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Purchasing Power Funds:
A New Technology for
Channeling the Public's
Investment Capital

By

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PURCHASING POWER FUNDS:

A NEW TECHNOLOGY FOR CHANNELING

THE PUBLIC'S INVESTMENT CAPITAL*

by

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_life is really simple, but men insist on making it complicated._

Confucius

I. INTRODUCTION AND SUMMARY

Financial markets are the ateliers in which investors fashion and re-

fashion the particular slices of their nation's (nonpersonal) real assets

that they choose to own. Some spend most of their daylight hours there;

others come only infrequently; most conduct their business there by messenger.

The basic materials from which investors carve their ownership slices

are called financial instruments. From time immemorial, financial instru-

ments have exhibited two basic characteristics: (1) they have been horizon-

tal, i.e., they have (individually and in portfolios) provided a positive

payback of some kind for all or most levels of return on the "market as a

whole," and (2) they have, with rare exceptions, been "denominated" in nom-

inal units.

This paper introduces a fundamentally new type of financial instru-

ments, instruments most easily issued by a financial intermediary which,

for lack of a better name, will be called a purchasing power fund (PPF).

The securities themselves, which will be referred to as supershares,
differ from all previously issued financial instruments in that 1) they are vertical, i.e., they provide a payoff only for a pre-specified level, or narrow range, of the "market" (or other) return over some period and 2) they are (readily) denominated in real (i.e., deflated) terms.

Why in the world would we even want to consider such a thing as a PPF? Let me attempt to give a pair of introductory reasons.

First, there is at present no way for the average investor to effectively cope with, or hedge against, inflation. It is of course true that various countries have provided indexed bonds, also known as purchasing power bonds (e.g., Brazil, Finland, Israel). But it is noteworthy that these indexed instruments are fixed obligations. There exist, to my knowledge, no indexed purchasing power instruments of the "equity" type. Of course, stocks in general have long been thought of as a hedge against inflation (although many have questioned their effectiveness in this regard). But even if we grant that common stocks are in some rough sense a reasonably good hedge against inflation, the investor faces certain difficulties in choosing an appropriate portfolio in terms of deflated return distributions. He does, in effect, have to estimate both the (distribution of the) nominal return on his portfolio and (that of) the inflation rate and then divide the first (random variable) by the latter. This is because the return he expects will in some way depend on each company's real operations (profitability). But profitability is a function of revenues and costs and they in turn depend in a non-trivial way on the level of inflation. The net result of this is that there is in fact no direct way to hedge against inflation in present markets.

One can, of course, always blame the government for creating inflation. While this generally places the blame where it belongs, it doesn't
solve the problem and replacing the administration does not seem to help either. Where does this leave the investor? In the Old West, when the government was too far away to offer adequate protection, the citizenry sometimes took the law into its own hands. In the same way, the time seems ripe for the financial community to take the matter of (better coping with) inflation into its own hands. To accomplish this it must provide mechanisms which make it possible for investors who wish to bear real risk by holding equity instruments to make their choices on a real return basis. The PPF provides such a mechanism.

Second, the ex post "return on the market" has become the yardstick against which more and more large and small investors measure their own investment performance. Representing the "average" return, it is simple, intuitive, and meaningful; moreover, it is something achievable, at least gross of transaction costs and for sizable portfolios. But the enormous growth in "beta analysis" reflects the increasing role of the "market return" in ex ante settings as well.¹ By his choice of beta, the investor knows roughly, and has some control over, how his portfolio will do given the return on the "market." (Of course, to know exactly what his portfolio return, conditional on the market, will be he must in fact invest (and hold) some proportion of his assets in the "market portfolio" itself.) But present instruments only enable the investor to linearly amplify (by choosing a β > 1) or dampen (β < 1) the return on the "market." He cannot, for example, (readily) choose a portfolio which does better than the "market" if the market return is less than or equal to 20% and which gives a smaller return if the "market" is up more than 20%, and he cannot go short in the "market" without foregoing all return on the proceeds and on his margin, etc. To make an analogy, present financial markets offer the same
opportunities as those facing the homebuilder who must construct his wood frame house from 2 by 4's pre-cut in even foot lengths. It can be done, of course—but it isn't: the household saw was invented in response to the desire for more flexibility than the above lengths alone provide.

What I'm leading up to is that there is room for some fundamental innovation in financial markets. Industry long ago moved from using only natural raw materials by developing synthetic materials (such as synthetic rubber and various plastics). The time has come for the financial community to consider taking the same step, i.e., to begin adding vertical financial instruments to its (limiting but essential) repertoire of horizontalia.

The rest of the paper proceeds as follows. To provide an adequate backdrop for evaluating the worth of PPF's, and to help the reader assess for himself whether it is in fact a natural step in the evolution of financial markets, the next section offers a very brief outline of the crucial role played by financial markets and financial intermediaries in modern societies. Section III then describes the PPF concept in some detail, illustrating it with an example. It is noted that PPF's have much in common with such other important intermediaries as banks, insurance companies, and investment companies, and that supershares may be thought of as the "chemical" elements of a regular mutual fund share. Section III also gives a few examples of the enormously increased flexibility in portfolio construction made possible by PPF supershares: the investor's complete freedom to rearrange the "chemical" elements as he pleases implies, for example, that he can construct an essentially risk-free purchasing power bond, that he can in effect borrow at the lending rate of interest without actually borrowing, that he can in effect go short with full use of the proceeds (without risk of default), that he can construct
every imaginable ("conventional" and unconventional) option on the "market," and that he can even gamble if he wishes—on favorable terms. Moreover, those and other not presently available possibilities for constructing ownership slices in real wealth are equally accessible to both large and small investors. And the investment problem has every appearance of being simpler: it is similar to that of a shopper in a supermarket, and the investor knows (almost exactly) what he will get, given the "market" (fund) return, in advance.

Section IV suggests that, with the exception of the floating (and initial pricing) of supershares, the management and operation of PPF's is free of complications. While a number of different approaches to issuing supershares deserve attention, only three are mentioned in any detail; two of these call for the PPF to do its own floating and involve very little risk exposure on the part of management. To the extent that transaction costs reflect compensation for services and risk-bearing, it therefore appears possible to keep them relatively low for full-term investors. The same may be true in the secondary market as well. Finally, Section V contains some concluding remarks.

II. ASPECTS OF THE EVOLUTION OF FINANCIAL MARKETS

To adequately assess whether, and in what sense, the PPF represents a step in the progression of financial markets we must briefly address three questions. In particular, we must review what we mean by financial markets, remind ourselves of the role they play, and refresh ourselves about how they have evolved.

What, then, do we mean by financial markets in somewhat more precise language? To most people this term denotes the market for stocks and bonds.
But others would interpret financial markets more broadly, to include the market for options, insurance, commodities, savings accounts, mortgages, and consumer loans in general. In any case, there is general agreement that, roughly speaking, financial markets provide a mechanism through which an economic unit, such as an individual, can change the form of wealth that it holds. The roughness of this characterization arises from the fact that a person buying a loaf of bread also changes his wealth holding, yet we do not tend to think of the grocery store as a financial market in the same sense as, for example, the New York Stock Exchange.

