Suddenly This Summer

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Introduction

Within a few days this summer we witnessed markets crash, economies about to crumble, the European Union on the verge of being dissolved, and voices heralding the end of Capitalism *à la* the end of Communism 20 years ago. We have reached an unprecedented state of fragility. It used to be that the stock market dropped when the president sneezed. But now the whole world economy shatters when an analyst in a credit-rating agency blinks! Who is the culprit? The widespread dissemination of information? The rapid access to transactions? The gullibility of an increasing naïve public? Or are we indeed finally paying the price of a poorly designed and ill-founded economic system?

Mass psychology and speculation being my devils, I will turn once again to science and natural laws for advice because they are immutable by their nature and can shed light on the long-term future. In what follows I call on and update previous studies that impact the economy in some way or another, all involving S-curves (natural growth in competition), and all based on analyses of raw data (no data manipulations whatsoever.)

Energy Consumption

World energy consumption has grown steadily during the last 150 years. This growth took place in two well-defined S-curve steps, see Exhibit 1. Since 2000 the annual energy consumption per capita worldwide has entered a third such growth step sketched in Exhibit 1 by an intermittent S-curve. There is little doubt that this latest S-curve will proceed to completion because the growth process has already reached beyond "infant mortality" — around 10% of the ceiling — and no niche in nature was ever left only partially filled under normal circumstances (normal circumstances here are the kinds of things that took place during the last 150 years.)

Growth in consumption of energy strongly correlates to economic growth. Appropriately the two flat horizontal sections of the data pattern, one around 1930 and another around the mid 1980s, coincide with periods of stagnating economies. But this is not the case during the last ten years when growth followed the early exponential part of an S-curve.
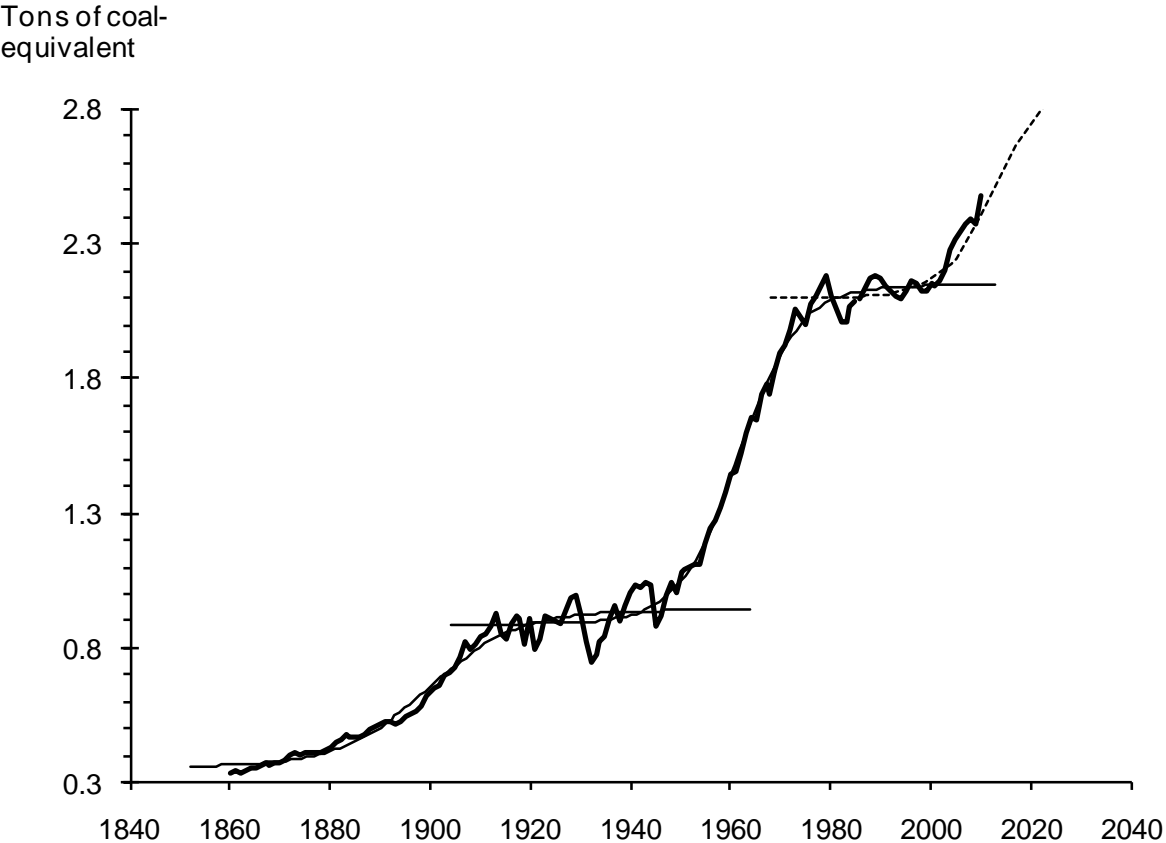
Per Capita Annual Energy Consumption Worldwide

