History of the Gold Standard

The Bank of England was the first central bank with strict regulations for the issue of bank notes. Founded in 1694, it competed for its first 150 years with other private money issuing banks to be the government creditor. In 1844 after years of abuse, the issue of notes came under strict regulation that allowed a maximum of 14 million pounds in securities to be issued at any time (Peel's Bank Act). These securities would be covered by bonds, but were not tied to gold. Every further pound note would be issued only at 100% gold reserve.

This was the beginning of the classical gold standard. It was the first internationally recognized monetary system with paper money based on gold, and in which note-issuing banks were allowed to issue more vouchers in the forum of currency than they actually had in gold reserve.

At the beginning of 1800 England was seen as a leader in world trade and could thus advance the classical gold standard to a global system with little interruption in the following years. According to the British model, every currency was just a national name for a certain amount of gold, whereby the price of gold (per troy ounce) was set through the intervention policies of the Bank of England at its gold market. For almost a century this price remained 3 pounds 17 shilling 9 pence (exchange rate: 1 kg Gold = 136.70£ = 2790 M or 1£ = 20.43 M).

Gold was the global currency and it was circulated throughout the world as various paper currencies that were linked through a set exchange rate. With the pound worth 9 grams of gold, and a thaler worth 3 grams, everyone would know that 3 talers = 1 pound and 1 taler = 1/3 pounds – and would remain so. since currency law could be changed by parliaments but not by market forces.

After 1914

England was politically and economically too weak to continue its leadership role after 1914. The US was on its way to being a global player while concurring interests and power struggles within Europe eventually escalated into World War I (1914-1918). War, however, can be financed only when enough money for military expenditures is available. The rules of the gold standard did not allow for this. The logical consequence was thus to discontinue the gold standard, in that the following measures were implemented

- Suspension of free trade of commodities, capital and gold - Suspension of the requirement of gold reserve by the banks Slackening of gold coverage regulations.

In addition to gold, treasury notes were also allowed as "cover." By suspending the gold standard, individual countries were allowed to – with the help of a national money printer – create money from nothing, without gold backing, and thus to finance the war and to push national debt into unforeseeable heights. (This is how, for example, the German money supply during 1914-1918 increased from 9 billion Reich marks (RM) to 52 million RM.) In the years 1920-1922 the US held approximately 70% of all world gold reserves. The influx of gold into the US from weapons payments and other war-related foreign transfers was "sterilized," i.e., not released into circulation. According to the rules of the gold standard, the US should have issued into circulation the equivalent currency for the war gold, but this would have resulted in even higher inflation. During this time there was no pressure for the US to devalue the currency (if necessary through a zero-interest rate policy), in order to restore economic equilibrium.

Bretton Woods and the end of the Gold standard

gold standard following the Second World War. This was a system of essentially fixed but in exceptional situations adjustable exchange rates, with currencies covered by gold and bond reserves of the central banks. The US-dollar and the British pound were the only reserve currencies. The result was a golddollar link. Central banks were obliged to exchange currencies for gold at a fixed exchange rate (\$35 per troy ounce). The IMF (international monetary fund) was established to oversee the system. The US could maintain its supremacy with the dollar as the global reserve currency only as long as the US practiced a disciplined financial policy, and as long as the rest of the world considered the dollar as good as gold. But international trust in the dollar's stability weakened as the US lived beyond its means in the aftermath of Johnson's "New Society" program, incurred war-related debts and contributed to global inflation. The dollar reserves of non-American central banks far surpassed the US gold reserves Theoretically, the US was bankrupt. France demanded that the US convert the French dollar reserves

Under the new world leader the United States of America, the "Bretton Woods system" reintroduced the

On August 15, 1971 US president Richard Nixon unilaterally "closed the gold window" by officially canceling the right for all other central banks to convert dollar holdings into gold. In 1973 the Bretton Woods system was replaced by a system with flexible exchange rate without ties to the dollar and gold

into gold, and to return it to France. In doing so, the French signaled a political crisis that would

from http://www.goldseiten.de

The end of Bretton-Woods

Starting in the 1950s, the United States began running persistent trade deficits that created liabilities in the United States to other central banks, and beginning in the early 1960s, the United States no longer had sufficient gold to cover these liabilities. To alleviate this problem, the United States Congress on March 18, 1968 repealed the requirement for a gold reserve to back US currency. However Central Banks could still redeem US dollars for gold. This became a serious problem in the early1970s when rising US inflation caused a lack of confidence in the U.S. dollar, leading Central Banks, particularly the Bank of France, to redeem US dollars for gold. As a result, the United States went off the gold standard on August 15, 1971 when President Richard Nixon announced that the United States would no longer convert dollars to gold at a fixed value.