One of the striking aspects of financial markets, even as loosely as we have defined them, is their disparity from nation to nation. Even the degree to which various countries have financial markets varies dramatically: some, including certain highly industrialized nations, have virtually no financial markets at all, while others provide such markets in great proliferation. These observables suggest that in order to explain why we have financial markets in the first place, and also to distinguish financial markets from other kinds of markets, we should start by looking at basic principles.

Real Wealth

Since markets in general involve the exchange of wealth, it will be useful to begin by categorizing the forms of real wealth that one finds in a nation; such a grouping can be found on the left side of Table I. The grouping in the table coincides fairly closely with that found in any standard treatise in economics. 3

Ownership of Real Wealth

Ultimately, all wealth is ascribed to human beings (as opposed to animals or the heavens). Bird sanctuaries and holy cows to the contrary,
# Table I

## NATIONAL WEALTH AND ITS CLAIMANTS

<table>
<thead>
<tr>
<th>National Wealth by Category</th>
<th>Ownership of National Wealth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Direct (Legal) Owners by Category</td>
</tr>
<tr>
<td>Personal items:</td>
<td>Individuals and &quot;families&quot;</td>
</tr>
<tr>
<td>Consumer goods</td>
<td>Individuals</td>
</tr>
<tr>
<td>Owner-occupied home(s), including condominia, etc., autos, furniture, clothing, and other personal belongings</td>
<td>Joint tenants</td>
</tr>
<tr>
<td></td>
<td>Proprietorship businesses, professional practices, and farms</td>
</tr>
<tr>
<td></td>
<td>Private trusts</td>
</tr>
<tr>
<td>Labor capacity and knowledge</td>
<td>Partnerships</td>
</tr>
<tr>
<td>Nonpersonal items:</td>
<td>Private organizations</td>
</tr>
<tr>
<td>Productive wealth</td>
<td>Religious institutions</td>
</tr>
<tr>
<td>Nonpersonal real estate</td>
<td>Private schools</td>
</tr>
<tr>
<td>Land, water (incl. natural resources)</td>
<td>Charitable and medical foundations</td>
</tr>
<tr>
<td>Buildings</td>
<td>Stock exchanges</td>
</tr>
<tr>
<td>Machinery and equipment</td>
<td>Social clubs</td>
</tr>
<tr>
<td>Business inventories</td>
<td>Mutual insurance companies</td>
</tr>
<tr>
<td>Extracted substances, metals, fuel, livestock, agricultural output, finished and unfinished goods</td>
<td></td>
</tr>
<tr>
<td>Production technology</td>
<td>Governmental units and public agencies</td>
</tr>
<tr>
<td>Technical know-how</td>
<td>Federal, state, and local governments and subdivisions, including public education districts, transportation authorities, government-owned &quot;corporations&quot; or enterprises, etc.</td>
</tr>
<tr>
<td>Organizational know-how</td>
<td>Corporations</td>
</tr>
<tr>
<td>Claims against foreign countries</td>
<td>Manufacturing, processing, extractive and agricultural units</td>
</tr>
<tr>
<td>Currencies, other holdings</td>
<td>Service units</td>
</tr>
<tr>
<td></td>
<td>Banks, insurance companies, pension funds, incorporated hospitals and dental practices, etc.</td>
</tr>
</tbody>
</table>
this assertion appears to apply as a self-evident truth, or at least as an operational definition, in all nations. This final ownership is exercised by humans as individuals or as families, which constitute the basic social units. But there is one important distinction that crops up again and again: some owners are viewed as "belonging" to the nation and others as "foreigners." Generally, the distinction is made on the basis of citizenship or permanent residence, but, especially in political contexts, it may also be based on residence in some distant past or even the superimposition of social class structures (such as the "people" vs. the "enemy"). While the distinction is of no great significance for purposes of this analysis, it will be convenient to equate a nation's individuals with those who reside there on a more or less permanent basis.

But even though natural persons and families are the ultimate claimants to a nation's wealth, their ownership rights are in many cases separated from the items of wealth themselves by a complex, and often extensive, legal and institutional network. While the legal ownership structure varies significantly from society to society, the categories of immediate (legal) owners of wealth that can be found are relatively few; the main types are shown in the middle column of Table I.

In Table I, the term personal items is used to denote those things of economic value which are always owned by individuals (or families) directly, as consumers and suppliers of labor. The vestige in the individual directly of his own labor capacity and knowledge is, of course, characteristic of all non-slave societies. Similarly, nonpersonal wealth (productive capital) consists of those forms of wealth which are capable of being owned by any one of the five first-line ownership categories: individuals and/or families, partnerships, private organizations, governmental and public
agencies, and corporations. It can also be said to include those forms of wealth, separable from natural persons, which are used in the production of goods and services or income.

As we examine different nations, there are substantial variations in the proportions of ownership distribution among the various categories. Direct ownership by individuals and families (of at least such things as clothing) appears to exist in all societies; similarly, public (government) ownership of at least some wealth appears to be universal. But the degree to which partnerships, private organizations, and corporations, if they are present at all, appear as direct owners of wealth is closely related to the foothold of the institution known as private property. Where this institution is strong, such as in the more "capitalistic" countries, the proportion of wealth held directly by individuals and families, partnerships, private organizations, and (nongovernment) corporations is relatively high (e.g., the United States, Sweden); in the more "socialistic" countries, the opposite is true (e.g., the Soviet Union).

The central point of Table I is that even though all national wealth (real wealth) is ultimately owned by individuals and families, only a small fraction of that wealth (in particular the non-personal wealth) is owned directly. Most ownership by individuals and families is indirect, via ownership in the nation's economic units (i.e., its partnerships, private organizations, governmental units, and corporations), who in turn own the real assets. This ownership is represented by claims issued by the direct owners; many of these are explicit while others are unwritten and implicit. The written claims are generally tradeable while the implicit ones are "untradeable." Stocks, bonds, commercial notes, warrants, commodity options, and paper money are examples of tradeable claims; they are often referred to
as financial assets of financial instruments. On the other hand, an individual's collective share in the net worth of his county, in the net worth of Yellowstone National Park, and in the net worth of the Ford Foundation is not evidenced by pieces of paper, nor is it possible for him to change (his residual) ownership in these economic units by trade (he can only do so by some type of physical relocation of his residence).

Financial assets (and non-tradeable claims) which are claims against domestic real assets can themselves not be real assets (since this would involve double-counting); only claims against the real assets of foreign countries qualify as part of a nation's (real) wealth (see Table I).

The Proliferation of Financial Instruments

We have observed that individuals own only a small part of the national wealth directly; most of it is owned indirectly via financial assets or other claims. Why is this? There appear to be several reasons. First, the use of financial instruments facilitates exchange; it is relatively easy to set up financial markets and to trade pieces of paper. Second, financial assets add flexibility to the form in which the nation's wealth can be held—that wealth can now be sliced into many more components than before, a property which is particularly important when returns to scale induce the establishment of large economic units. The desire for flexibility in asset holdings has in fact been so strong that it has led to the establishment of financial intermediaries, i.e., of economic units whose main function is the creation of new types of claims based on pools of claims issued by direct owners of real wealth (i.e., by individuals, partnerships, private organizations, governmental units, and corporations). Financial intermediaries then, hold primarily "first-line" financial claims against which they issue new types of claims. Examples are banks, who create
demand and time deposits (against what is essentially a pool of consumer, business, and government loans), insurance companies, who construct property, health, life, retirement and other contracts largely against a portfolio of stocks, bonds, mortgages, etc., and open and closed end investment companies, who generally issue one type of new claim against a diversified portfolio of "ordinary" claims. While particularly prominent in recent times, financial intermediaries have a long history; banks played an important role in economic life as far back as Babylonian times and became especially prominent in the period preceding the Renaissance (recall the Medicis, etc.). Insurance companies have a long history also while investment companies are of more recent origin.

