Beyond the Barrel: Investing the New Petrodollar Wealth

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Abstract

Prolonged appreciation in global energy prices has given rise to enormous wealth in energy-exporting nations. Despite their new wealth, poor infrastructure, political instability, and corrupt governance have hindered domestic investment. In search of investment opportunities, energy-rich nations have turned abroad, injecting enormous liquidity into the global financial system. Traditionally, the full faith and credit backing of US Treasury securities has made them the vehicle of choice for foreign investors, but recent poor returns and exchange rate volatility has driven foreign investors toward other assets in the search for yield. The readiness of foreign investors to buy US assets has precipitated poor outcomes for both foreign creditors and US investors. Sovereign wealth funds are taking an increasingly important role in the global economy, offering to recapitalize institutions whose financial condition has been impacted by the recent United States credit correction.

1 Fossil Energy: The Lifeblood of the Modern Economy

Global energy use is on the rise. Since 1980, world energy consumption has grown at a compounded average rate of 1.98% per annum, culminating in 463 quadrillion British Thermal Units ("quads") used in 2005 [1]. With global affluence on the rise, there is scant evidence indicating that world energy use will subside anytime soon. China is currently the second-largest consumer and third-largest importer of oil (behind the United States) [2]; the EIA has predicted its imports will triple by 2030 [3].

Fossil fuels are characterized by their derivation from aged deposits of organic matter buried at various depth below Earth's surface. In 2005, the world got 87% of its energy from fossil fuels, dwarfing other sources (nuclear, hydroelectric, etc.) [1]. Fossil energy is extracted in three principal forms, each suitable to different applications. Coal is inexpensive but heavy; it is the fuel of choice for stationary applications (boilers, industrial uses, etc.). Coal combustion releases foul-smelling, hazardous by-products (e.g. sulfur), making it best-suited for use away from population centers.

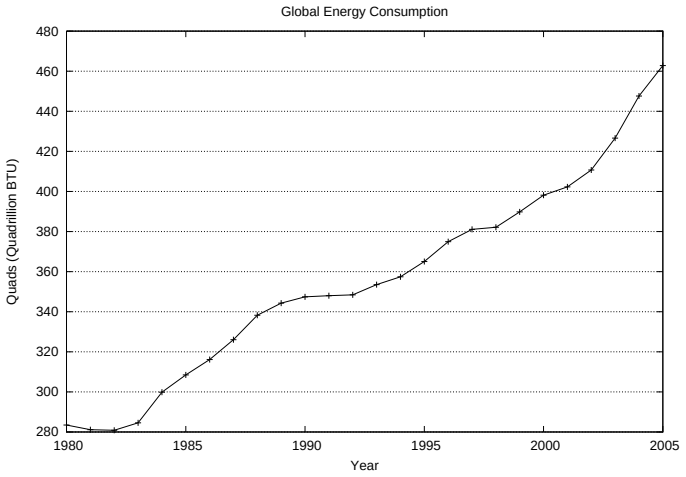

Figure 1: Global energy use. Source: EIA

Natural gas, on the other hand, produces a hot, clean flame, lending it to dense residential use, but at at price significantly higher than coal. Natural gas is generally transported by pipeline to stationary locations, although recently it has been liquified for long-distance transport over greater distances. Petroleum, the third and probably best-known source of fossil energy, burns relatively cleanly at a price between natural gas and coal; its high energy density (available energy per unit mass) makes it desirable for applications where the fuel supply must move, such as transportation [4].

In 2005, petroleum accounted for 36.6% of global energy use, while natural gas accounted for 26.5% and coal, 23.3% [1]. Although fossil energy use is not dominated by any one fuel, this paper will focus on petroleum because it constitutes 29.03 out of 34.49 quads of energy (84.2%) imported by the US in 2006, leading to an enormous outflow of dollars into the world financial system (see Figure 2). This section explores the market for petroleum: its players, trends in energy prices, and the global flow of capital. Understanding this market is crucial to grasping the way petrodollar wealth is affecting the global financial system.