The US gold reserves were, by 1975, already quite inadequate to cover all dollars in circulation at the official parity. Thus the notion that the US\$ was backed by gold was nominal rather than real, and the United States had been on a fiat money system since the 1940s at least.

Nixon's move undermined the Bretton Woods system and left the International Monetary Fund, Bank For International Settlements and World Bank all without any foundation for global monetary policy other than to rely on the US dollar as a reserve currency. This was seen as an imperial move by many, removing any and all semblance that these institutions were mediators or regulators of money markets. They were, in effect, marketing agencies for the US dollar and a system in which other currency was neces-

source:http://www.wordiq.com/definition/Gold_standard

On November 6th of 2000 Iraq became the first country to receive all of its oil export payments in euros instead of

U.N. to let Iraq sell oil for euros, not dollar

UNITED NATIONS (Reuters) -- A U.N. panel on Monday approved Iraq's plan to receive oil-export payments in Europe's single currency after Baghdad decided to move the start date back a week.

Members of the Security Council's Iraqi sanctions committee said the panel's chairman, Dutch Ambassador Peter van Walsum, would inform U.N. officials on Tuesday of the decision to allow Iraq to receive payments in euros, rather than dollars.

in three months on the impact of the switch to euros, which a U.N. study said would cost Iraq at least \$270

U.N. Secretary-General Kofi Annan's office is to report

Baghdad currently is selling about \$60 million in crude day, about 5 percent of the world's oil exports.

Under the U.N. "oil-for-food" programme, Iraq is permitted to sell unlimited quantities of oil to purchase needed supplies for its people, to alleviate the impact of U.N. sanctions. The embargoes were imposed when Baghdad's troops invaded Kuwait in August 1990.

Contracts for goods as well as oil sales are approved by the United Nations, which has a dollar-based escrow account at the New York branch of the French bank BNP-Paribas. More than \$10 billion is in the bank.

CNN.com

Introducing the Petrodollar

To focus on the study of the emerging petroleum revenues in light of the sharp increase in its price as of the beginning of 1974, I wish to introduce a new term Petrodollars. It may be defined as the Unites States dollars earned from the sale of oil. For certain historical reasons, price of oil has been and still is denominated in United States dollars.

It may be observed that 1974 will stand in recent history as the year of energy crisis in industrialized countries, the year of conflict between oil-exporting and oil-importing countries, the year of unprecedented reallocation of resources intra and internations and the year of unconventional disequilibria in balance of payments in most of the countries of the world.

Oil, as the main source of energy, is a depletable natural resource for which demand is inelastic. This means that if production is curtailed, both prices of oil and Petrodollars will increase.

As the main oil exporters and with the largest known recoverable reserves in the world, Arab-oil exporting countries reduced their oil production by twenty five percent, stage by stage, to attain justifiable political and economic demands as the result of the Mideast October war of 1973. One of the most significant outcomes of the October events was the substantial increase in oil prices. The price of a barrel of Saudi Arabian 341 crude oil, F.O.B. Ras Tanura, rose from \$2.59 on January 1, 1993 to \$5.12 on October 16, 1973 to \$11.65 on January 1, 1974. Hence Petrodollars surpluses will accumulate until they are to be spent on consumption, development and investments.

Source: Petrodollars: Problems and Prospectsby Dr. Ibrahim M.Oweiss Address before the Conference on The World Monetary Crisis Arden House, Harriman Campus, Columbia UniversityMarch 1 - 3, 1974