The desire for richness in a nation's wealth-holding possibilities shows up in other ways as well. Recently direct owners of real wealth, particularly corporations, have begun to issue new kinds of instruments themselves (warrants, convertible preferred stock, convertible bonds, etc.), instruments which provide increased flexibility for investors directly. Finally, by establishing option markets, investors themselves, so to speak, are adding additional flexibility to the form in which the nation's wealth can be held.

To repeat, financial markets have arisen for two principal reasons: they add richness to the forms in which the nation's wealth can be held by its individuals and families, and they make it easier to change the form in which individuals hold that wealth. Generally speaking, the richer a nation's financial markets, the better off that nation's individuals are, other things being equal. More precisely, whenever investors are heterogeneous in a non-trivial sense, there is a direct relationship between the economic welfare of the nation's individuals and families and the richness of its financial markets.¹
Quo Vadis?

We have now come to a point where we might reasonably ask the question: "Where does the process of adding new financial markets stop?" In a classic paper, Professor Kenneth Arrow demonstrated that the process will stop when we reach what is known as a "complete" financial market. A complete market can be described quite simply: it is a situation in which we have a market connected with every contingency that at least some investors are concerned about and to which they would prefer differential exposure. As a practical matter, however, no one knows for sure what a complete market is, especially in the presence of transaction costs.

But even though we cannot tell exactly when we will reach a complete market, three things are reasonably clear: 1) we are still far from a complete financial market; 2) we will continue the process of moving toward a complete market by adding even more financial instruments; 3) the addition of new instruments drastically increases the information demands placed on investors. With respect to the last item, American investors are faced with a choice among thousands of financial instruments. Because of this multitude of investment outlets, choosing a portfolio on an informed basis may even now seem overwhelming to the ordinary person; this possibility may in part be responsible for the recent decline of his role as a "direct" participant in financial markets.

The question which arises, then, is the following: Is there 1) a way to add important new flexibility to the ways in which the nation's wealth can be held, that is, can we add significantly to market richness, 2) without adding too many new instruments, while at the same time 3) keeping the information demands on the investor down? I now hope to show that the creation of one or more purchasing power funds is a natural step along such a path.
III. THE PURCHASING POWER FUND CONCEPT

I will now attempt to describe the purchasing power fund (PPF) concept in some detail. To provide an appropriate backdrop for this description, it may be useful to begin by identifying its main characteristics. First of all, a purchasing power fund is a financial intermediary. As such, it combines the main features of our principal contemporary intermediaries: like banks, it does a great deal of risk pooling and issues entirely new instruments; it provides, like insurance companies, a multitude of novel risk sharing arrangements; like investment companies, it provides diversification by simple means. Second, a PPF accomplishes a substantial enrichment of the financial market (in terms of the choices it makes possible for investors) with relatively few instruments, particularly in relation to the enrichment obtained with a similar number of conventional convertibles and options. Third, a PPF enables the investor to directly choose the risk he wishes to bear in real terms as opposed to nominal terms. Fourth, the investor knows almost exactly what kind of (real) return he will have for a crucial, simple, and meaningful (mutually exclusive and exhaustive) set of contingencies. Finally, (for the preceding to be possible) the instruments issued by the PPF must have a fixed maturity (or a sequence of maturities) and the fund is, for reasons that will become clear later, best left "unmanaged." The ultimate purpose of the PPF then, simply stated, is to provide large and small investors with a simple and versatile means of directly investing in their nation's economy.

An Example

Table II presents the balance sheet of a PPF (with, for illustrative purposes, initial assets of $10 million). The asset side would contain the more important stocks and bonds, ranging from possibly 100 to perhaps well
<table>
<thead>
<tr>
<th>Assets</th>
<th>Claims</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of outstanding supply of bond 1</td>
<td>5,000,000 &quot;-50%&quot; shares payable Jan. 7, 77 only if the deflated value of the assets is less than or equal to $5,050,000</td>
</tr>
<tr>
<td>% of outstanding supply of bond 2</td>
<td></td>
</tr>
<tr>
<td>% of outstanding supply of bond m</td>
<td>**</td>
</tr>
<tr>
<td>% of outstanding supply of stock 1</td>
<td>5,100,000 &quot;-49%&quot; shares payable Jan. 7, 77 only if the deflated value of the assets exceeds $5,050,000 and is less than or equal to $5,150,000</td>
</tr>
<tr>
<td>% of outstanding supply of stock 2</td>
<td></td>
</tr>
<tr>
<td>% of outstanding supply of stock n</td>
<td></td>
</tr>
<tr>
<td>% of outstanding supply of stock n</td>
<td></td>
</tr>
<tr>
<td>% of outstanding supply of stock n</td>
<td></td>
</tr>
</tbody>
</table>

Total Assets: $10,000,000

Total Claims: $10,000,000

*At most recent (closing) market prices.

**At issue prices, pro-rated.
over 1000 in number. Note that the fund holds the same percentage of the outstanding supply of each item in its portfolio. This is certainly not necessary but it has several virtues. It means of course that the PPF would own a cross-section of the "market," a representative slice of the nation's economy, or, if you will, the "market portfolio." This in turn simplifies the investor's decision problem and insures that the PPF will be particularly relevant and beneficial in terms of economic welfare.6

Against its assets, the PPF has, in the illustration, issued 111 mutually exclusive claims, all maturing on Jan. 7, 1977. (Since all assets are financial instruments, the PPF clearly qualifies as a financial intermediary). These claims are fundamentally different from the financial instruments on the asset side (as in a bank) and they are contingent on specific events (as in an insurance company). The claims are tied to 111 different possible events (one claim for each event), one, and only one, of which must, without ambiguity, happen on the maturity date. At maturity, all assets will accrue to one claim—the other 110 will, on that date, expire worthless. Thus, the claims issued by the PPF are similar in nature to options.

The specific events to which the claims are keyed is the percentage change in the value of the fund's total assets from the time the claims were issued to their maturity date. For example if the asset side, after adjusting for inflation, is still worth $10 million on Jan. 7, 1977, the fund will have experienced a 0% real gain. The "0%" supershares therefore "pay off," and since there are 10 million such shares outstanding (see Table II), each "0%" share receives $1 in real terms (that is $1.09 in actual money if, for example, the rate of inflation turned out to be 9%); all other supershares receive nothing. If on the other hand the fund had experienced a 49% real loss (i.e., the deflated value of the assets had fallen to $5,100,000 at
maturity), the ",-49%" shares would pay off (and no others)---since there are
(only) 5,100,000 such shares outstanding, each share would again receive
one dollar in real terms. 7 And so on.

The "x%" shares do not only pay off if the real rate of return is
exactly x%, they also pay off if the real rate of return, rounded to the
nearest %, is x%. Thus, the "-24%" shares, for example, pay off if the
real rate of return exceeds -24.5% and is less than or equal to -23.5%.
The payoff per share, therefore, need not be exactly $1 but will range from
roughly 99c to $1.01 per share, excepting the "extreme" shares, i.e., in
this illustration the "-50%" and the "60%" shares. 8 (Note, from Table II,
that the "-50%" shares, for example, would pay 50 cents [and the others
nothing] if the real rate of return on the fund's assets were -75%, and the
"60%" shares would, as an example, pay $1.50 if the real rate of return were
140%).