1.1 Oil Trading: Instruments and Their Prices

Some oil is sold in "spot" transactions without an intermediary, but many prefer the market depth, price discovery, and standardized contract terms of a formal futures exchange. Oil trading involves many standardized contract parameters:

- **Product**: Many grades of oil are traded. Differentiators of grade include *sweetness*, a measure of sulfur content, and *heaviness*, a measure of viscosity. "Brent", a particular variety of oil, is used to price

Figure 2: US Energy Flow. Source: EIA

two thirds of the world's oil transactions; "West Texas Intermediate", is frequently used as a benchmark in the United States [5].

- **Amount**: Market participants must specify the amount of oil they want; a *barrel*, frequently abbreviated "bbl", is equal to 42 US gallons (about 159 liters).

- **Time of Delivery**: *Spot* transactions are settled immediately, while *forward* transactions stipulate future settlement. When standardized forward contracts are traded on an exchange, they are referred to as *futures* contracts.
- **Type of Settlement**: Oil futures are either physically or financially settled. Physically settled contracts obligate their seller to deliver, and buyer to take delivery, of the oil specified in the contract. Financially settled contracts are benchmarked to an index, and require the seller to deliver the "price" in cash at the conclusion of the contract. Many times, companies agree to take delivery from a buyer far into the future, but at an unknown price; financially-settled contracts allow market participants to control their exposure to oil prices, independent of how and when they take delivery [6].

With some 400,000 contracts traded daily, The New York Mercantile Exchange "CL" contract is the international benchmark for oil prices. The contract obligates its seller to deliver 1000 barrels (42,000 gallons) of oil to Cushing, Oklahoma, on the specified settlement date. (April 18, 2008, a typical trading day, saw some $50 billion in CL contracts traded.)

Because many contracts trade simultaneously, it can be difficult to quantify "the price of oil" exactly. For one, contract holders must commit their capital when purchasing a futures contract for goods delivered into the future, so contracts are discounted at the risk-free rate of return. Also, many grades trade simultaneously in different markets. Futures contracts are settled only once monthly, so the "current" price of oil is often quoted as the price of the contract in trading with the next expiration date[1]. By plotting the next-to-expire contract (whichever contact that happens to be) over a period of time, a piecewise-continuous data set depicting the "current price of oil" emerges; figure 3 depicts oil prices using this methodology. Bloomberg calls the series depicted in figure 3 "CL/1", meaning "the price of the CL contract one month from expiration".

The CL contract has traded since 1986, providing a hyper-detailed 20 year historical record of conditions in the world's oil markets. Economic historians generally recognize three major "oil crises", occurring in 1973, 1979, and 1990 (the 1990 crisis is clearly visible on the graph). The three crises differ in important ways (duration, intent), but share a crucial similarity: all were supply-side disruptions. In stark contrast to previous supply shocks, many economists agree that the almost *500%* appreciation apparent from 2002-2008 was demand-led; growing global energy use (see section 1), in tandem with full-capacity production of oil-exporting nations leaves little else to blame for today's stratospheric oil prices[2]

1.2 Good and Capital Flows

In 2006, the United States imported 12.4 million barrels of oil per day, the majority of its 20.6 million barrels per day of consumption [2]. The

[1] The *front-month* contract, in futures jargon

[2] IEA's Monthly Oil Reports elaborate on this point. In fact, oil prices are so high today, that most producers are operating near peak capacity (less reserve capacity, saved for disruptions).