US dollar hegemony has got to go By Henry C K Liu

There is an economics-textbook myth that foreign-exchange rates are determined by supply and demand based on market fundamentals. Economics tends to dismiss socio-political factors that shape market fundamentals that affect supply and demand. The current international finance architecture is based on the US dollar as the dominant reserve currency, which now accounts for 68 percent of global currency reserves, up from 51 percent a decade ago. Yet in 2000, the US share of global exports (US\$781.1 billon out of a world total of \$6.2 trillion) was only 12.3 percent and its share of global imports (\$1.257 trillion out of a world total of \$6.65 trillion) was 18.9 percent. World merchandise exports per capita amounted to \$1,094 in 2000, while 30 percent of the world's population lived on less than \$1 a day, about one-third of per capita export value. Ever since 1971, when US president Richard Nixon took the dollar off the gold standard (at \$35 per ounce) that had been agreed to at the Bretton Woods Conference at the end of World War II, the dollar has been a global monetary instrument that the United States, and only the United States, can produce by fiat. The dollar, now a fiat currency, is at a 16-year tradeweighted high despite record US current-account deficits and the status of the US as the leading debtor nation. The US national debt as of April 4 was \$6.021 trillion against a gross domestic product (GDP) of \$9 trillion. World trade is now a game in which the US produces dollars and the rest of the world produces things that dollars can buy. The world's interlinked economies no longer trade to capture a comparative advantage; they compete in exports to capture needed dollars to service dollar-denominated foreign debts and to accumulate dollar reserves to sustain the exchange value of their domestic currencies. To prevent speculative and manipulative attacks on their currencies, the world's central banks must acquire and hold dollar reserves in corresponding amounts to their currencies in circulation. The higher the market pressure to devalue a particular currency, the more dollar reserves its central bank must hold. This creates a built-in support for a strong dollar that in turn forces the world's central banks to acquire and hold more dollar reserves, making it stronger. This phenomenon is known as dollar hegemony, which is created by the geopolitically constructed peculiarity that critical commodities, most notably oil, are denominated in dollars. Everyone accepts dollars because dollars can buy oil. The recycling

of petro-dollars is the price the US has extracted from oil-producing countries for US tolerance of the oil-exporting cartel since 1973. By definition, dollar reserves must be invested in US assets, creating a capital-accounts surplus for the US economy. Even after a year of sharp correction, US stock valuation is still at a 25-year high and trading at a 56 percent premium compared with emerging markets. The Quantity Theory of Money is clearly at work. US assets are not growing at a pace on par with the growth of the quantity of dollars. US companies still respresent 56 percent of global market capitalization despite recent retrenchment in which entire sectors suffered some 80 percent a fall in value. The cumulative return of the Dow Jones Industrial Average (DJIA) from 1990 through 2001 was 281 percent, while the Morgan Stanley Capital International (MSCI) developed-country index posted a return of only 12.4 percent even without counting Japan. The MSCI emerging-market index posted a mere 7.7 percent return. The US capital-account surplus in turn finances the US trade deficit. Moreover, any asset, regardless of location, that is denominated in dollars is a US asset in essence. When oil is denominated in dollars through US state action and the dollar is a fiat currency, the US essentially owns the world's oil for free. And the more the US prints greenbacks, the higher the price of US assets will rise. Thus a strong-dollar policy gives the US a double win. (...) A strong-dollar policy is in the US national interest because it keeps US inflation low through low-cost imports and it makes US assets expensive for foreign investors. This arrangement, which Federal Reserve Board chairman Alan Greenspan proudly calls US financial hegemony in congressional testimony, sound money can ever lead to full employment when unemployment is necessary has kept the US economy booming in the face of recurrent financial crises in the rest of the world. It has distorted globalization into a "race to the bottom" process of exploiting the lowest labor costs and the highest environmental abuse worldwide to produce items and produce for export to US markets in a quest for the almighty dollar, which has not been backed by gold since 1971, nor by economic fundamentals for more than a decade. The adverse effect of this type of globalization on the developing economies are obvious. It robs them of the meager fruits of their exports and keeps their domestic economies starved for capital, as all surplus dollars must be reinvested in US treasuries to prevent the collapse of their own domestic currencies. The adverse effect of this type of globalization on the US economy is also becoming clear. In order to act as consumer of last resort for the whole world, the US economy has been pushed into a debt bubble that thrives on conspicuous consumption and fraudulent accounting. The unsustainable and irrational rise of US equity prices, unsupported by revenue or profit, had merely been a devaluation of