**Conditions for Payment of Claims**

We shall now examine more closely the conditions under which a particu-
lar supershare pays off. In the Table III example, the x% claims become pay-
able at maturity if and only if

\[ 100 + x - .5 < \frac{m/b}{0.01(1 + .01i)} < 100 + x + .5, \quad x = -49, -48, \ldots, 59, \]

where m is the market value of the fund's assets at maturity, b is the
opening market value of the fund's assets, and i is the rate of inflation
based on the Consumer Price Index (or similar index); the left side does not
apply for the "-50%" shares (x = -50) and the right side does not apply for
the "60%" shares (x = 60).

As an example, suppose that over the term of a given set of supershares
the assets of the fund decrease in value 26.4% (i.e., m = $7,360,000 if b =
$10 million) and the rate of inflation is 12.2%. 9 In this case, the "-34%"
shares would pay off, since \[ \frac{7,360,000}{10,000,000} \approx 0.736 \]. Each share would receive $1.11515 actual (nominal) dollars ($7,360,000/6,600,000), which translates to $0.9939 (1.11515/1.122) deflated dollars per share.

As a second example, the "20%" shares would pay off under a variety of conditions, including the following:

<table>
<thead>
<tr>
<th>Increase in Nominal Market Value of Fund</th>
<th>Rate of Inflation</th>
<th>Proceeds Per Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>14%</td>
<td>-5%</td>
<td>.9500</td>
</tr>
<tr>
<td>20%</td>
<td>0%</td>
<td>1.0000</td>
</tr>
<tr>
<td>26%</td>
<td>5%</td>
<td>1.0500</td>
</tr>
<tr>
<td>27%</td>
<td>6%</td>
<td>1.0583</td>
</tr>
<tr>
<td>29.2913%</td>
<td>7.3%</td>
<td>1.0761</td>
</tr>
<tr>
<td>31%</td>
<td>9%</td>
<td>1.0917</td>
</tr>
<tr>
<td>32%</td>
<td>10%</td>
<td>1.1000</td>
</tr>
<tr>
<td>38%</td>
<td>15%</td>
<td>1.1500</td>
</tr>
<tr>
<td>44%</td>
<td>20%</td>
<td>1.2000</td>
</tr>
<tr>
<td>50%</td>
<td>25%</td>
<td>1.2500</td>
</tr>
</tbody>
</table>

etc.

Initial Supershare Prices: An Illustration

So far, everything looks a bit abstract. In order to make the discussion more concrete, we need to ask what the investor can do in the presence of a PPF that he couldn't do before. This, however, requires a price structure for the supershares. A hypothetical initial price structure of this type is given in Table III. However, even though purely hypothetical (since supershares have no empirical counterpart at the present time), this price structure captures certain things that one might reasonably expect. For example built into the prices are a management/underwriting fee of 2.13%; note, also, that the "-15%" to "25%" shares, for example, cost more than the "-40%" shares and the "40%" shares, etc.
TABLE III

Hypothetical Initial Prices: One-Year Purchasing Power Fund
with 111 Types of Shares Outstanding

<table>
<thead>
<tr>
<th>Share Type</th>
<th>Price Per 100 Shares</th>
<th>Share Type</th>
<th>Price Per 100 Shares</th>
</tr>
</thead>
<tbody>
<tr>
<td>-50%</td>
<td>$ .02</td>
<td>1%</td>
<td>$ 3.00</td>
</tr>
<tr>
<td>-46%</td>
<td>.02</td>
<td>10%</td>
<td>3.00</td>
</tr>
<tr>
<td>-45%</td>
<td>.04</td>
<td>11%</td>
<td>2.00</td>
</tr>
<tr>
<td>-41%</td>
<td>.04</td>
<td>20%</td>
<td>2.00</td>
</tr>
<tr>
<td>-40%</td>
<td>.05</td>
<td>21%</td>
<td>1.00</td>
</tr>
<tr>
<td>-36%</td>
<td>.05</td>
<td>25%</td>
<td>1.00</td>
</tr>
<tr>
<td>-35%</td>
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<tr>
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<td>2.25</td>
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Cost of 100 shares of all types $97.55
Mean real rate of interest 2.51%
Range of real rate of interest* 1.49% to 3.53%
Cost of "mutual fund share" per $100 asset value $102.13

*Assuming asset value does not decrease more than 50.5%
or increase more than 60.5%.
(Once issued, we would clearly expect a secondary market in supershares to develop in the same way that we observe such markets arising for other widely held financial instruments. I will have more to say about secondary trading later; for the time being, we shall limit the discussion to the ramifications of full-term investment, although the essential aspects of much of the analysis applies with equal force to positions acquired after the issue date.)

Returning to Table III, then, we see that the "1%" shares cost $3 per 100 or 3 cents apiece (recall that the "1%" shares will return something very close to $1 in real terms if the real return on the fund's assets is within one half percent of 1%). Similarly, the "-40%" shares sell for 5 cents per 100, the "-20%" shares for 80 cents per 100, the "20%" shares for $2 per 100, the "60%" shares for a penny per 100, etc.

Suppose now that we consider buying 100 shares of all types. This means that we are almost sure to get something very close to $100 in real dollars back; in every contingency, 100 of our shares will pay off. And what they will pay will be within 1% of $1 per share (excepting the "-50%" shares, which may pay less than $1, and the "60%" shares, which may pay more than $1). If we view a real rate of return on the "market portfolio" of less than -50.5% or over 60.5% as very unlikely, then owning 100 shares of each type is in the nature of a promise to pay or a virtually riskfree bond. Actually, it is more than an ordinary bond—it is a purchasing power bond or an indexed bond. Yet no government stands behind it, no corporation has had to promise to the "holder" a nominal rate of interest plus the rate of inflation. It is a "bond" constructed by the investor himself, of his own free will; it is "backed" by a solid cross-section of the major financial instruments traded in the financial markets. Furthermore, the investor can buy the "bond" in any denomination he chooses.
The cost of the "bond," clearly, is the sum of the costs of its components; adding the prices shown in Table III, a "$100 bond" costs $97.55, a "$10,000 bond" $9,755. Thus, the real rate of interest is essentially (within 1% of) 2.51% \((100(100/97.55 - 1))\). Built into the price structure of every PPF (with a sufficient number of different supershares), then, is a real rate of interest; in our illustration that rate, as noted, is approximately 2.5%\(^{11}\).

How much would the PPF collect by selling all of its supershares at the prices shown in Table III? This of course is a matter of simple arithmetic: for the $10 million fund in Table II we would sell 5 million "-50\%" shares at $.02 per 100, 5.1 million "-49\%" shares at $.02 per 100, ..., and 16 million "60\%" shares at $.01 per 100, which yields a total of $10,213,000. Since the assets "cost" $10 million, we see that the Table III price structure indeed incorporates a 2.13% management fee, as alluded earlier. However, since the fund is essentially unmanged, it may be more appropriate to refer to this fee as compensating for the risks and costs of underwriting or otherwise floating the PPF.