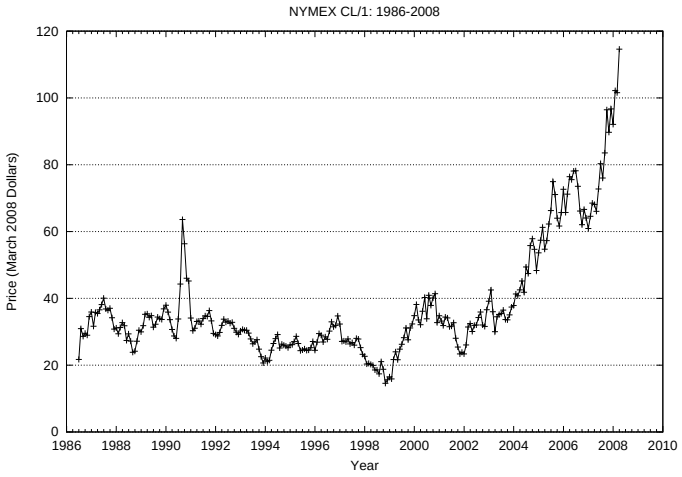

Figure 3: Real CL/1 Contract Price. Source: Bloomberg

following sections explore good and capital flows associated with US oil imports.

1.2.1 Goods Flow

In 2005, United States energy use totaled 100.69 quads, representing 21.7% of world energy use. Despite today's staggeringly disproportionate energy use by the United States, growth in global use outpaced growth in US use from 1990-2005, causing US relative use to decline even as total US use increased (use grew at a yearly rate of 1.49% globally versus 1.16% in the US). Figure 4 depicts the origin of the oil used in the United States. Domestic production has decreased even as consumption has risen, forcing the US to import ever-greater quantities of oil from foreign suppliers [2].

Among its accounts of major foreign holders of US debt, the US Treasury includes a separate entry for the "oil-exporting nations" (OENs). Treasury's OEN group includes Algeria, Bahrain, Ecuador, Gabon, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Oman, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela. Figure 5 depicts US import volume from the OEN group. From 1993-2007, this group of 15 nations supplied between 42% and 51% of the oil imported by the US [7].

1.2.2 Capital Flows

With both the price and quantity of oil rising, US oil spending has run into the tens of billions per year. As Figure 5 suggests, much of this spending goes to the OEN group. Annual sales volume to the OEN group ranged from 27-158 billion dollars, with sales volume generally corresponding roughly to the price of oil. Figure 6 shows the volume of sales to the OEN group [2].

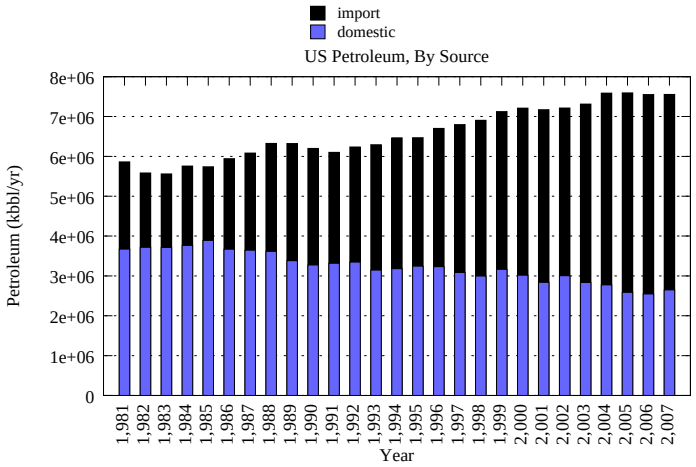

Figure 4: US Oil Consumption, Source Depicted. Data from EIA.

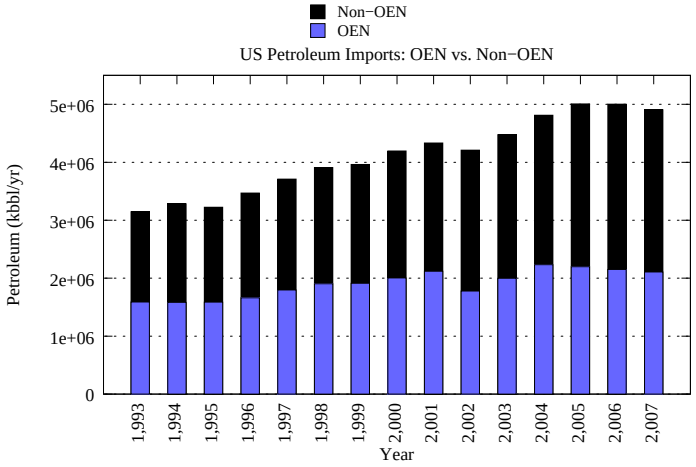

Figure 5: US Oil Imports: OEN vs. Non-OEN. Data from EIA.

