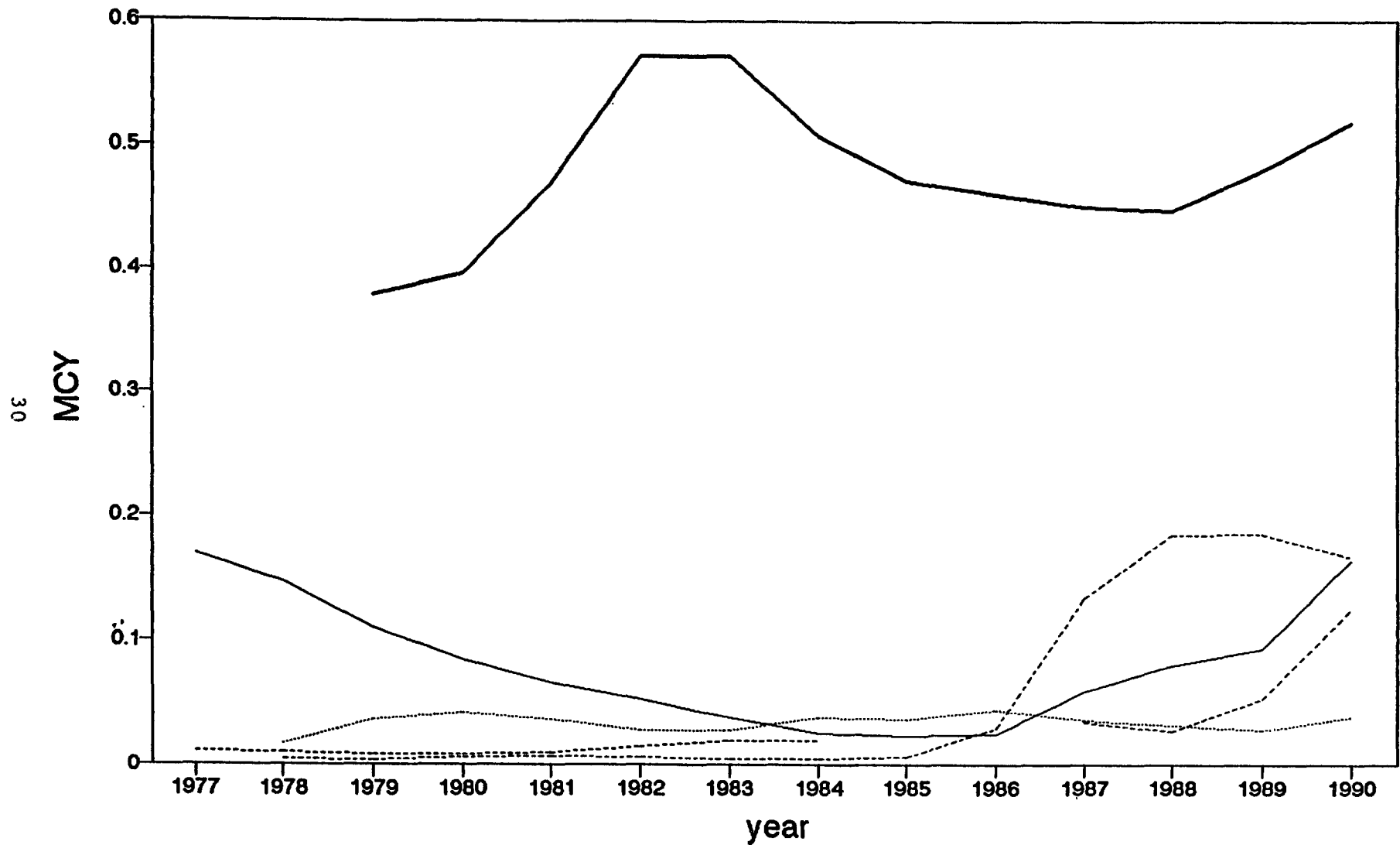


Figure 7 Korea
MCY, M1Y, QMY and DCPY over time

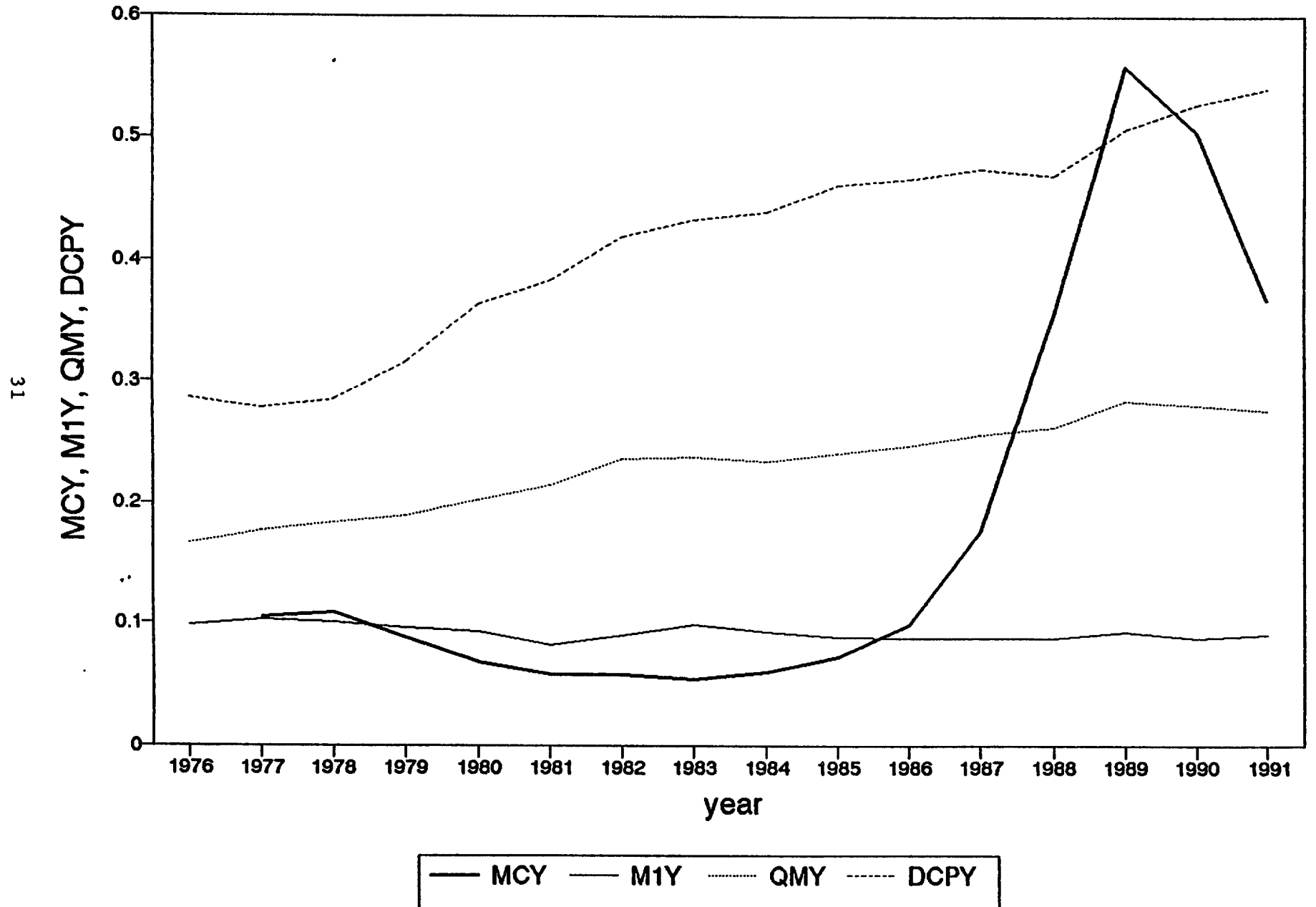


