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Summary of "Demographics and Industry Returns"[1]

Demographic changes are forecastable years in advance. Current age cohort sizes, in combination with mortality and fertility tables, generate accurate forecasts of future cohort sizes even at very long horizons. Since different goods have distinctive age profiles of consumption, forecastable changes in the age distribution produce forecastable shifts in the demand for goods. These shifts in demand induce predictable long-term changes in profitability for industries that are not perfectly competitive.

Investors may be inattentive to information about future industry profitability beyond their foresight horizon. In the U.S. stock market, five years is usually the longest horizon at which analysts make earnings forecasts. For periods farther into the future, investors may extrapolate the near-term forecasts. Thus certain information about long-term demographic changes may not be fully reflected in stock prices. In this paper, the authors find forecastable demographics-driven demand changes predict stock returns.

The first step is to forecast demographic changes using current age cohort sizes, mortality tables, and fertility rates.[2] The forecasted cohort growth rates over the next fifteen years closely track the actual growth rates. Second, goods are categorized into industries with distinct age profile of consumption, using consumer surveys.[3] For a given good, the age profile is quite stable across the surveys. Last, in each year, the authors forecast the demand growth at one- to fifteen-year horizons by multiplying the forecasted age cohort sizes with the age-specific consumption of goods estimated on the most recent survey and then aggregating across age cohorts. The output is the good-by-good forecasted demand growth caused by demographic changes.

Focusing on the industries with unstable demand growth driven by demographics (called "Demographic Industries") in the sample period from 1974 to 2003, the authors find a 1% increase in forecasted annual demand growth increases the industry-average return on equity (ROE, the profitability measure) from an average of 11.1% to an average of 13.8%, i.e. a 24% increase.[4] The ROE predictive power of forecasted demand is stronger in more concentrated industries, possibly due to higher barriers that deter entrants and thus translate predictable long-term demand growth into profitability.[5]

The forecasted demand growth predicts the return to the value-weighted industry portfolios. A 1% increase in the forecasted annualized demand growth from year 5 to year 10 increases the annual industry return by 8.92%, after hedging the market exposure.[6] In contrast, the forecasted demand growth from year 1 to year 5 does not forecast industry returns. This is consistent with the hypothesis that investors only pay attention to the near-term predictability of industry profitability which is consequently incorporated into current stock prices. The predictability of returns is higher in industries with above-median concentration ratio and with a larger share of public companies relative to the private companies.

Next, the authors sort the industries into two equal groups based on long-term (five- to ten-year) forecasted demand growth ("absolute" long-term growth sort), and then within each of these two groups, sort the industries into two equal subgroups based on the difference between predicted long-term and short-term (one- to five-year) forecasted demand growth ("relative" long-term growth sort). A zero-investment portfolio that long industries with high absolute and relative ranks and short industries with low absolute and relative ranks exploits the return predictability of demographics-driven long-term demand growth and investors' inability to extrapolate trend. After hedging the market exposure, the annualized return for the portfolio is 6.8%, which is similar to the 3-factor alpha and 4-factor alpha. [7] The return increases to 8.2% if the portfolio is formed using only industries with above-median concentration. Moreover, the outperformance of the zero-investment portfolio depends more heavily on the long portfolio than on the short portfolio. The returns from trading on demographic information are sizeable, and rational market participants could exploit the market underreaction to long-term demographic information.

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[1] DellaVigna, Stefano, and Joshua M. Pollet, 2007, *American Economic Review* 97(5), 1667-1702.

[2] The cohort size data are from the Current Population Reports, Series P-25 (US Department of Commerce, Bureau of the Census). Mortality rates are from period life tables for the years 1920–2000 from Life Tables for the United States Social Security Area 1900-2080. To get birth rates, the authors use the Vital Statistics of the United States: Natality (US Department of Health and Human Services).

[3] Consumption surveys include the ongoing Consumer Expenditure Survey, and earlier surveys, such as the Study of Consumer Purchases in the United States (1935-1936), the Survey of Consumer Expenditures (1960-1961), and the Survey of Consumer Expenditures (1972-1973).

[4] The authors rank industries by the standard deviation of forecasted annual demand growths in the next fifteen years, and label the top 20 industries as "Demographic Industries". Since these industries have volatile demand growth driven by demographics, the simple extrapolation of near-term growth forecasts tends to significantly deviate from the real long-term industry trend.

[5] The concentration ratio measure is the ratio of revenue for the largest four firms to total industry revenue, from the Census of Manufacturers

[6] The hedge is done by deducting from raw excess return (raw return minus the Treasury bill rate) the product of market excess return and the industry's market beta, i.e. the CAPM alpha.

[7] For details of the factors, refer to: Fama, Eugene F., and Kenneth R. French, 1993, Common risk factors in the returns on stocks and bonds, *Journal of Financial Economics* 33, 3-56; Carhart, Mark M., 1997, On persistence in mutual fund performance, *Journal of Finance* 52, 57-82.