2 Investment

2.1 The United States: The World's *De Facto* Bank

The developed economy (section 2.1.1) and preeminance of its currency (section 2.1.2) allows the United States to enjoy a superior position in the global economy. However, both of these cases may be on the brink of major change as trade account regions (explained below) begin to show concern for their international investment positions, and the Euro becomes an important world currency.

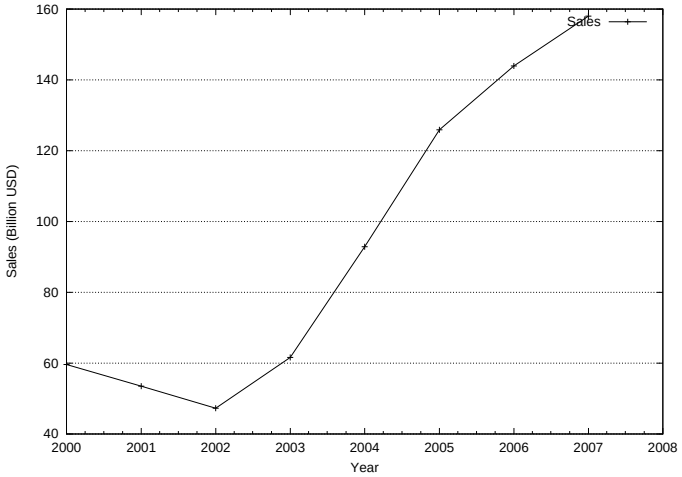

Figure 6: OEN Sales Volume, US Dollars

2.1.1 The Revived Bretton Woods System

Michael P. Dooley, David Folkerts-Landau, and Peter Garber (hereafter "DFG") wrote an influential paper in 2003 arguing that the world has returned to an economic system similar to that resulting from the post-World War II Bretton Woods agreement [8]. The authors argue that today's system, with its fixed exchange rates and well-defined functional roles, is similar enough to the original system to merit calling it "Bretton Woods II".

The original Bretton Woods agreement ("Bretton Woods I") came into effect through a series of treaties signed shortly after World War II. Under the system, participating nations agreed to fix their exchange rates to the US dollar, and by extension, to each other. The war-torn nations of Europe used strong demand abroad to catalyze domestic capital reformation. Bretton Woods' export-led growth, combined with its undervalued exchange rates (in the exporting nations) gave the system a "beggar thy neighbor" character, where the developed nations assisted in the redevelopment of their neighbors' less developed capital stocks. Ongoing trade imbalances cannot persist indefinitely; the system relied on willingness to accumulate current account deficits in the importing ("center") countries, while the exporting ("peripheral") nations accumulated reserve assets of the center. Through foreign direct investment, the center further assisted the periphery in developing a competitive domestic capital stock. The center, acting as the periphery's financial intermediary (the center borrowed cheaply and lent expensively, often between the same nation), reaped substantial transfer payments from the peripheral nations.

Under today's "Bretton Woods II" (the subject of DFG's paper), the world is divided into three functional groups. The United States again serves as the "center", its financial intermediary. The "capital account" countries, characterized by developed economies and floating exchange

rates with respect to the center (USD), are concerned primarily with the risk/return profile of their (often substantial) international investment position. The capital account region include most of Western Europe, Canada, Australia, and most of Latin America, all of which display personal saving rates much higher than the United States [9]. The "trade account" region includes most of East Asia (China, Taiwan, HK, Singapore, etc.) – nations primarily concerned with export-led growth. Trade account regions are interested primarily in developing their domestic capital stock, with less concern for the health of their international investment position.