is insufficient to absorb the continuous growth of the world's new productive power. For the world economy to grow, the whole population of the world needs to be allowed to participate with its fair share of consumption. Yet economic and monetary policy makers continue to view full employment and rising fair wages as the direct cause of inflation, which is deemed a threat to sound money. The Keynesian starting point is that full employment is the basis of good economics. It is through full employment at fair wages that all other economic inefficiencies can best be handled, through an accommodating monetary policy. Say's Law (supply creates its own demand) turns this principle upside down with its bias toward supply/production. Monetarists in support of Say's Law thus develop a phobia against inflation, claiming unemployment to be a necessary tool for fighting inflation and that in the long run, sound money produces the highest possible employment level. They call that level a "natural" rate of unemployment, the technical term being NAIRU (non-accelerating inflation rate of unemployment). It is hard to see how to maintain sound money. Within limits and within reason, unemployment hurts people and inflation hurts money. And if money exists to serve people, then the choice becomes obvious. Without global full employment, the theory of comparative advantage in world trade is merely Say's Law internationalized. No single economy can profit for long at the expense of the rest of an interdependent world. There is an urgent need to restructure the global finance architecture to return to exchange rates based on purchasing-power parity, and to reorient the world trading system toward true comparative advantage based on global full employment with rising wages and living standards. The key starting point is to focus on the hegemony of the dollar. (...) Source: Henry C K Liu, US dollar hegemony has got to go, Asia Times, April 11,

d'Investissements was incorporated in Luxembourg in January, 1973. It is owned by twenty four Arab and Western banks including the Bank of America together with West German, Italian, Japanese and french banks. It opened its first subsidiary Banque Franco-Arabe d'Investissements in Paris in April, 1973. In addition to the above four major consortia, there are several other

was made up of sixteen Arab financial

institutions including FRAB and seven

European banks. It has subsidiaries in

° La Compagnie Arabe et International

branches in Paris and Milan.

Brussels and Frankfurt and plans to have

institutions and banks which are presently competing independently for business with Arab oil-exporting countries. The First

National City Bank of New York operates ° The European Arab Bank headquartered branches in Beirut, Saudi Arabia, Bahrain and Dubai. The Chase Manhattan Bank the dollar. Ironically, the current fall in US equity prices reflects a trend to an even stronger dollar, as it can buy more deflated shares. The world economy, through technological progress and non-regulated markets, has entered a stage

of New York has branches in Beirut and Bahrain. Chase Manhattan along with Morgan Guarantee Trust of New York hold most of Saudi Arabian government deposits. In addition, a number of other American banks operate out of Beirut which is regarded as the Mideast financial

There is only one private Arab banking institution, The Arab Bank, which is functioning on an international basis in bidding for deposits of Petrodollars. The Arab Bank was incorporated in Jordan and has branches in Zurich, London and Frankfurt. urthermore, there are a few individuals who manipulate some funds from

Petrodollars in world money markets strictly for commission. Using those funds as collateral, they can even borrow money at a certain rate and lend out at a higher rate. This probably explains why four

Arabian Gulf Emirates were the largest borrowers in the Euro-dollar market during the month of November and the first week of December. AAn amount of \$340 million has been borrowed by four [Arabian] Gulf Emirates in the Euro-dollar market over the last five weeks. These loans alone equal about two weeks normal world Euro-dollar borrowing and have had an upward effect on rates in the market. The following question may now be posed Will the above financial institutions and private bankers be able to manage Arab Petrodollars particularly when such reserves increase from \$13.1 billion in 1973 to an estimated figure of about \$50 billion in 1974?

Source: Dr. Ibrahim M. Oweiss, 'Economics of Petrodollars' from The Economic Dimensions of Middle Eastern History, The Darwin Press, Inc., Princeton, NJ, 1990, pp. 179-99

of overcapacity in which the management of aggregate demand is the obvious solution. Yet we have a situation in which the people producing the goods cannot Fiat money afford to buy them and the people receiving the profit from goods production cannot consume more of these goods. The size of the US market, large as it is,

Fiat money or **Fiat currency** (usually paper money) is a type of currency whose only value is that a government made a fiat (i.e. decreed) that the money is a legal method of exchange. Unlike commodity money or representative money it is not based in another commodity such as gold or silver and is not covered by a special reserve. Fiat money is a promise to pay by the issuer and does not necessarily have any intrinsic value. Its value lies in the issuer's financial means and creditworthiness. Most currencies in the world as of 2004 are flat monies.