Exhibit 1. The graph is an update of Appendix Figure 10.2 in *Predictions*. The two S-curves (smooth solid lines) are fits on the data whereas the intermittent line sketches a scenario by analogy. The data cover up to the end of 2010. There is little doubt that around 2000 we have entered a new growth phase.

The alternation between growth periods and stagnating periods echoes Kondratieff's cycle that can be unambiguously evidenced by taking the ratio point by point of the data to one single overall S-curve fitted on the entire set of data, see Exhibit 2.

In my book *Predictions* I have listed dozens of social endeavors resonating with this cycle. Of interest here are stock-market crashes. In Exhibit 2 we see that the last three major crashes — to oldest one in Europe — are in synchronization with the cycle. This pattern suggests that a possible next crash of such magnitude will not take place before the early 2040s!

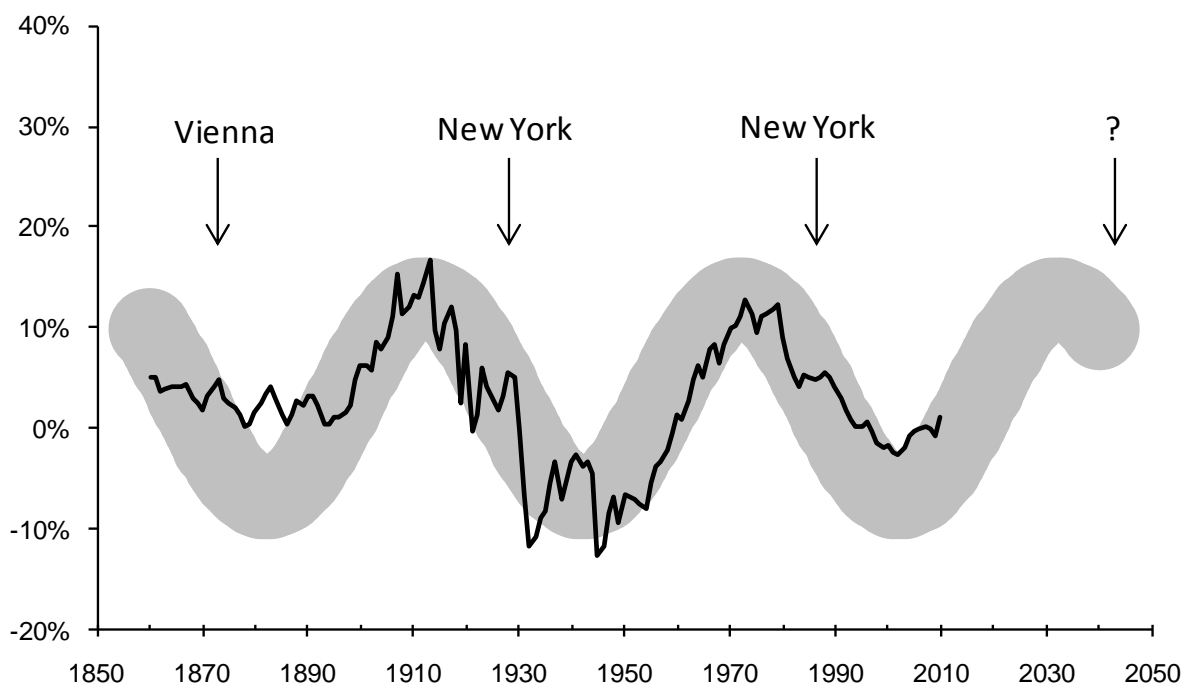## The Kondratieff Cycle and Stock-Market Crashes