DFG hypothesize that the United States enjoys a limitless ability to borrow from the trade account region, and that this ability will persist as long as the trade account nations remain preoccupied with export-led growth. Writing about the capital account's concern about the attractiveness of investment in the US, they note that "The irony here is that concern of investors in the capital account region about the risk/return in an increasingly indebted US is misplaced. The US is being underwritten by Asia for the foreseeable future."

Interestingly, many things have changed since DFG wrote their 2003 paper. For one, the massive appreciation in real oil prices started just as their paper was going to press, in 2003. Additionally, China, a nation DFG identify as a major trade-account player, un-fixed their currency to the US dollar in 2005, preferring instead to index to a market basket of currencies. Notably, the group has nothing to say about the OEN group, or the middle east generally. Although the size of China's holdings of Treasury securities are vastly larger than the OEN group (486.9 billion in Feb 2008 vs. the OEN group's 146.1), the group holds 6% of the overall foreign debt, a significant contribution [7].

China's move to a managed float, if anything, has enormously impaired the value of their international investment position, making clear their continued commitment to trade-account behavior. The recent 15% fall of the Yuan from its pegged level has devalued their US holdings some $75 billion over the past 3 years, with untold further costs in non-Treasury holdings. The OEN group, on the other hand, has exhibited trade-account behavior in their exports of oil to the US, but have no domestic currency to speak of, making it difficult to devalue their exchange rate. Their concern with the quality of their international holdings suggest they may also share some characteristics with the capital account nations. It is unclear what role DFG felt these nations played in their original analysis, but the group seems to be walking a fine line between trade and capital account behavior. The balance of this section will explore this issue further.

2.1.2 Monetarism

The monetarists, exemplified by McKinnon, argue that the "monopoly currency status" of the United States dollar gives the US an unlimited ability to finance its deficits by printing more money. For one, "debtor countries on the dollar's periphery can only borrow on reasonable terms in foreign exchange–largely dollars and so bears the exchange risk." Monetarists insist that foreign creditors, with huge dollar stockpiles, are happy

to continue holding their stockpiles so long as the Federal Reserve remains in control of the dollar's inflation. "As long as the American price level remains stable, there is no well-defined *ex ante* restraint on the amount the US can borrow internationally." [10]

Although inflation has been relatively stable around 4% since the dollar was taken off the gold standard, real yields on treasuries have plummeted in recent years, even as the dollar has seen significant trade-weighted exchange rate volatility (see next section). Additionally, if foreign creditors begin to view the Euro as more stable than the dollar, it may become a legitimate competitor for vehicle currency status, as it has in Western Europe.

2.2 A Run on the Bank?

Despite predictions by DFG and McKinnon that the US will retain an almost unlimited ability to borrow, deterioration of macroeconomic fundamentals has convinced the OEN group to look elsewhere for a place to store their money.

2.2.1 Declining Real Yields

The US Federal Reserve has done a commendable job of keeping inflation under control since 1980. However, Treasury securities are being offered at razor-thin coupon rates, such that small spikes in inflation have the power to swing Treasury yields from positive to negative territory.

Looking at figure 7, real yields briefly swung into negative territory in 2003. Although investors have no way of knowing what to expect *ex ante*, prudence would suggest a more diversified investment strategy in the future, leading them out of US Treasury securities.