Figure 8 Malaysia
MCY, M1Y, QMY and DCPY over time

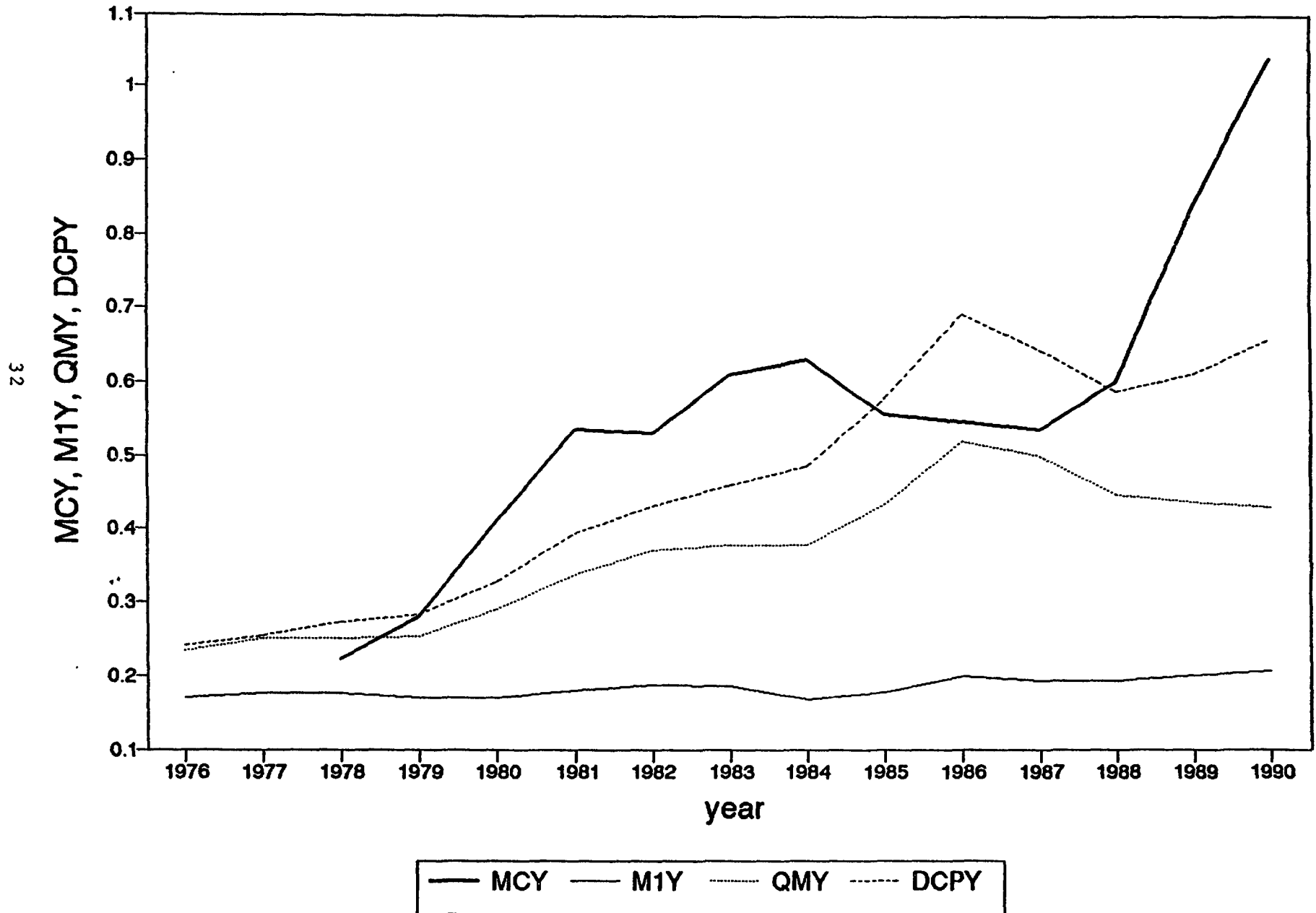