Supershares: The "Chemical" Elements of the Mutual Fund Share

We have already seen how the investor can construct a virtually risk-free indexed bond from the supershares issued by a PPF. Let us now consider a few more examples of what investors can do in the presence of a PPF.

First, let us ask whether the investor can buy a "regular mutual fund" share in the fund. The answer is yes. For example, suppose an investor would like to invest $10,000 (plus the 2.13% fee for a total investment of $10,213). If the fund were of the regular variety with one type of shares outstanding, he would, using our previous $10 million fund as an illustration, end up holding .1% of the fund's common shares. But by purchasing .1% of each of the outstanding supershares (i.e., 5,000 of the "-50\%" shares, 5,100 of the "-49\%", ..., 16,000 of the "60\%" shares), the investor would be in an identical position, no matter what happens. That is, no
matter which supershare pays off, the investor is entitled to .1% of the fund's net worth. If the fund's assets increase by 11.241%, the investor's $10,213 investment would nominally be worth $11,241 whether he had bought a "regular mutual fund" share or the aforementioned super-share package. Our first fundamental observation, then, is that the investor can always, on basis of supershares alone, construct for himself a regular mutual fund share holding in the PPF should that be his preferred holding (see illustration #1 in Table IV for further details).

Water is composed of two elements, hydrogen and oxygen, in the combination $H_2O$. Analogously, as we have seen, a regular mutual fund share can be thought of as being made up of elements also, elements which we have called supershares. The right side of the balance sheet in Table II is nothing less than the chemical formula of 1 million $10 par value mutual fund shares or 5 million $2 par value mutual fund shares, etc. In our example, the formula involves 111 elements, elements which the PPF has made separately tradeable and separately priced.

Having learned the principles of chemical decomposition, man has chosen to put the basic elements together in new arrangements, constructing useful synthetics such as nylon and various plastics. Knowing the chemical formula of the mutual fund share, the financial community has the same opportunity to offer investors fundamentally new products. In contrast to the physical scientist, however, the underwriter has almost complete freedom to define elements. This is a blessing of course but also a burden since it necessitates careful choice.

Some Illustrative Supershare Portfolios

Let us briefly examine some of the investment packages (portfolios) that the PPF illustrated in Tables II and III make possible. In Table IV,
# | Brief Description                      | Portfolio Construction                                                                 | Cost$ | Net Real Return on Investment if Deflated "Market" Return is:
|---------------------------------------|-----------------------------------------------------------------------------------------|-------|--------------------------------------------------
| 1 | "Market" portfolio                    | Buy 5,000 "-50%" shares, 5,100 "-49%", ... 10,000 "0%", ... 16,000 "60%" shares       | 10,213| -26.6                                           
| 2 | "Riskfree" portfolio                  | Buy 10,251 shares of each type                                                          | 10,000| 2.5%                                           
| 3 | 50-50 "blend" of "market" portfolio and "riskfree" portfolio | Buy 7,626 "-50%" shares, 7,676 "-49%", ... 10,126 "0%", ... 13,126 "60%" shares        | 10,107| -12.2%                                          
| 4 | "Market" portfolio with 40% leverage  | Buy 2,900 "-50%" shares, 3,040 "-49%", ... 9,900 "0%", ... 18,300 "60%" shares         | 10,298| -37.9%                                          
| 5 | 50% short position in "market" added to "riskfree" portfolio | Buy 12,877 "-50%" shares, 12,827 "-49%", ... 10,377 "0%", ... 7,377 "60%" shares       | 9,893 | 17.5%                                           
| 6 | Call on "market" with 0% exercise price | Buy 1 "1%" share, 2 "2%" shares, ... 59 "59%" shares, 60 "60%" shares                    | 8.27  | -100%                                           
| 7 | Put on "market" with 0% exercise price | Buy 50 "-50%" shares, 49 "-49%", ... 2 "-2%", 1 "-1%" share                            | 3.69  | 577.5%                                          

-25% | 5%  | 30%
<table>
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<th>#</th>
<th>Brief Description</th>
<th>Portfolio Construction</th>
<th>Cost&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Net Real Return on Investment&lt;sup&gt;b&lt;/sup&gt; If Deflated 'Market' Return is</th>
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<td></td>
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<td></td>
<td></td>
<td>-25%</td>
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<tr>
<td>8</td>
<td>Fixed return if &quot;market&quot; goes up, nothing back otherwise</td>
<td>Buy 16,129 &quot;12&quot; shares, 16,129 &quot;22&quot;, ... 16,129 &quot;602&quot; shares</td>
<td>$10,000</td>
<td>-100%</td>
</tr>
<tr>
<td>9</td>
<td>Fixed return if &quot;market&quot; goes down, nothing back otherwise</td>
<td>Buy 30,030 &quot;-50%&quot; shares, 30,030 &quot;-49%&quot;, ... 30,030 &quot;-12%&quot; shares</td>
<td>$10,000</td>
<td>200.3%</td>
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<td>Fixed return if &quot;market&quot; return is between -25% and 30% inclusive, nothing back otherwise</td>
<td>Buy 10,989 &quot;-252%&quot; shares, 10,989 &quot;-24%&quot;, ... 10,989 &quot;0%&quot;, ... 10,989 &quot;30%&quot; shares</td>
<td>$10,000</td>
<td>9.9%</td>
</tr>
<tr>
<td>11</td>
<td>Fixed return if &quot;market&quot; goes up from 1 to 10% inclusive, money back otherwise</td>
<td>Buy 10,000 &quot;-50%&quot; shares, ... 10,000 &quot;-0%&quot;, 10,816 &quot;12%&quot;, ... 10,816 &quot;10%&quot;, 10,000 &quot;112%&quot; ... 10,000 &quot;602%&quot; shares</td>
<td>$10,000</td>
<td>0%</td>
</tr>
<tr>
<td>12</td>
<td>Bet on &quot;market&quot; going down 25%, money back otherwise</td>
<td>Buy 10,000 &quot;-50%&quot; shares, ... 10,000 &quot;-25%&quot;, 59,000 &quot;-25%&quot;, ... 10,000 &quot;602%&quot; shares</td>
<td>$10,000</td>
<td>490%</td>
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<tr>
<td>13</td>
<td>Bet on &quot;market&quot; going up 30%</td>
<td>20,000 &quot;30%&quot; shares</td>
<td>$100</td>
<td>-100%</td>
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<sup>a</sup> Based on Table III price structure.

<sup>b</sup> Net of all costs (except taxes) if held from issue date to maturity date.
portfolio #1 is the "mutual fund holding" we have already discussed. Portfolio #2 may be thought of as the most riskfree portfolio constructable from supershares and was also discussed earlier; its yield is within 1% of 2 1/2%, in real terms, if held to maturity. The important thing to remember is that the same elements which enable the investor to construct a (risky) mutual fund position also enable him to construct a virtually riskfree purchasing power bond, bonds not available in most countries—he simply applies a different "chemical" formula.

Continuing along this pattern, the investor can, from the basic supershares, clearly also construct any linear combination of the previous portfolios, i.e., of the mutual fund holding (in this case the "market portfolio") and of the "risk-free" bond; the supershare formula of a 50-50 blend is shown in Illustration 3.