Allocation of Petrodollars

was established in Paris in 1970 with

by fourteen Arab banks. UBAF has

Luxembourg and Tokyo. Partners in

° Union des Arabes et Françaises (UBAF)

more than \$700 million in assets. It is 40%

owned by Crédit Lyonnais but controlled

subsidiaries in London, Rome, Frankfurt,

those subsidiaries including several big

European banks and the Bank of Tokyo.

Internationaux (FRAB) was chartered in

Paris in 1969 by the Kuwait Investment

Company in partnership with the French

Banque Suisse. It has about \$180 million

Société Gènérale and the Société de

in Luxembourg started in 1972. It

in assets.

now a fiat currency

The Choice of Currency for the Denomination of the Oil Bill by Mr Javad Yarjani, Head, Petroleum Market Analysis Dept, OPEC

The International Role of the Euro (Invited by the Spanish Minister of Economic Affairs during Spain's Presidency of the EU) April 14, 2002, Oviedo, Spain

As we all know, the mighty dollar has reigned supreme since 1945, and in the last few years has even gained more ground with the economic dominance of the United States, a situation that may not change in the near future. By the late 90s, more than four-fifths of all foreign exchange transactions, and half of all world exports were denominated in dollars. In addition, the US currency accounts for about two thirds of all official exchange reserves. The world's dependency on US dollars to pay for trade has seen countries bound to dollar reserves, which are disproportionally higher than America's share in global output. The share of the dollar in the denomination of world trade is also much higher than the share of the US in world trade.

Having said that, it is worthwhile to note that in the long run the euro is not at such a disadvantage versus the dollar when one compares the relative sizes of the economies involved, especially given the EU enlargement plans. Moreover, the Euro-zone has a bigger share of global trade than the US and while the US has a huge current account deficit, the euro area has a more, or balanced, external accounts position. One of the more compelling arguments for keeping oil pricing and payments in dollars has been that the US remains a large importer of oil, despite being a substantial crude producer itself. However, looking at the statistics of crude oil exports, one notes that the Euro-zone is an even larger importer of oil and petroleum products than the US.

Source: Organization of the Petroleum Exporting Countries

Pricing of Oil

A study of the pricing of oil in world markets may shed some light on the analysis of Petrodollars.

Pricing of oil as far back as the 1920's was established on the basing point system. The United States and Mexico were the two main exporters of oil at that time. Therefore, it was natural that the price of oil in world trade was mainly influenced by the price of oil from the Gulf of Mexico. The basing point was simply calculated on the basis of the price of crude oil quoted in the Gulf of Mexico plus transportation costs, irrespective of the point of origin, from the Gulf of Mexico to the point of delivery. For example, if oil is shipped from Abadan in Iran to Calcutta in India, the buyer will have to pay the price of the Gulf of Mexico in addition to the cost of transportation from the Gulf of Mexico all the way to Calcutta. Even with the emergence of Venezuela as one of the major exporters of oil in the late twenties, this basing point system was not disturbed.

However, during WWII and with the emergence of the Middle Eastern countries as important suppliers of crude oil to the West, England became extremely concerned with the phantom freight rate being charged. In 1945 a new basing point system was established in which buyers in the Arabian Gulf would still pay the posted

price of oil from the Gulf of Mexico in addition to a freight rate from the nearest supply source. Therefore, it was feasible for Middle Eastern oil to compete geographically with U.S., Mexican or Venezuelan oil in nearby markets.

As the United States became concerned over the depletion of its own oil resources, the growing demand for fuel in Europe led to a substantial increase in the Middle East oil production.

Some writers concluded that in order to direct the oil market towards the Middle East and to ensure conservation of the United States oil resources in particular, Ait was necessary that the relative price of Middle Eastern crude oil should fall so as to enable it to compete with Western Hemisphere oil in Western Europe. Hence in 1945-47 Gulf of Mexico prices of crude were raised by \$1.32 per barrel (to \$2.68 for crude oil of 34 degrees API) [Arabian] Gulf prices were raised only by \$1.17 (to \$2.18). By March, 1948, all major Middle Eastern producers had established a uniform [Arabian] Gulf Price of \$2.18 per barrel (341), at which price existing freight rates equalized Middle Eastern and Gulf of Mexico based prices in London. In May 1948, [Arabian] Gulf prices were reduced to \$2.03. This was intended to make Middle Eastern oil competitive with Venezuelan oil in Western Europe. Since Venezuelan prices continued to equal Gulf of Mexico prices (minus the above mentioned import duty into the United States),

while Venezuela-western Europe freight rates were some 154 per barrel lower than United States-Western Europe rates, it was necessary to bring the price of Middle Eastern oil slightly below that of Venezuela.