Figure 9 Chile
MCY, M1Y, QMY and DCPY over time

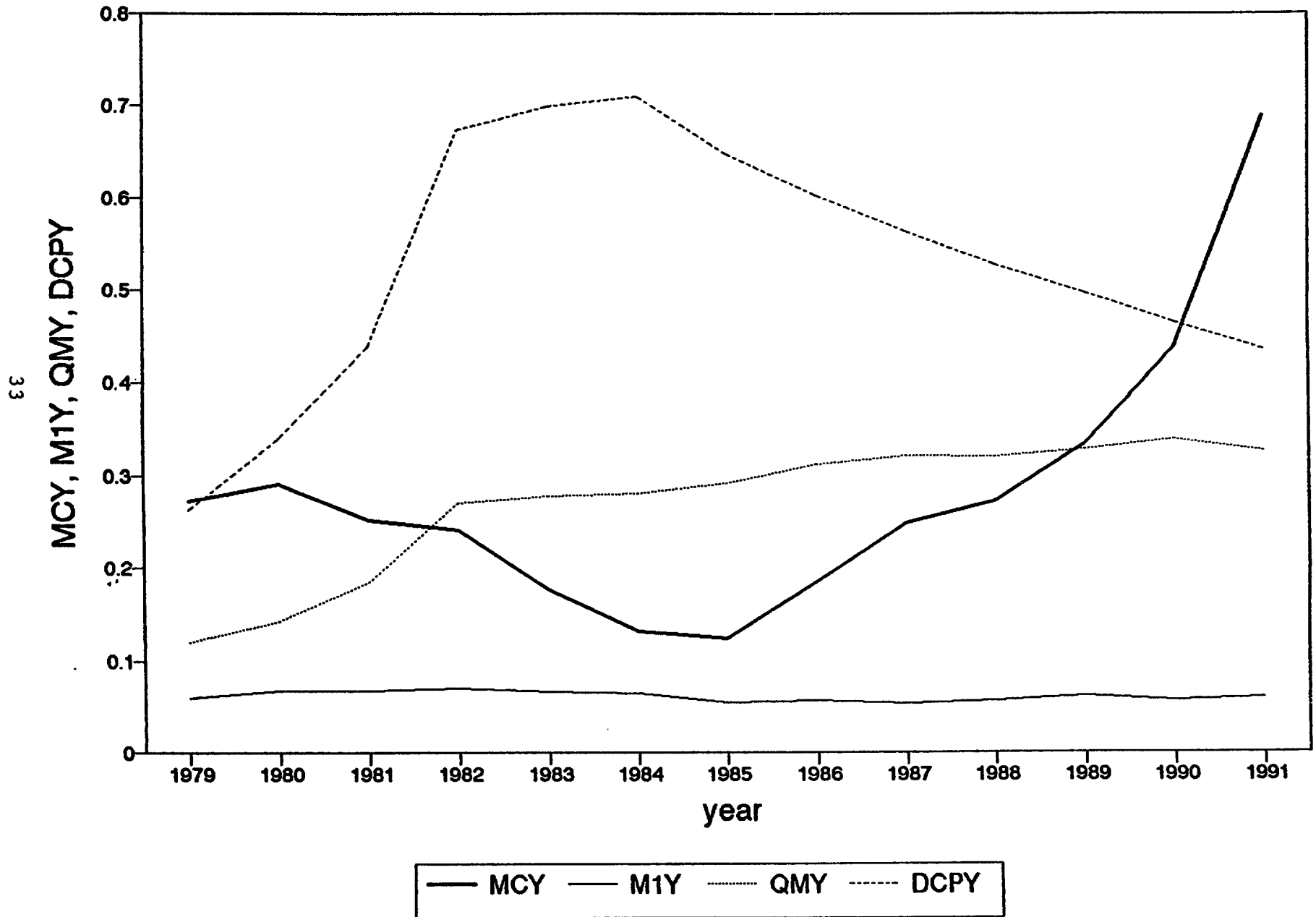


Figure 10 Greece