Consider an investor with $10,000 (plus fees) to invest who wants a "market portfolio" holding on a 71% margin, i.e., he would like a $14,000 "regular mutual fund" position, borrowing 4,000 to complete the transaction. If he could borrow at the lending rate, 2.5%, then he would have to repay the lender $4,100 in real terms, leaving him, if the return on the fund were -50%, say, with 1/2 of $14,000 - 4,100 or $2,900; if the fund went up 60% he would end up with $1.6 x 14,000 - 4,100, or $18,300, etc., on a total investment of $10,000 plus 2.13% of $14,000 or $10,298.

But with supershares available, the investor does not have to locate a reputable lender who is willing to lend him money at a rate less than or equal to the rate he (the lender) pays for money. The investor can (almost exactly) duplicate the previous leveraged portfolio with long positions in supershares; with $10,298 he can afford to buy 2,900 "-50%" shares, 3,040 "-49%" shares, ..., and 18,300 "60%" shares (see Illustration 4).
The significance of the preceding is that supershares make it possible for investors, in effect, to take leveraged positions without actually borrowing. No matter how terrible the investor's credit rating, he can in fact borrow money at the rate he would get as a saver, without loan approval, without the need to monitor his loan, without the risk of a margin call, without risk of default—the only money the investor can lose is his own. The "chemical" elements of the mutual fund share can be repackaged, by the investor himself, into leveraged portfolios reflecting a borrowing interest rate which is the same as that he would get as a (small) saver; there is no premium paid by "borrowers" over the rate on (small) savings because there is nothing for anyone to do to earn that premium.

Suppose an investor with $10,000 to invest desires a $5,000 short position in the "market" and the opportunity to invest the proceeds plus his own money, i.e., $15,000, in an indexed bond. This is rather difficult, if not impossible, to accomplish in present markets, where the proceeds from short sales plus a margin generally must be held in a nonearning escrow account. But it is possible in the presence of a PPF. By an appropriate combination of long positions in the mutual fund share elements (see Illustration 5 in Table IV), he can in fact "go short," with (implicit) full investment of the proceeds, without margin and therefore without risk of margin calls, and without risk of default. The "chemical" formula of a "short position" is no more complex nor more difficult to execute than that of a long position in "bonds." This being the case, the investor does not, as under present "technology," have to forego the interest or other earnings on the proceeds and on his "margin."12

At the present time, put and call options are attached to individual common shares only. The elements of a PPF basic share, however, can be used
to construct puts and calls on portfolios—in real terms. Two such options on the "market portfolio," with a "0%" exercise price and an expiration date of January 7, 1977, are shown in Illustrations 6 and 7 of Table IV. While the expiration date must coincide with that of the supershares, the investor can himself easily buy calls and puts on the fund's real portfolio return at any exercise price. Such options are merely (complex) packages of the basic claims (basic options) issued by the PPF. Note, also, that no writer of options is needed—the elements of the PPF's "mutual fund share" supply all the ingredients for the construction, by the investor himself, of a huge number of different options, without being dependent on a specialized option trading floor.

So far, the return patterns we have examined are similar to those obtainable with present securities. We shall now look at some more unusual ones.

One way to place a bet on the market going up in real terms is to buy (real return) calls (see Illustration 6 for an example). But there are many other ways to place such bets. One is to purchase a "fixed" real return contingent on the "market portfolio" going up any amount. As an example, under the price structure in Table III, an investor would, with $10,000, be able to buy 16,129 of each of the "1%" to "60%" shares, yielding him a 100% loss if the real return on the "market portfolio" were 1/2% or less and a 61.3% (approximately) real return on his investment if the real "market portfolio" return exceeded 1/2%. Similarly, as Illustration 9 shows, the investor would, under the Table III price structure, be able to achieve a (fixed) real return of approximately 200.3% on an investment focused entirely on the "market portfolio" going down 1/2% or more in real terms. Illustrations 8 and 9 are examples of the multitude of
investment positions, constructed from the elements of the PPF "mutual fund share," that are far from possible at the present time.

Table IV contains some additional examples based on the Table III price structure. Illustration 10 shows that if the investor is willing to act as if the real return on the "market" will fall between \(-25.5\%\) and \(30.5\%\), he can raise the real return on his investment to (approximately) \(9.89\%\) by assuming the risk of \(100\%\) loss if the fund's real return falls outside that range. Illustrations 11 and 12 point out how (in this case) \(97.55\%\) of the investor's funds can be used to get his money back in real terms and how the remaining \(2.45\%\) can be employed to achieve a positive return by "betting" on one or more of the contingencies he sees as most likely.

Finally, Illustration 13 confirms that, considered individually, the elements of the mutual fund share are in the nature of lottery tickets: for a few cents, it is possible to obtain, with a small probability, a payoff very close to \$100 (see Table III); the "30\%" shares, for example cost 50 cents per 100 so that a \$100 investment could conceivably be turned into \$20,000. Thus, although primarily designed for "serious" investors, the supershares also offer opportunities for "gambling." Note, however, that the gambling opportunities provided by the elements of the "mutual fund share" are in the nature of a favorable game, i.e., one in which the expected return is clearly positive (since it is directly tied to the return on the "market portfolio"). This is in sharp contrast to the more common gambling opportunities offered by (state) lottery tickets, casinos, horseracing, and other betting pools on which there is generally a substantial "house" take, often on the order of 20\%, and on which there are no earnings on contributed funds. To the extent that a PPF attracts "gamblers," it can clearly be viewed as performing a useful service since their capital is in effect channeled into the productive activities undertaken by the
economic units whose financial instruments the PPF holds, rather than into purely redistributive-betting situations.

The preceding illustrations are perhaps sufficient to give some clues to the enormous range of choice that the PPF offers the investor, both large and small. He can indeed "put his money where his beliefs are" with respect to the market as a whole. The elementary particles, the supershares, give him greatly expanded flexibility in building the portfolio that suits him best. He can choose, if he so desires, to own an entirely different slice of his nation's real wealth than is presently possible.

The Simplicity of Investment Choice

For those who limit their investment to supershares, perhaps the most significant aspect of the PPF is the simplicity of the resulting investment choice. It is rather like entering a supermarket with (in our example) 111 items on the shelves, all priced. The investor only needs to decide how to spend his available funds among these items. In essence, this only requires him to perform simple calculations of the multiplication and addition variety (and to know something about his beliefs and preferences, of course). Clearly, his task is very much like that performed by ordinary shoppers every day. In any case, it seems simpler than constructing a portfolio of regular securities, which involves combinations of already complex packages of "chemical" elements. In addition, by sticking to supershares, the investor will know in advance what he will get conditional on something both intuitive and meaningful, namely the realized real return on the "market." This of course is not true in present markets: even for well-diversified portfolios whose beta has been perfectly estimated, there is generally residual uncertainty concerning their (nominal or real) return given the (nominal or real) return on the "market." In other words, portfolios composed of ordinary shares (other than "index" funds, of course)
leave their owners/managers conditionally uncertain with respect to the end result, not only in real terms but also in nominal terms.

IV. OPERATING A PPF: SOME OF THE MANAGERIAL ISSUES

So far, we have examined the PPF concept primarily through the eyes of the investor, or from the demand side. We shall now look at it from the supply side, more specifically by examining some of the managerial issues that would be involved in floating and operating a PPF. Management involvement would occur at essentially four levels: 1) the determination of the issue date and the maturity date of each battery of supershares to be sold, 2) the selection of the particular set of supershares to be issued, 3) the choice of assets to be held over each term, and 4) the joint determination of the size of the fund and how the supershares for each term are to be floated. The first three decisions are relatively straightforward and the fourth can also, at the option of management, be made fairly simply and with little risk exposure. Thus, since there may be relatively little to compensate management for in the way of services and risk-bearing, there is a potential at least for full-term investors in supershares to enjoy the benefit of relatively low transaction costs. The managerial problem will now be discussed in more detail.