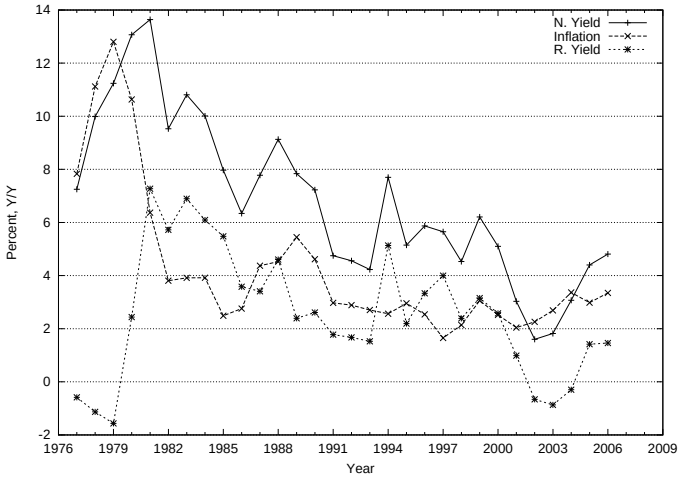

Figure 7: Real Yield on 2-Year Treasury Note

2.2.2 FX Volatility

In additional to real yields having deteriorated, the US dollar has fallen precipitously since 2002. Figure 8 shows the US dollar against a trade-weighted basket of currencies; the data is provided by the Federal Reserve Bank of St. Louis.

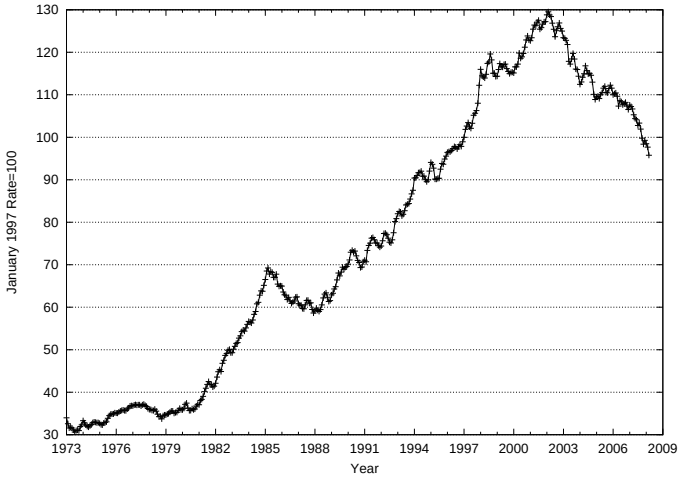

Figure 8: Trade-Weighted Exchange Value of USD. Source: St. Louis Fed.

2.3 The OEN's International Investment Position

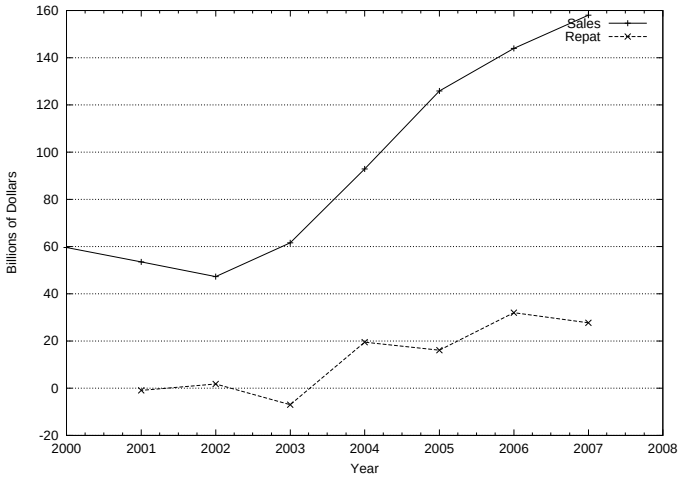

Figure 9: OEN Sales vs. Change in Treasury Holdings

The data confirm that the OEN group has looked elsewhere for investment opportunities in recent years. Figure 9 depicts the sales volume of the OEN group alongside the year-on-year change in Treasury holdings. Despite the short duration of the graph, the *divestment* of Treasury assets in 2003, as well as the slowing pace of investment in 2005 and 2007, are quite shocking, considering the steady acceleration of sales volume.

3 The Way Forward

Emergent thinking suggests that the glut of foreign liquidity flowing into the United States in years past, from China and the OEN group, among others, has had damaging consequences.