MCY, M1Y, QMY and DCPY over time

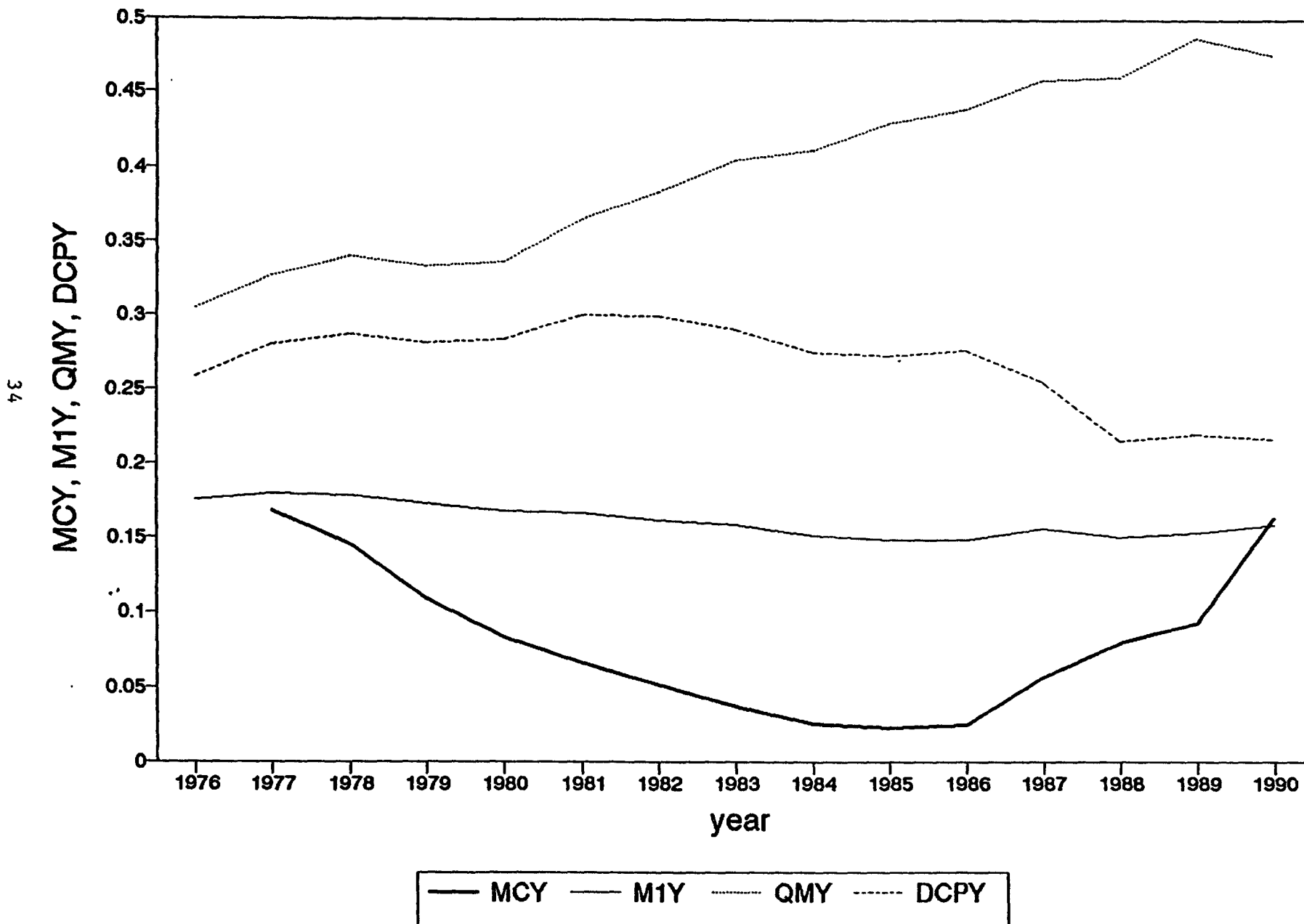


Figure 11 Japan
MCY, M1Y, QMY and DCPY over time

