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court advantage" that domestic savers have over their foreign counterparts, and is somewhat similar to the pecking order hypothesis of corporate finance.

In corporate finance, the hypothesis maintains that firms prefer internal finance (retained earnings) to external finance. In the international capital market, FDI comes first, FFDI second, and FPEI third. My 1997 analysis with Sadka and Yuen considers three tax instruments, which together can level the playing field and restore efficiency: a tax on the capital income of nonresidents, a tax on capital income of residents; and a corporate income tax.⁸

Typically, though, there is also significant asymmetry in information between the managing stockholders (owner-managers) and other portfolio equity- and debt-holders. This asymmetry of information causes severe market failures, which can be devastating in the case of equity-financed capital investment. We show

that the equity market may collapse to a "lemon" market, as in Akerlof,⁹ and that little financing is provided for capital investment. We show that in this case, FDI has an essential role in restoring the function of the capital market and the financing of capital investment. However, such financing is still not fully efficient, because it leads to foreign overinvestment and domestic undersavings. A corrective tax package, with a tax on the capital income of nonresidents and a subsidy to corporate income, will restore efficiency. Non-uniform taxation of capital income from various sources is crucial for the efficiency of the international capital market in the presence of information-based market failures.

¹ G. Akerlof, "The Market for 'Lemons': Qualitative Uncertainty and the Market Mechanism," *Quarterly Journal of Economics*, 89, (1970) pp. 488-500.

² R. Glick and K. Rogoff, "Global versus Country-Specific Productivity Shocks and the Current Account," *Journal of Money*

Economics, 35 (February 1995), pp. 159-92.

³ L. Leiderman and A. Razin, "Determinants of External Imbalances: The Role of Taxes, Government Spending, and Productivity," *Journal of the Japanese and International Economics*, 5 (December 1991), pp. 421-50.

⁴ G. Milesi-Feretti, and A. Razin, "Sustainability of Persistent Current Account Deficits," *NBER Reprint No. 2100, December 1996. [1996a]*

⁵ "Current Account Sustainability: Selected East Asian and Latin American Experiences," *NBER Reprint No. 2111, March 1997. [1996b]*

⁶ "Sharp Reductions in Current Account Deficits: An Empirical Analysis," *NBER Working Paper No. 6310, December 1997.*

⁷ A. Razin, "The Dynamic-Optimizing Approach to the Current Account: Theory and Evidence," *NBER Reprint No. 1984, July 1995. [1993]*

⁸ A. Razin, E. Sadka, and C. Yuen, "Tax Principles and Capital Inflows: Is it Efficient to Tax Nonresident Income?" *NBER Reprint No. 5513, March 1996. [1996]*

⁹ "An Information-Based Model of FDI and Capital Flows," *forthcoming as an NBER Working Paper. [1997]*

Institutions for Managing Risks to Living Standards

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Do our existing institutions for investment, hedging, and insurance

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allow individuals to manage risks to their living standards effectively? How effectively can people manage risks to the various components of U.S. household wealth? Figure 1 shows a breakdown of U.S. national wealth in 1996 (\$114 trillion), which here includes human capital, or the present value of labor income, which

usually is ignored in wealth computations. Human capital accounts for 73.7 percent of estimated national wealth; financial assets account for 16.2 percent; real estate accounts for 7.9 percent; and consumer durables account for 2.2 percent.¹

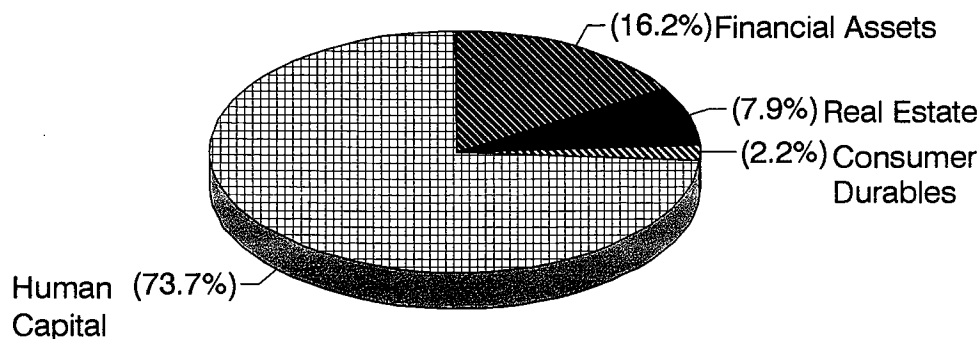


Figure 1. Breakdown of estimated \$114 trillion U.S. national wealth into components. Source: Author's calculations using national income, stock market, and Board of Governors of the Federal Reserve System *Balance Sheets for the U.S. Economy*.