Exhibit 2. The black line shows deviations from a growing trend (an overall S-curve fitted on the entire set of data of Exhibit 1). The most recent turnaround with respect to the overall trend was in 2002. The gray band is a sine wave with a period of 60 years to guide the eye. The arrows point at stock-market crashes; the next one positioned not before the early 2040s.
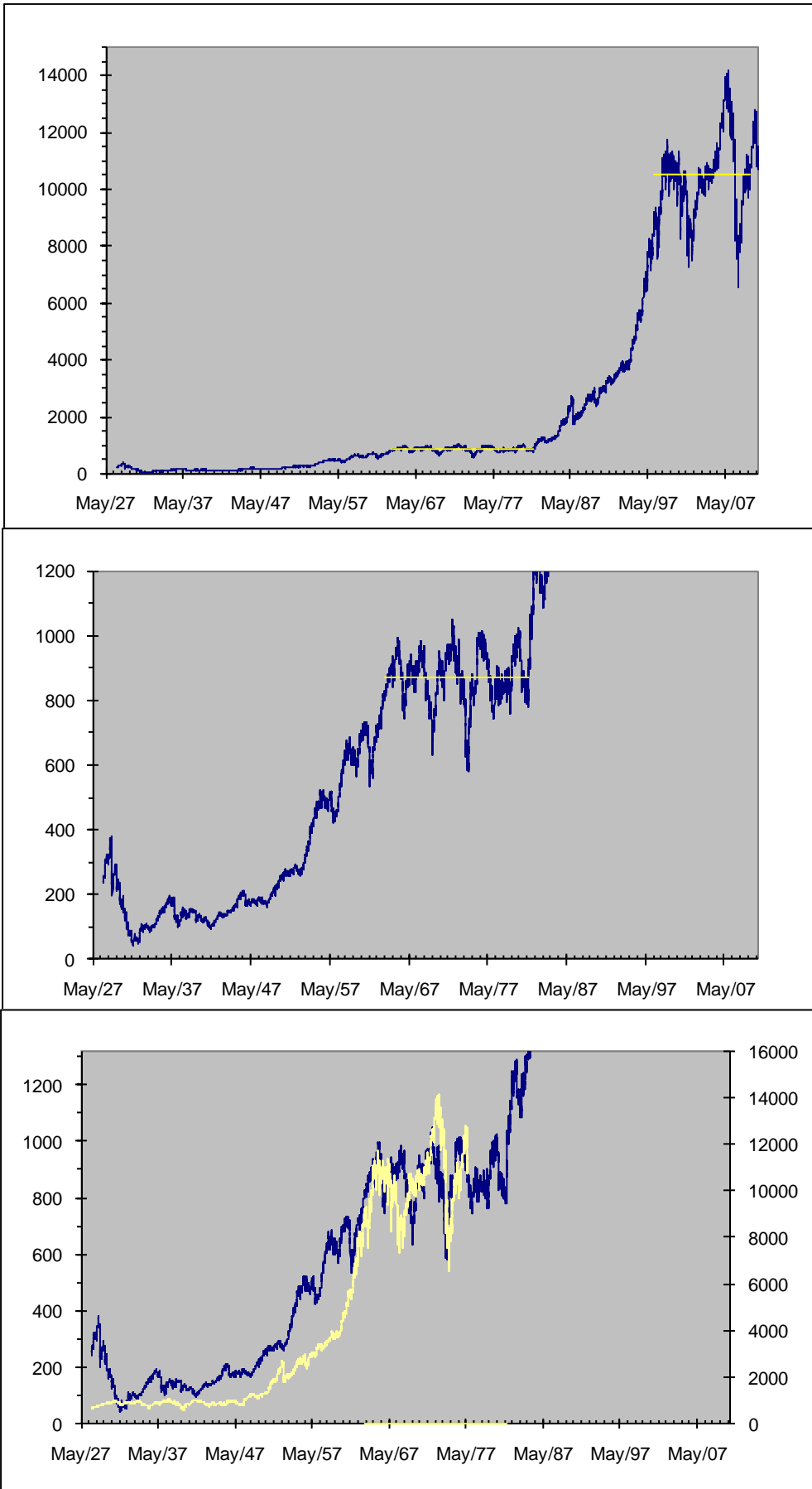

The Stock Market

The stock market has indeed been very turbulent, but this is not recent; it has *always* been that way. In Exhibit 3 we see daily closing prices of the DJIA since early 20th century (top graph). To better appreciate the 2-step growth structure of the data, the vertical scale is expanded in the middle graph, and recent data are superimposed displaced (yellow line) in the lower graph in an effort to evidence possible autocorrelations.