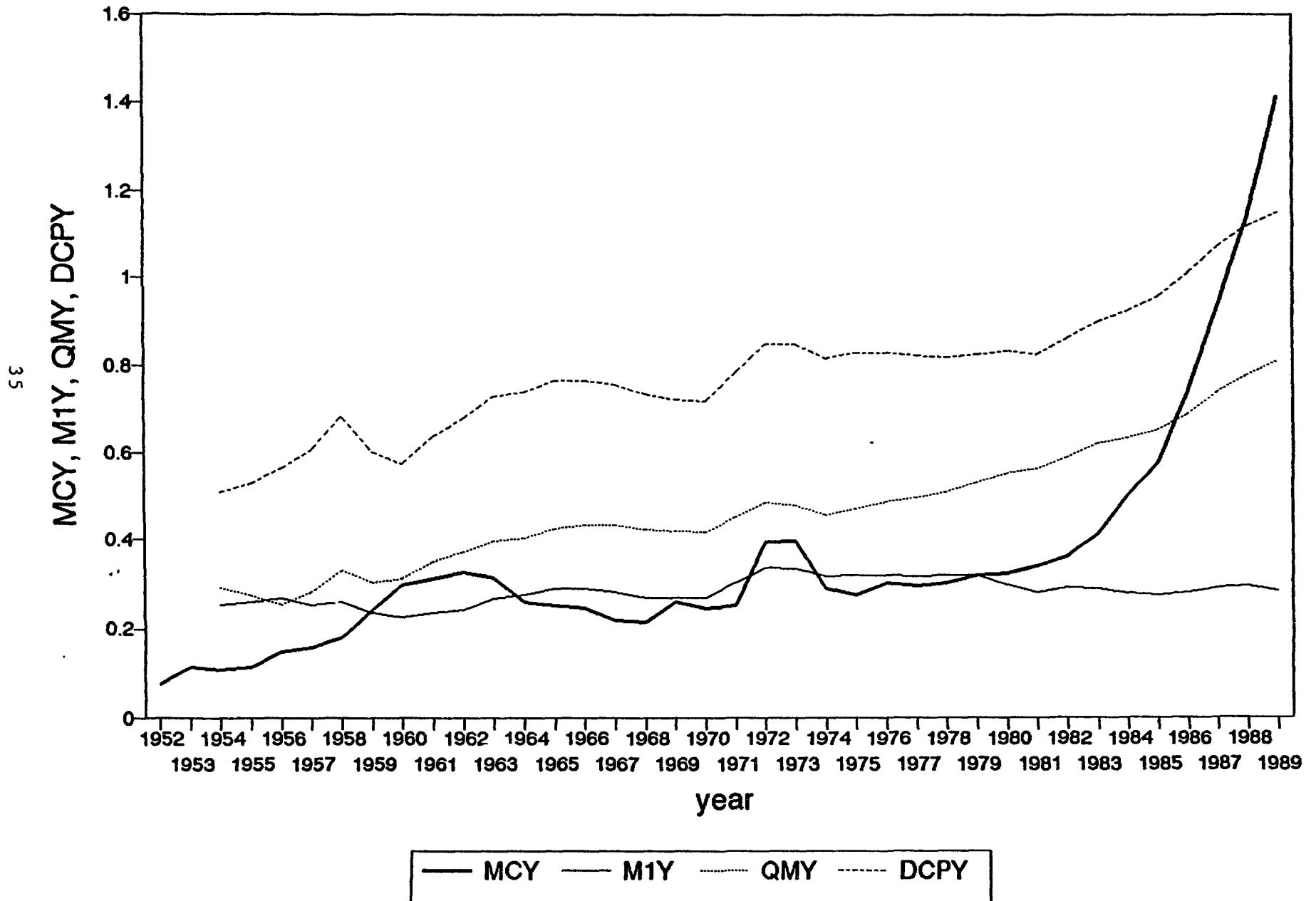


Figure 12 USA
 MCY, M1Y, QMY and DCPY over time

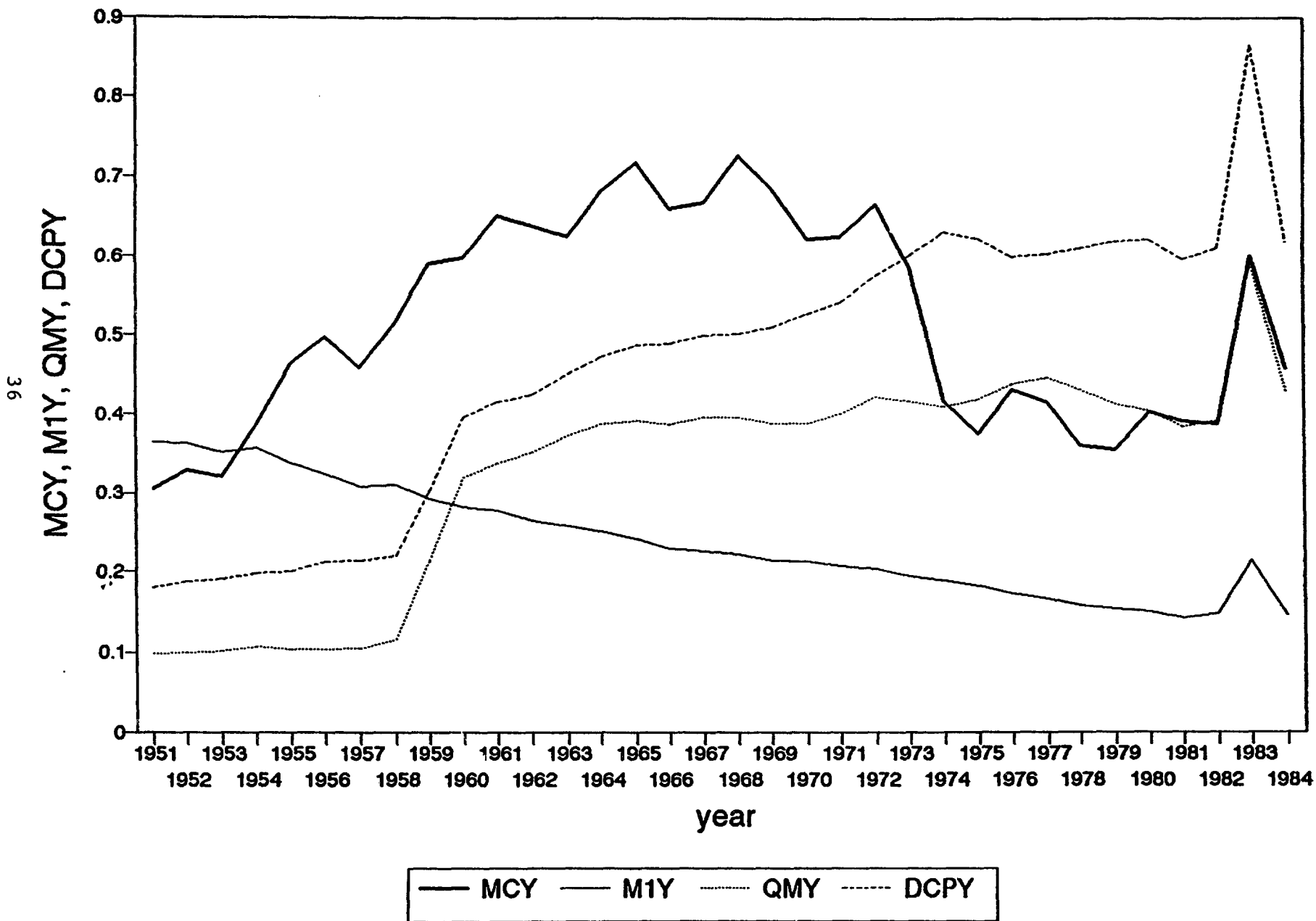