The Scope of Management Decisions

As to the term of each battery of supershares, management has complete flexibility: six months, a year, two years, three years, etc. More than one maturity can clearly be issued against the same asset base but it would probably be simpler (and more flexible) to have a separate PPF for each maturity. An "annual" PPF, for example, might issue supersecurities before the opening of business each second Monday in January for a period ending
at the close of business on Friday preceding the second Monday in January
the following year.

Concerning the particular battery of supershares to be issued, the PPF
again has an open-ended range of possibilities: it can issue anywhere from 2
(one of which pays off if the asset side goes up and the other if the assets
decrease or remain unchanged in value, for example) to several hundred
supershares. Loosely speaking, the more elements the basic "mutual fund
share" is broken down into, the closer one can come to constructing a com-
pletely risk-free (in real terms) portfolio from supershares, and the lower
the price of each supershare. The illustration used in this paper clearly
is just that: a more or less arbitrarily chosen example involving a uniform
supershare "density" of 1% and -50% and 60% "end-shares." Management is
clearly free to choose a variable "density" and to place its "end-shares"
wherever it wishes. However, since proliferation of supershares for its
own sake lacks virtue, a reasonable objective would be to issue the minimum
number of supershares consistent with the possibility of constructing an
indexed bond which would, in the eyes of most investors, be viewed as essen-
tially risk-free. The PPF may also find it useful to devise names for par-
ticular packages of its supershares in dealing with its public, e.g., "bonds,"
"equity shares," "6% calls," etc.

As noted earlier, the value of having a PPF fund, from an economic
welfare point of view, can be expected to be greatest if it comes close
to holding the "market portfolio," broadly interpreted. 13 A representative
sample of the "market" may conceivably include as few as 100 instruments
(stocks, corporate bonds, warrants, government securities) and perhaps as
many as 1,500. In any case, each security held by the PPF should be
"centrally quoted" and have a broad enough market to discourage manipulation
(by supershareholders) as the maturity date approaches.14 Similarly, both to keep itself above suspicion of manipulation and to provide (full-term) investors with a clear-cut basis for choosing a (full-term) portfolio, the "market portfolio" held should remain fixed for each period. (It can, and should, of course, be modified, on the basis of changes in the market, "between" periods.) The asset value of the PPF at the end of the period would consist of the closing market values of the original instruments, plus dividends and the market value of instruments (or cash) received in exchange in the case of mergers and from stock splits and stock dividends, with all cash receipts invested in a preannounced manner.

We now come to the most challenging managerial aspect of the PPF: the floating of supershares. Let me begin by describing three possible models.

**Model I.**—One approach would be an ordinary underwriting, in which a syndicate guarantees to raise, just prior to the issue date, a fixed sum for the PPF by selling all of its supershares at predetermined prices. This method can be expected to be fairly costly, although the underwriting risks (the first time around) can be kept at a minimum by gauging the size of the fund on the basis of "tentative orders" solicited by circulation of an advance price list.

**Model II.**—Another route would be a variant of that used by no-load mutual funds plus a bit of publicity. The prospective PPF would set its own supershare prices (some prior sampling wouldn't hurt) and would accept orders on the following prorated basis: Let the total number of "$x\%$" shares ordered by investors before the deadline (just prior to the issue date) be $D(x)$. Find the minimum of the ratios $D(x)/(1+.01x)$ over all applicable $x$ and set it equal to $A$. $A$ now represents the initial asset size of the PPF for which a sufficient number of each kind of supershare has been sold.
D(x) - A(1 + .01x) then gives the number of excess "x%" shares ordered for that initial fund size; "excess" demands would be pro-rated, with each investor receiving proportion A(1 + .01x)/D(x) of his "x%" share order, plus a refund for the amount of overpayment. For example, if the asset size A turned out to be $10 million and 12,500,000 "15%" shares had been ordered, each investor would be allotted 92% of his "15%" order, resulting in the issuance of 11,500,000 "15%" shares, the correct amount for a fund of that initial size. (In principle, of course, it would be possible for management to price the supershares "correctly" so that no excess demand would result.) This approach is clearly quite conservative and management may well wish to accept a bit of risk by choosing a somewhat higher asset level A.

Model III.—A third approach would be for the PPP to issue only ordinary, but decomposable, "mutual fund shares," that is, to issue supershares only in mutual fund share packages, e.g., a package composed, per $100 asset value, of 50 "-50%" shares, 51 "-49%" shares,..., 100 "0%",..., 160 "60%" shares. Investors would now be left to modify their portfolios, if desired, by trading on their own in the secondary market, thereby establishing initial prices. At the maturity date, that supershare which becomes payable would be redeemable in cash and/or a new "mutual fund share" package spanning the next period. And so on.

The preceding examples are by no means exhaustive, of course. Simultaneous bidding is also a possible means to launch each set of supershares, perhaps along the lines of floating Treasury Bills or in ways similar to that in which new issues are sold in France. 15

However floated when first sold, there is every reason to make that supershare which becomes payable at maturity payable in cash. While some
holders undoubtedly will want cash, in full or in part, longer-term investors will likely wish to reinvest all of their proceeds in the next set of supershares offered by the PPF and some may choose to increase their position; in addition new investors will enter. The resulting "between periods" net cash inflow may thus be either positive (resulting in a larger next-period PPF) or negative (resulting in a smaller next-period PPF). While a large net outflow seems rather unlikely, the expiring supershare could of course also be made payable in the PPF's assets or in "mutual fund shares" (recall Model III).

While the PPF could, at least in principle, always stand ready to increase or decrease its holdings in its chosen "market portfolio," i.e., be fully open-ended, the most natural mode of operation is probably to do this "between periods." This is also the natural point in time for the PPF to modify the composition of its "market portfolio" on the basis of changes in the market, i.e., as issues come and go and as companies expire and grow.

**What Size Transaction Costs?**

Since the PPF is an entirely new concept, there is clearly no way to make an accurate prediction of the transaction costs that the investor can expect to face in connection with supershares. However to the extent that transaction costs represent compensation for services rendered, we can at least get a feel for them by examining what lies behind them.

Let us first consider the full-term investor who (buys supershares when first offered and holds them to maturity, and thus) deals only with the PPF. Under Model I (the underwriting approach) his transaction costs may well be substantial. But consider Models II and III—here the PPF management assumes essentially no risk in connection with the floating of
shares. Any excess over the closing prices preceding the issue date that the PPF has to pay to acquire its assets portfolio, however, represents a genuine element of risk exposure (this "excess" may, of course, turn out to be negative). This risk, however, can be held down by various means: any regular security desired by the PPF would presumably be acceptable as payment for supershares; the third market would probably be helpful also in executing purchases at or near the applicable closing prices. Actually, it is doubtful that even a large fund would exert much pressure on prices, even if it made all its purchases in the open market: a $50 million PPF with 500 instruments in its portfolio would only need to acquire a few dozen lots of each type. Thus, under Models II and III, for instance, there is very little in the way of risk-bearing and very little in the way of administrative services (recall that the fund is "unmanaged") for management to be compensated for. Under reasonably competitive conditions, then, and if the pricing is such that the "excess" demand for supershares in Model II is low (so that the required "corrective" adjustments by investors in the secondary market would be small), full-term investors might well face relatively low transaction costs. The same would be true, under Model III, for investors who wish supershare holdings "close" to that of the "mutual fund arrangement"—those who do not would face more extensive, and certainly more costly, secondary market "corrective" transactions.