In a 2005 speech to the Virginia Association of Economics, then-Governor of the Federal Reserve Ben S. Bernanke remarked that the world has a "global saving glut" [11]. Speaking about the effects of cheap credit on the economy, Bernanke said, "In particular, during the past few years, the key asset-price effects of the global saving glut appear to have occurred in the market for residential investment, as low mortgage rates have supported record levels of home construction and strong gains in housing proces." In March 2008, E. Gerald Corrigan, Managing Director at Goldman Sachs, remarked that "While it is easy to point to the sub-prime mortgage situation as the proximate cause of the current crisis, identifying the underlying cause is more difficult. However, I believe there are four inter-related forces...First, for several years running global financial markets have been awash with liquidity. This condition reflected in part the recycling of (1) excess saving from Asia...and (2) excess cash from energy producing countries." [12]. Without further study, it is impossible to know whether the recent US credit crunch was precipitated by foreign capital flowing into the United States, but the Bernanke/Corrigan theory put forth above is worthy of further investigation.

Correcting Bernanke's "saving glut" requires a closer match between global consumption and production. Considering that most energy exporting nations are underdeveloped relative to their buyers, it would seem that profitable investment opportunities would abound. Bernanke himself addresses this point, stressing the importance of improving domestic institutions: "For example, developing countries could improve their investment climates by continuing to increase macroeconomic stability, strenghen property rights, reduce corruption, and remove barriers to the free flow of financial capital." [11]. Unfortunately, institutional development is a very long-term process, so we may be stuck with today's pattern of capital flows (and the current account deficits that come with them) for a long time.

Regardless of the quality of their investment decisions or institutions, energy-exporting nations are spending mightily on domestic infrastructure [13]. The Gulf Cooperation Council (GCC), consisting of Saudi Arabia, Bahrain, and Kuwait, among others, have embarked on large state-sponsored construction projects, including hospitals, office buildings, and schools. The Burj al-Arab in Dubai, the world's only seven star hotel, offers 42-inch plasma televisions, and 13 pillows on each bed. The King

Abdullah Economic City, a new development also in Dubai, will have 2,000 factories, 2 million people, and 22,500 rooms of resort space. Recently, reports have emerged that the GCC is considering forming a monetary union by 2010, spurred on largely by the rapid depreciation of the dollar [14].

In addition to their domestic investments, oil-exporting nations have set up state-operated investment trusts, the so-called sovereign wealth funds ("SWFs"). A recent report pt SWF assets under management at 2.5 trillion dollars, in addition to 1 trillion/year in growth [15]. These pools of sovereign capital are at least as opaque as today's hedge funds, but dwarf them in size. SWFs have displayed a high degree of investment sophistication, participating recently in secondary equity offerings by Merill Lynch, AMD, and Citigroup. It is somewhat ironic that these groups may be helping to recapitalize the very institutions their nations' high rates of savings led astray in the first place.

4 Conclusion

The United States uses approximately one-quarter of all the energy used in the world. Despite its staggering use, this rate is expected to decline as global energy demand outpaces US growth.

The global demand for oil has pushed prices to levels seen previously only during supply shortages. With these high prices comes an enormous capital outflow from the United States. Traditionally, foreign creditors have used US Treasury securities as a means of holding wealth, but the deteriorating investment climate in the United States is encouraging them to look elsewhere, such as Euro-denominated deposits and homeland investment opportunities.

Foreign capital flowing into the United States has supported consumption and borrowing by private individuals and the US government, but too much foreign capital has caused a glut of liquidity in the financial system. Equilibriation of the glut by balancing supply and demand would be best, but is unlikely to happen. Foreign investors need better investment opportunities beyond simply handing their money to the United States, for better or for worse. The Gulf nations have undertaken many construction projects, but it is unclear whether the property rights and governance are of sufficient quality to ensure these investments will be profitable. In the mean time, all we can do in the United States is wait and perhaps help, while the rest of the world develops more expertise in governing and investing, as well as greater appetites for domestically produced goods.

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