Figure 13 USA
The Movement of MCY from 1929 to 1991

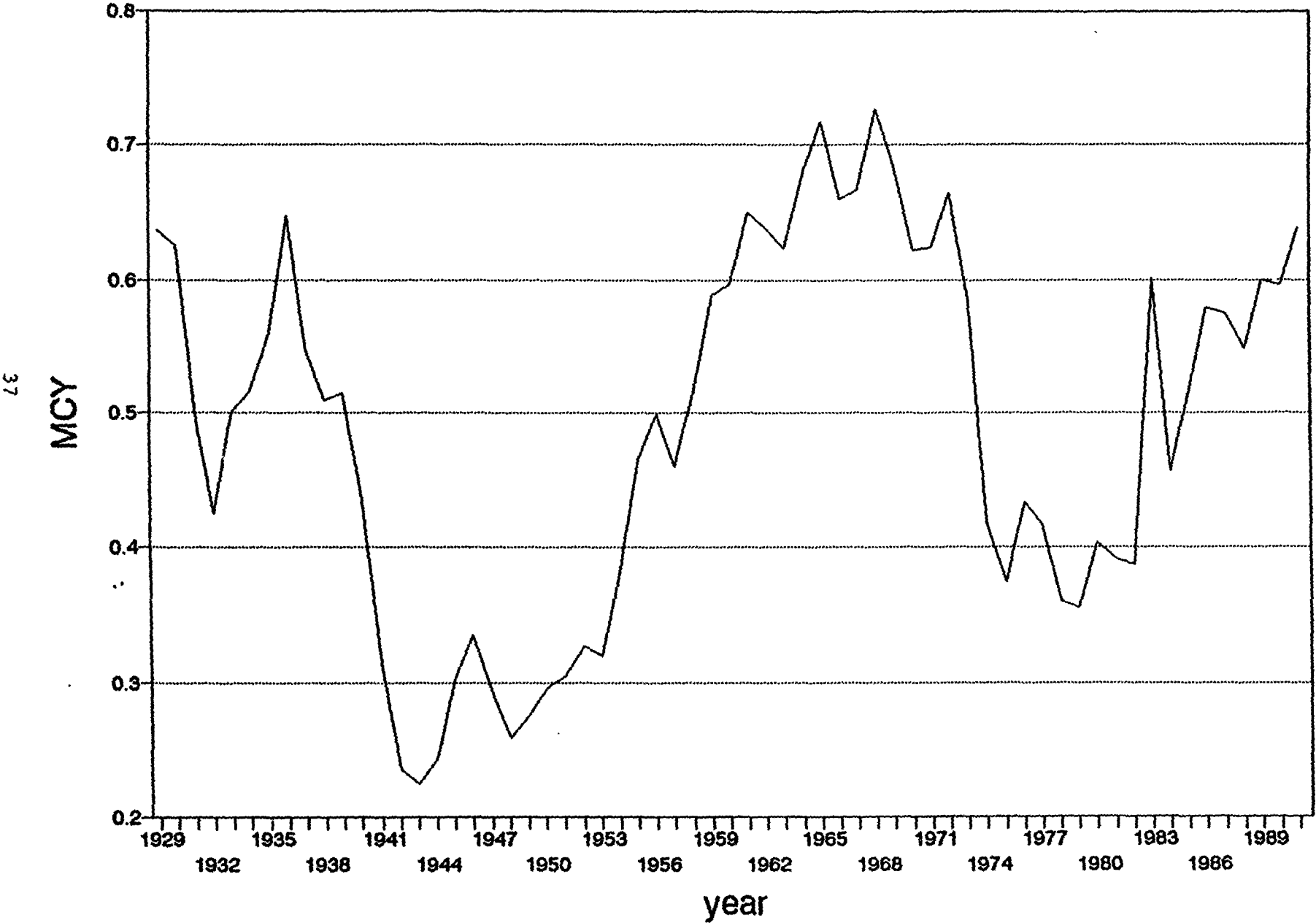