In the secondary market, there are no compelling reasons to believe that supershare commissions would not become attractive to investors, since they only need to cover the costs of executing simple trades between investors in long positions: no option writers must be found (the PPF, in effect, has already written the options), there is no credit approval or
naked writers' or short sellers' collateral to worry about, no margin posi-
tions to monitor, no margin calls to make. Since the net supply of supershares would be in the millions (as opposed to zero for regular options), we can also expect a reasonably broad secondary market to develop.

V. SOME ADDITIONAL QUESTIONS

Without going into detail, a number of additional aspects deserve brief mention. It is unclear, for example, whether it would be best to have many small funds, a few large ones, or one very large fund. Small funds would probably be easier to float and would insure competition but would also entail substantial "duplication" of effort. One could argue that, given a reasonable consensus on the contents of the "market portfolio," one large fund is all that is really needed and may well be readily imple-
mentable in countries with a well developed brokerage industry; however, the lack of direct competition would certainly be a drawback to this approach.

Note that the PPF concept is dependent on the existence of a broad market in the underlying horizontal (regular) financial instruments (since it is the market values of these instruments which determine which supershare pays off). Thus, the combined holdings of all PPF's in a given (regular) financial instrument cannot be too large a fraction of the out-
standing supply of that security.

As the maturity date of a particular battery of supershares approaches, the prices of some supershares will increase while the prices of most will tend to zero. As a result, we can expect trading in the secondary market in most supershares to cease before expiration. Conceivably, if two (adjacent) supershares appear roughly equally likely to pay off, their prices may be close to 50 cents essentially right up to the moment of
expiration even though one must become worthless and one will be worth (close to) $1 at closing time. Call this gambling, if you will—but it would be gambling on by far the best terms available anywhere.

With respect to taxes it is not inconceivable that Congress could be persuaded to make "full-term" investors who continually reinvest their proceeds in the next set of supersecurities subject to (capital gains) tax only when they eventually sell out. This is, with minor exceptions, the case for investors who hold on to their mutual fund shares now. But the investor who initially buys a "mutual fund package" of supershares and continually exchanges it for a new "mutual fund package" as it expires is in that identical position. Why should the investor who each time happens to pick a different supershare arrangement, but holds it to maturity and then reinvests, be treated differently? 16

While this paper has focused on a "market portfolio" based PPF due to the clearcut economic welfare benefits associated with such a fund, the issuance of vertical financial instruments, i.e., supershares, can also be expected to be valuable when the real asset base is "specialized," i.e., solely tied to such resources as energy, minerals, agriculture, new companies, etc. Similarly, if the (general) PPF does not issue supershares with sufficient density, there is clearly room for "satellite" PPF's, funds which holds a subset of the "main" PPF's supershares, issuing against each holding a "richer" set of supershares. 17 And supershare funds based on nominal (rather than deflated) returns are clearly just as easily implemented. Ultimately, an informed "market" must of course be the ultimate arbiter of the extent to which vertical financial instruments are needed.

Finally, the creation of vertical instruments via a simple financial intermediation process of the PPF type may reduce the "pressure" to create
new horizontal instruments, since many of the things, such as hedging, that complex portfolios of regular instruments are able to achieve, are more easily done via simple packages of elementary particles, i.e., supershares. While vertical instruments, being dependent on a functioning market for horizontal (regular) instruments, seem best suited in countries with well organized financial markets, they may also be of interest to developing countries interested in attracting foreign capital since the PPF makes this possible without giving up domestic control. This in turn may stimulate the development of capital markets in the smaller countries, especially since returns can readily be made available in real terms, i.e., adjusted both for inflation and foreign exchange fluctuations.

To sum up, the PPF concept offers a novel, sensible, simple, apparently implementable, and above all flexible means for especially smaller investors to own the kind of slice of their nation's real assets that they perhaps always wanted to have--but were afraid to ask for.
FOOTNOTES


2. I am by no means alone in this view; for example, The Wall Street Journal ("Bankers Doubt Ability to Meet Loan Needs As Economy Rebounds," June 13, 1975, p. 23) attributes the following quote to E. H. Yeo III, vice-chairman of Pittsburgh National Bank: "...the financial community should devise new mechanisms to funnel more individual investors' funds to potential borrowers."

3. Two main departures may be noted. First, owner-occupied real estate has been shown under consumer goods rather than as a capital good (non-personal wealth in Table I) where it is usually (but arbitrarily) classified. Second, labor capacity and knowledge are listed as specific aspects of personal wealth and production technology as a part of non-personal wealth. While their existence and importance as forms of wealth are difficult to argue with (witness the (monetary) values attached, in all parts of the world, to unusual skills in athletics, medicine, etc., and to many patented processes, and the efforts with which military secrets are guarded), their specific value is difficult to measure in currency.

4. For further details, see Nils Hakansson, "Efficient Paths Toward Efficient Capital Markets in Large and Small Countries," Finance Working Paper No. 25-1, Institute of Business and Economic Research,


7. Of course, 10 million shares of each kind could have been issued, in which case the "-49%" shares would be entitled to 51¢ per share (or nothing).

8. Alternatively, the PPF may wish to pay exactly $1, with the difference either reducing or increasing the "management fee."

9. Since the change in the CPI is not announced until the middle of the month, the December 1, 1975- November 30, 1976, change in the CPI might, in our example, be chosen as a proxy—this presents no problem as long as everyone knows the rules.

10. These numbers reflect the 1974 change in the Standard and Poor's 500 industrial stocks (including dividends) and the rate of inflation in that same year, as measured by the CPI.

11. There is nothing to preclude the real rate of interest from being negative, of course.

12. At the present time, a $5,000 short rate requires a margin of $2,500 (50%). If the investor put his remaining $7,500 in a 2.5% (real interest) account, he could, if the asset in which he goes short goes down 25% (in real terms), cover his position with $3,750, which would leave him with $11,437.50 ($5,000 - 3,750 + 2,500 + 7,687.50). But with $10,000 (in fact, $9,893—see Table IV), he could have bought 11,627 "-25%"
shares, plus a sufficient number of other shares to put him ahead by approximately $189.50 (in turn, approximately 2.5% of $5,000 + 2,500) in each contingency.


14. The present lack of a "centralized" quotation system for corporate bonds in the United States may inhibit holdings in such securities.


16. It is also unclear whether the PPF concept is consistent with the Investment Companies Act of 1940. Implementation should clearly be preceded by an administrative ruling by the Securities and Exchange Commission (or a clarification of or a change in the law). The purpose of this paper, of course, as previously stated, is to bring the PPF concept to the attention of the financial community so that its economic merits may be considered—any legal considerations are clearly secondary at this point.

17. For example, a satellite fund owning 1,050,000 of the "5%" shares issued by the PPF in our illustration might, against this holding, issue 1,046,000 "4.6%" supershares, 1,047,000 "4.7%" supershares,..., 1,054,000 "5.4%" supershares, etc.