Observing oil price movements since 1948, we find that the gap between the price of the Middle Eastern oil and that of the Gulf of Mexico has widened. Not only was Middle Eastern oil priced cheaply, but it was also abundantly produced. Fluctuations in tanker freight rates after WWII created new markets for Middle Eastern oil in back price is that price Aramco pays the government of the Far East, particularly Japan.

Reviewing the pricing of oil in world trade one can easily deduce the following facts:

1. Pricing of oil in world trade was not determined by the competitive forces of supply and demand, but was actually administered, controlled and manipulated by the international oil companies, mainly by the so-called seven sisters: Standard Oil of New Jersey (Exxon), Standard Oil of California (Socal), Standard Oil of New York (Mobil), Gulf Oil, Texaco, Anglo-Persian Oil (British Petroleum) and Royal Dutch Shell. In my view that those companies having owned most of the oil in the world through oil concessions, pursued an oligopolistic policy to maximize their profits. By keeping the price of oil low, they paid less royalties as they were usually a percentage of the posted price. Furthermore, they marketed their cheap oil to their parent companies, to their own refineries and/or to their own down stream operations, thus widening the gap between the cost of the main input, namely crude oil, and the revenues from the sale of the final products.

2. As a result of an administered pricing of oil, there was a disparity of prices, particularly between oil originating from the Gulf of Mexico and that originating from the Middle East. From 1948 to 1973, the gap between these two sets of prices was widening over time. Thus terms of trade of Middle Eastern exporting deteriorated more rapidly than those of Venezuela.

3. A complicated structure of oil pricing emerged as a result of diversified terms of international oil concessions and historical developments of oil ownership. There is, of course, a market price which reflects the actual price paid for every transaction and which is usually less than the posted price of oil. International oil companies came up with the notion of posted price which is a reference figure used to compute taxes and royalties paid to the Governments or rulers wherever oil was pumped. Then there is a buy-back price which

emerged with the implementation of OPEC's Resolution XVI,90 which stressed the necessity of oil-exporting countries to participate in the ownership of concessionholding companies. The buy-back price is what an oil company pays to the country from where oil is exploited for the percentage of oil produced which represents the governments ownership share in the company. In 1974, for example, the ownership of share of Saudi Arabia in the Arabian-American Oil Company (Aramco) represented sixty percent of the total production. A buy-Saudi Arabia on sixty percent of the oil produced.

Needless to say, this type of pricing does not exist in countries which have reacquired the full ownership of their oil production. In other countries which still share oil production with international oil companies, the buyback price also is less than the posted price. With the current fluid situation of oil issue, I do not think that the multiple and complicated system of oil prices can

4. The Middle East oil was cheaply sold in world markets. In money terms, in which figures are not adjusted for inflationary component, we find that the posted price declined from \$2.18 in 1947 to \$1.80 in 1970, a monetary decline of seventeen percent during this period. Thus Saudi Arabian oil as an example for other Middle Eastern countries bought less and less in real commodity exchange markets. This also means that the terms of trade of Middle Eastern oil-exporting were deteriorating over time. Furthermore, if we allow for the fact that the posted price is usually above market prices due to price discounts - which were sometimes substantial - one can easily conclude that oil exploitation of Middle Eastern oil was only suited to serve the economic interests of oil importing countries at the expense of oil-exporting nations. Further decline in the price of oil in 1959 triggered the anguish of oil-exporting countries. Therefore based on meetings of Iraq, Iran, Kuwait, Saudi Arabia and Venezuela, the Organization of Petroleum Exporting Countries (OPEC) was formed in September 1960 of which its current member countries are thirteen. The intention was to form a unified front as a means of collective bargaining with an extremely powerful group of buyers which had dictated an oil policy, in pricing as well as in production, along its own

Source: Dr. Ibrahim M. Oweiss, 'Economics of Petrodollars' from The Economic Dimensions of Middle Eastern History, The Darwin Press, Inc., Princeton, NJ, 1990, pp.