Figure 14 GNP per capita in 1985
in US\$ at 1987 constant prices

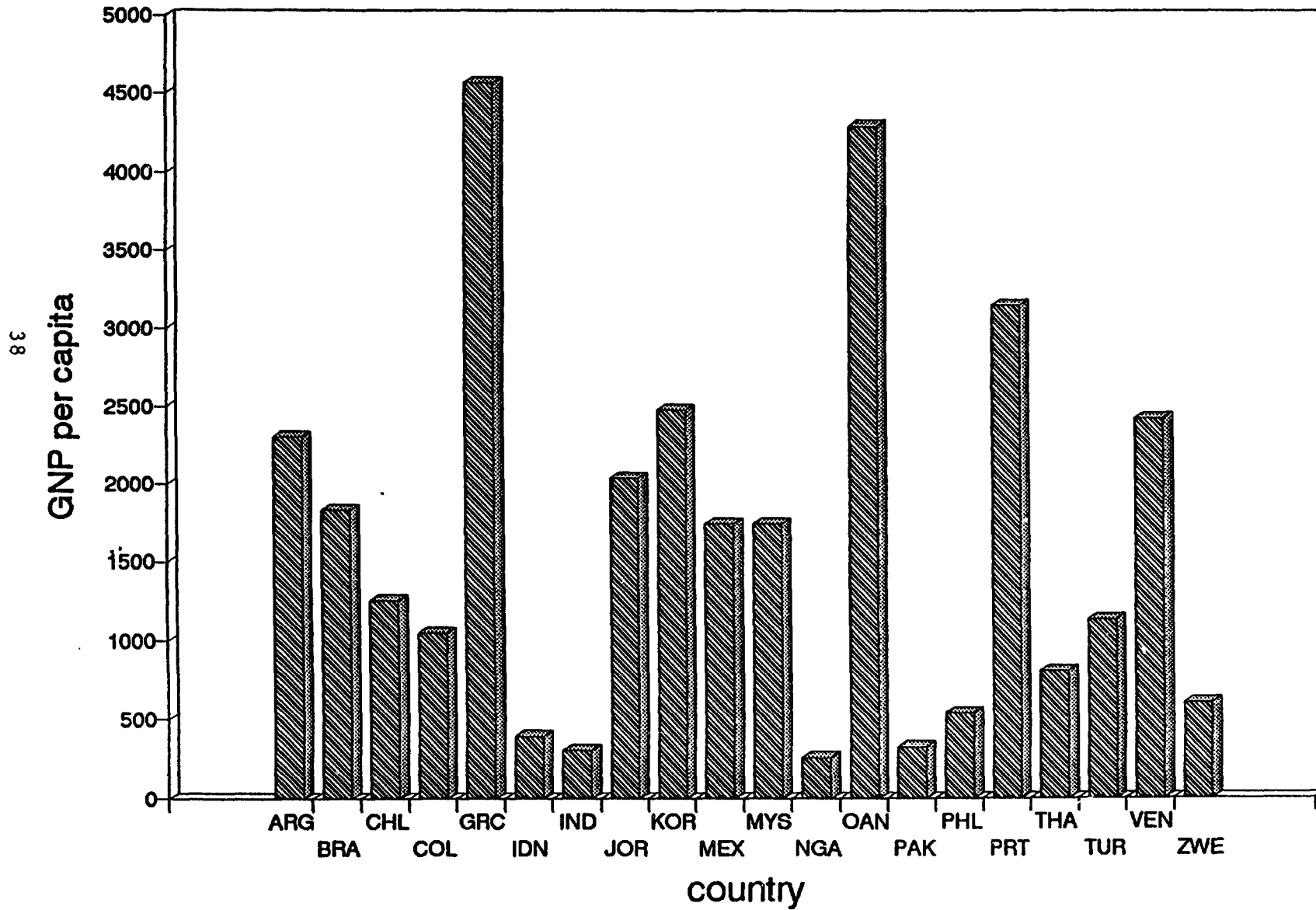