Indeed, the two steps (blue and yellow lines in the lower graph) not only display comparable-size relative jumps from minimum to maximum values, but are also characterized by the same-size (percentagewise) fluctuations at the ceiling. In percent the stock market was as turbulent in the early 1970s as has been in the last ten years!

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Exhibit 3 (next page). Daily closing prices of the DJIA since October 1928. The yellow line at the bottom, plotted on the right-hand axis, shows the data of the top graph displaced. The yellow horizontal lines indicate average levels.

The DJIA

The yellow horizontal lines in Exhibit 3 represent average values 10526, and 872 for the top and middle graphs respectively. It should also be noted that maximum daily fluctuations around the 10526 level were +35%, -39%, whereas maximum fluctuations around the 872 level were +21%, -34%. Finally, from the bottom graph we see that if history repeats itself, the behavior of the DJIA since 2000 should continue for another six years or so before a possible new steady-growth phase settles in.

Gold Production

Gold production worldwide has been steadily growing. On the assumption that there is a finite amount of it underground (limited resource) and that there is competition for it, we can treat is as a species and try to describe it with an S-curve. In Exhibit 4 we see an S-curve fit on the cumulative gold-production data worldwide since 1850 when reliable data first became available. What becomes immediately obvious is that gold production on a world scale is a process that has considerable remaining growth potential. The S-curve is presently pene-trated to less than 30%, which means that despite a medium-term cyclical varia-tion the rate of production will continue growing on the average along a trend that will reach a peak of an annual 122 million ounces around 2065. A 90% confidence level indicates that this date can vary between 2045 and 2089. Despite periodic short-term shortages (gold production is known to be cyclical) that may temporarily contribute to high prices, gold will by and large be readily available in the long term.

Worldwide Gold Production
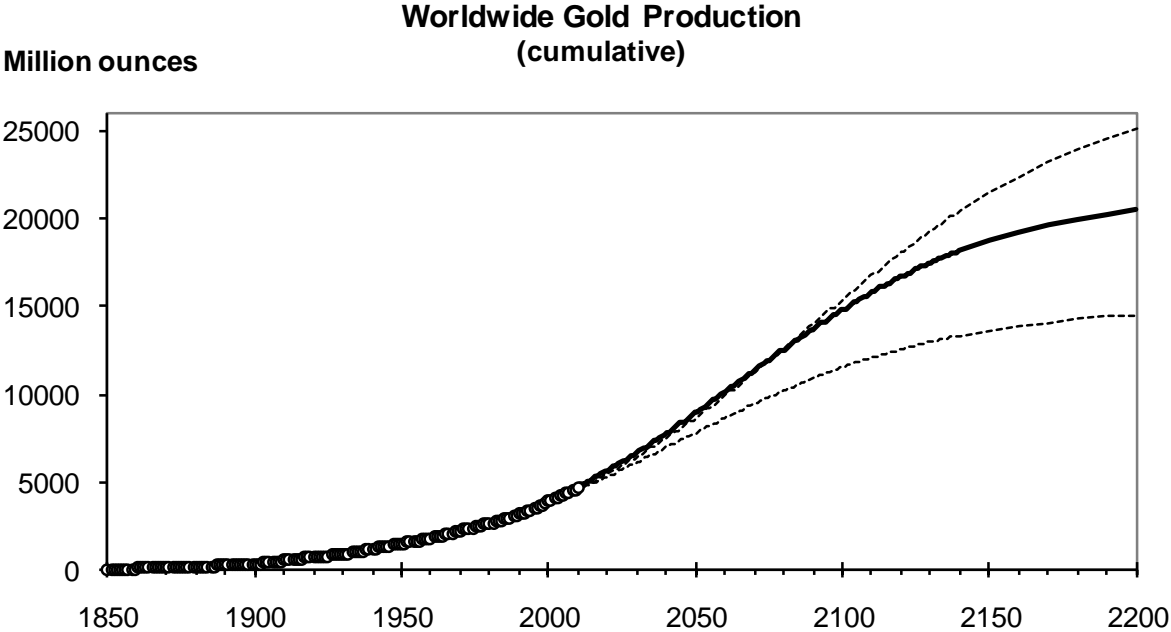**(cumulative)**

Million ounces

Exhibit 4. An S-curve fit on yearly data and the 90% confidence-level band delimited by the dotted lines. The mid points of the three S-curves are at 2045 (lower S-curve), 2065, and 2089 (upper S-curve).