Of these major components, only financial assets—16.2 percent of the total—have well-developed liquid markets that allow ready hedging and diversification. There are no hedging or diversification vehicles for human capital. For real estate, particularly single family homes, there are no large liquid markets: One cannot hedge the risk in one's own home and cannot invest easily in a truly diversified world-wide real estate portfolio.

Can one use existing financial markets to hedge risks to total wealth? Hedging income risks seems to entail shorting one's own country's stock markets in massive amounts, as Baxter and Jermann argue.² But we have no assurance that there will be a positive covariance between financial asset returns and returns on claims on aggregate incomes. Bottazi, Pesenti, and van Wincoop estimate that the covariance has been small and negative for U.S. aggregates.³ In terms of managing real estate risk, note that existing financial assets tied to real estate—real estate investment trusts and securitized mortgages—are not representative of overall real estate price risk and do not provide a vehicle for hedging of local real estate price risk. To hedge risks, it is much better to write risk management contracts directly in terms of the risks to be hedged.

Macro Markets

In my 1993 book *Macro Markets: Creating Institutions for Managing Society's Largest Economic Risks*, I argue that markets could be set up for long-term claims on aggregate incomes.⁴ These could be privately managed futures, options, or swaps markets for national incomes, or they could be markets for government national income-denominated bonds. Although such markets are unknown today, they could become extremely important. Given the relative impor-

tance of nonfinancial components of national wealth, they could someday be much larger and more important than existing financial markets.

These markets are important because of the uncertainty that people face with regard to risks to national income. Based on data for 49 countries, Stefano Athanasoulis, Eric van Wincoop, and I estimated that there is an 89.4 percent probability that the unweighted average real per capita GDP of the seven best performing countries relative to that of the seven worst performing countries will triple in 35 years.⁵ Thus, we can expect to see substantial winners and losers in terms of national income, and the livelihoods of individuals in these countries will be very different, depending on the fortunes of their country.

To reduce the effects of such risks, the social security trust funds of each country could invest in national income-denominated debt of foreign countries and could borrow by issuing its own such debt. Social security benefits then could be indexed to world income, allowing optimal risk management for retirement income.⁶ Private pensions of course could do the same kind of hedging, if such debt or analogous markets existed. All of these options depend on creating national income-denominated national debt or on other forms of long-term claims on incomes, wages, or salaries.

Indexing national debt owed to foreigners to national income would prevent countries from falling into difficult situations if their economic growth were not as high as expected. Instead, foreign investors would bear some of the national income risk as part of a diversified portfolio. Such risksharing might be very important for countries with high foreign debt and uncertain national incomes.

Markets for long-term claims on each country's income might not need to be set up initially, since

countries that correlate well could be grouped together and their securities traded together, much like index funds today trade groups of stocks. A small number of markets for swaps between major groups of countries also might be very useful.⁷ A market for a perpetual claim on the income of the entire world, the biggest market of all, also might be advantageous.⁸

Potential problems do exist in setting up these markets for claims on aggregate incomes. One problem is that countries might misrepresent their national income statistics. This could be minimized by internationalizing or privatizing the function of constructing national incomes. National income statistics as currently constituted may not be ideal for the settlement of contracts; there might be alternative definitions used that handle demographic changes somewhat better.⁹ The "moral hazard" problem—that people will not work hard if they know their incomes are insured—is probably not severe, because the macro markets will be settled on aggregate, rather than individual, incomes.

Real Estate Risk Management

Figure 1 shows that real estate wealth constitutes a small but substantial fraction (7.9 percent), of estimated total wealth. However, real estate is an important part of wealth for individuals late in the life cycle. Venti and Wise report that in 1991 the median level of housing equity held by U.S. families whose heads were 65 to 69 years old was \$50,000, about half their median social security wealth, and far more than their median employer-pension wealth (\$16,017) and their median personal financial assets (\$7,428).¹⁰ Thus, fluctuations in real estate prices have a real impact on the livelihoods of many people.