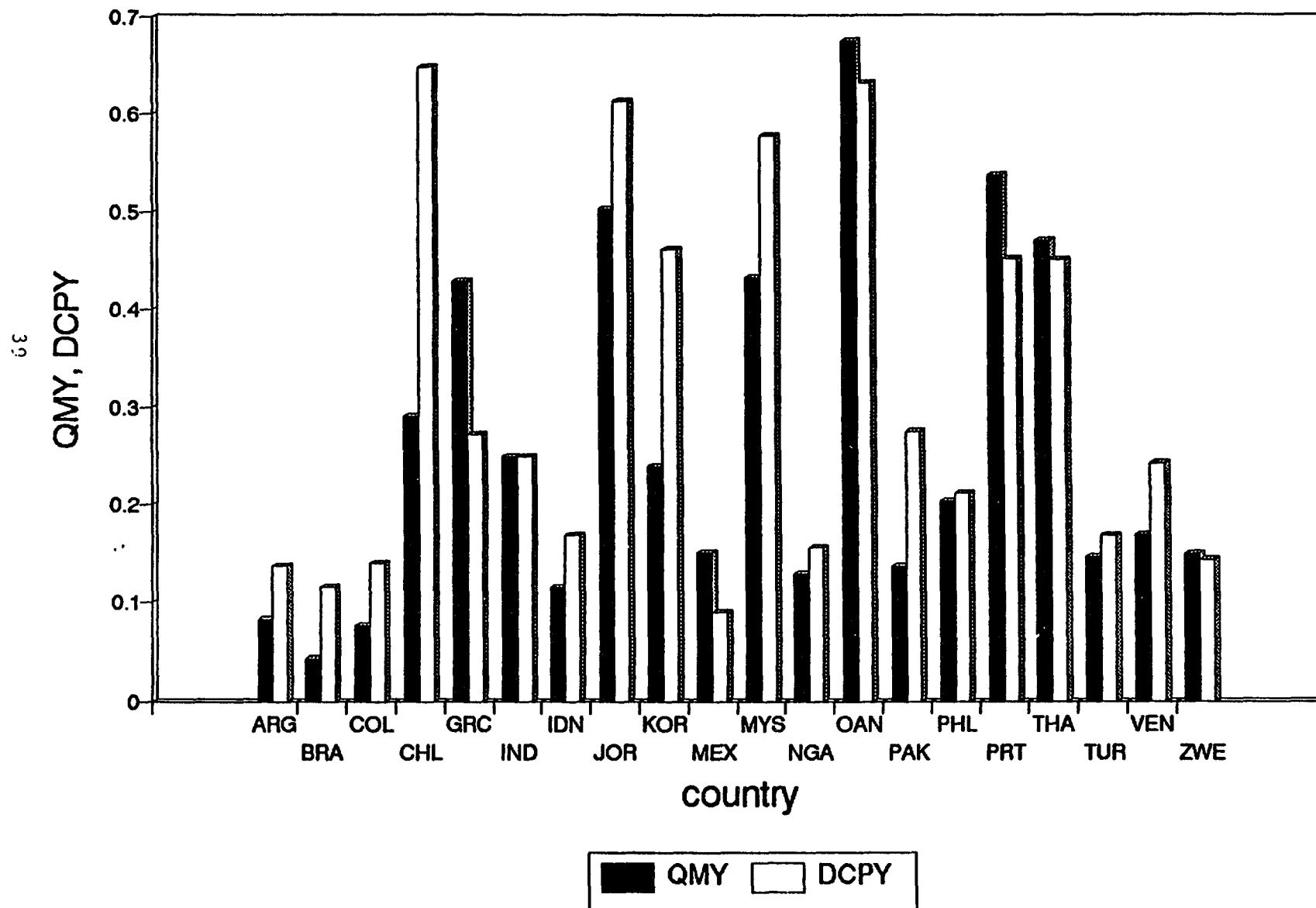


Figure 15
QMY and DCPY in 1985



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