The Price of Oil

In June 2008 when oil prices hit $145 a barrel I updated a graph from my book *Predictions*, and concluded that a real oil-price flare up is not for the near future. In Exhibit 4 below I update this graph once again. I should say that the prices plotted in the figure are not simply corrected for inflation, but also expressed in Swiss Francs, a currency more neutral and stable. The yellow line represents a scenario emulating the very first peak in the price of Fuel & Lighting. The forecast shows no significant price hikes in the near future. For the next 25 years the price of oil will be hovering on the average around where it is today.
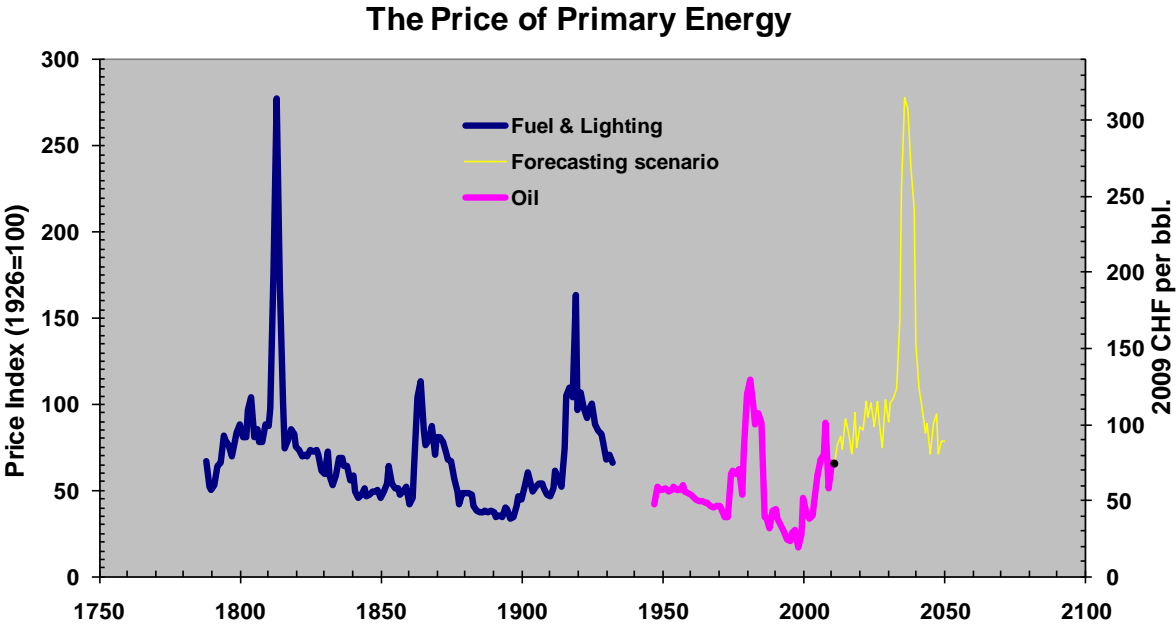
The Price of Primary Energy

Figure 4. The little black dot on the purple line indicates the 2011 average price. Next oil peak could be in 2036.

Conclusions

This summer journalists, analysts, and stock-market plunges have given most investors (and many simple citizens) the scare of their lives. And yet, the world economy has irreversibly embarked on a steep-growth trajectory, the stock market is poised to remain stable, albeit with *large* fluctuations but no *real* crash in sight, gold production will be steadily increasing every year (on the average), and there will be no menace from the price of oil. All this forecasted for many years! Such economic stability is reflected on the currencies of the two largest economies: the ratio of USD/EUR has been pinned around 1.4 $/€ a value I had forecasted back in February for the next several years. How seriously can we take all these forecasts?

My confidence stems from the way I arrived at these conclusions, namely using natural laws. You can count on S-curves to proceed to completion under normal circumstances, and before you argue that today's circumstances are not normal let me remind you that normal in my analysis is all that has been happening during the historical window from which the data are drawn.

Of course S-curve trends can be interrupted. A tree in the forest will never reach its final height if there is a forest fire. But such a fire never took place while the seedling was growing providing us with data measurements. What is the equivalent to a forest fire in today's economy? What singular event of great importance took place this summer or earlier this year that had never happened before? If you can find such an event and convince yourself of its unique nature and great impact on world affairs, then you can justifiably question my forecasts.