Although it is possible today to

insure real estate against fire and other catastrophes, hedging against real estate price declines generally is not possible. People could hedge their local real estate risks if futures and options markets were created, based on contracts settled in cash on regional real estate price indexes.¹¹ For example, futures markets for both residential and commercial real estate in each major metropolitan area could be devised, allowing people in each area to take short positions in the futures market corresponding to their area, thereby hedging their risk. Efforts in the United Kingdom to start futures markets for U.K. real estate were undertaken by the London Futures and Options Exchange in 1991 and by Barclay de Zoete Wedd in 1996, but there have been no attempts yet in the United States or in other countries. The announcement in January 1998 of new real estate futures contracts by the Chicago Board of Trade is not really about real estate price futures: These futures will be listed on the Dow Jones index of real estate investment trusts.

With or without real estate futures, options, or swaps markets, retail institutions could help owners of real estate to manage their risks better, and we see beginnings of some such new institutions, including the Home Equity Conversion Mortgage (HECM) program sponsored by the Federal Housing Administration. However, the HECM and similar programs are not designed with only risksharing in mind. Other programs could do a better job of protecting homeowners against price fluctuations. For example, limited partnerships could enable individual homeowners to purchase a fraction of their home, with the remainder sold to investors.¹² Alternatively, insurance companies or mortgage lenders could attach index-settled home equity insurance policies to their contracts with homeowners.¹³

Any such new retail institutions for

real estate risk management must be designed carefully, though. Concerns should include the homeowner's strategic selling of the house or cancellation of the policy, moral hazard risk, and risk of poor maintenance of the house. Still, it may be possible to design new institutions that reduce real estate owners' risk substantially.¹⁴

Inflation Indexation

Some of the risks to the components of wealth are attributable to inflation-induced shifts in the real values of nominal payments that are specified in contracts. Total nominal contracts are more important than financial assets in national wealth (as shown in Figure 1) because they exclude most inside debts, and because interpersonal contracts have no net value in national wealth. Of course, nominal assets are important for many individuals, especially for the elderly. Although inflation might appear to be vanquished at the moment, we can never be sure that it will stay down in future years, so the risk of inflation remains. Indexed debt protects people against the risk of inflation by tying debt payments to inflation.¹⁵

In January 1997, for the first time in U.S. history, the U.S. Treasury, following the example of many other countries, introduced indexed federal government debt: the Treasury Inflation Protection Securities program (TIPS). TIPS represents a significant financial innovation, but even though public acceptance has been described as encouraging relative to expectations, the public actually has purchased very little of these new securities, amounting to roughly 0.5 percent of the U.S. federal debt. Other countries' experiences indicate that the public is often only marginally interested in purchasing indexed debt, even in times of high inflation.

My study of public acceptance of indexation in the United States and

Turkey (a country with high inflation) demonstrates many reasons for public apathy toward indexation. They include lack of appreciation of inflation uncertainty, lack of understanding of the nature of redistributions caused by unexpected inflation, and simple difficulties in understanding the math involved in indexation formulas.¹⁶

Public acceptance of indexation might be enhanced if the government (or an international agency) creates a new unit of measurement of value that itself is indexed and encourages its widespread use. The government (or agency) need only define an indexed unit of account, like the *unidad de fomento* introduced in Chile in 1967. To promote the use of this unit in setting prices and defining payments, the government could publish regularly an exchange rate between the unit and the currency and initiate its use by denominating indexed debt, tax brackets, and the like in these units. If people then chose to quote prices and payments in terms of the units rather than the currency, they automatically would be indexing them to inflation. Indexed units of account are a realistic way to encourage widespread indexation, and they are virtually costless to create.

The exchange rate between the indexed unit of account and the currency might be defined so that the unit has desirable properties in terms of its real value.¹⁷ The real value of a unit can be made constant by tying the unit to the consumer price index, or the value of the unit can track labor income. When the government defines indexed units of account, it could consider their effects on money illusion and price rigidity; for example, wage units might be biased downward relative to wage income in order to control for certain inflationary pressures. Properly designed indexed units of account might not only encourage better risk manage-

ment, but also might diminish the price stickiness that is, by some accounts, an important source of macroeconomic instability.¹⁸

Outlook for Institutional Change

Important changes in our institutions usually are adopted only in times of national crisis. For risk management purposes, this is unfortunate, because people must always purchase insurance before, not after, a risk is realized. The issuance of indexed government debt in the U.S. in 1997 during a period of low inflation is a remarkable example of adopting an important financial innovation without waiting for a crisis. Although the public acceptance of the indexed government debt in the United States has been somewhat disappointing so far, there is still a good chance that eventually it be widely accepted. In the future, we must consider carefully what other new institutions are feasible, offer real advantages, and can be started effectively, if only on a small scale initially. Once new institutions are introduced, we might expect that their public use can then grow gradually over time.

¹ Total national wealth in 1996 was estimated by dividing seasonally adjusted national income in 1997-III by the difference between a discount rate (the geometric average annual return on the Standard and Poor's Index, 1946-1996, or 11.9 percent) and an expected growth rate for national income (the geometric

average annual growth rate of per capita national income from 1946 to 1996 or 6.0 percent). Of course, there is considerable margin for error in the resulting estimated U.S. national wealth of \$114 trillion; there is no way to produce an accurate value for a claim on national income when such claims are not, and have never been, traded. The values for financial assets (net of household and nonprofit financial liabilities), real estate (structures and land), and consumer durables (including equipment owned by nonprofit organizations) are taken from the balance sheet of households and nonprofit organizations, "Balance Sheets for the U.S. Economy, Board of Governors of the Federal Reserve System," 1997. The value of human capital is the residual estimated national wealth minus these components.

² M. Baxter and U. Jermann, "The International Diversification Puzzle is Worse than You Think," *American Economic Review*, 87, 1997, pp. 170-80.

³ L. Bottazzi, P. Pesenti, and E. Van Wincoop, "Wages, Profits, and the International Portfolio Puzzle," *European Economic Review*, 40 (2), 1996, pp. 219-54.

⁴ R.J. Shiller, *Macro Markets: Creating Institutions for Managing Society's Largest Economic Risks*. Oxford, England: Oxford University Press, 1993.

⁵ S. Athanasoulis, R.J. Shiller, and E. Van Wincoop, "Macro Markets and Financial Security," unpublished paper, Iowa State University, 1998.

⁶ See R.J. Shiller, "Social Security and Intergenerational and International Risk Sharing," paper to be presented at the Carnegie-Rochester Conference, April 1998.

⁷ See R.J. Shiller and S. Athanasoulis, "World Income Components: Measuring and Exploiting International Risk Sharing Opportunities" NBER Working Paper No. 5095, April 1995.

⁸ See S. Athanasoulis and R.J. Shiller, "The Significance of the Market Portfolio," NBER Technical Working Paper No. 205, February 1997.

⁹ See R.J. Shiller and R. Schneider, "Labor Income Indices Designed for Use in Settlement of Risk-Management Contracts," NBER Working Paper No. 5254, September 1995, and forthcoming in *Review of Income and Wealth*, 1998.

¹⁰ S.F. Venti and D.A. Wise, "The Wealth of Cohorts: Retirement Saving and the Changing Assets of Older Americans," NBER Working Paper No. 5609, June 1996.

¹¹ See K.E. Case, R.J. Shiller, and A.N. Weiss, "Index-Based Futures and Option Markets in Real Estate," *Journal of Portfolio Management*, 1993.

¹² See A. Caplin, S. Chan, C. Freeman and J. Tracy, *Housing Market Partnerships*, Cambridge, MA: MIT Press, 1997.

¹³ See R.J. Shiller and A.N. Weiss, "Home Equity Insurance," NBER Working Paper No. 4830, August 1994.

¹⁴ See R.J. Shiller and A.N. Weiss, "The Role of Real Estate Price Indices in Home Equity Conversion," paper presented at the AREUEA Meetings, Chicago, January 1998.

¹⁵ See J.Y. Campbell and R.J. Shiller, "A Scorecard for Indexed Government Debt," NBER Macroeconomics Annual, Cambridge, MA: MIT Press, 1996.

¹⁶ See R.J. Shiller, "Public Resistance to Indexation: A Puzzle," in *Brookings Papers on Economic Activity*, 1, 1997, pp. 159-228.

¹⁷ See R.J. Shiller, "Indexed Units of Account: Theory and Assessment of Historical Experience," NBER Working Paper No. 6356, January 1998.

¹⁸ See R.J. Shiller, "Designing Indexed Units of Account," paper presented at the American Economic Association meeting, January 1998.

