The 2013-2018 Outlook for Systemic Broad-And Medium-Spectrum Antibiotic Pharmaceutical Preparations of Injectable, Semisynthetic Single Penicillins in Japan

Description: WHAT IS LATENT DEMAND AND THE P.I.E.?

The concept of latent demand is rather subtle. The term latent typically refers to something that is dormant, not observable, or not yet realized. Demand is the notion of an economic quantity that a target population or market requires under different assumptions of price, quality, and distribution, among other factors. Latent demand, therefore, is commonly defined by economists as the industry earnings of a market when that market becomes accessible and attractive to serve by competing firms. It is a measure, therefore, of potential industry earnings (P.I.E.) or total revenues (not profit) if Japan is served in an efficient manner. It is typically expressed as the total revenues potentially extracted by firms. The "market" is defined at a given level in the value chain. There can be latent demand at the retail level, at the wholesale level, the manufacturing level, and the raw materials level (the P.I.E. of higher levels of the value chain being always smaller than the P.I.E. of levels at lower levels of the same value chain, assuming all levels maintain minimum profitability).

The latent demand for systemic broad- and medium-spectrum antibiotic pharmaceutical preparations of injectable, semisynthetic single penicillins in Japan is not actual or historic sales. Nor is latent demand future sales. In fact, latent demand can be either lower or higher than actual sales if a market is inefficient (i.e., not representative of relatively competitive levels). Inefficiencies arise from a number of factors, including the lack of international openness, cultural barriers to consumption, regulations, and cartel-like behavior on the part of firms. In general, however, latent demand is typically larger than actual sales in a market.

For reasons discussed later, this report does not consider the notion of “unit quantities”, only total latent revenues (i.e., a calculation of price times quantity is never made, though one is implied). The units used in this report are U.S. dollars not adjusted for inflation (i.e., the figures incorporate inflationary trends). If inflation rates vary in a substantial way compared to recent experience, actual sales can also exceed latent demand (not adjusted for inflation). On the other hand, latent demand can be typically higher than actual sales as there are often distribution inefficiencies that reduce actual sales below the level of latent demand.

As mentioned in the introduction, this study is strategic in nature, taking an aggregate and long-run view, irrespective of the players or products involved. In fact, all the current products or services on the market can cease to exist in their present form (i.e., at a brand-, R&D specification, or corporate-image level) and all the players can be replaced by other firms (i.e., via exits, entries, mergers, bankruptcies, etc.), and there will still be latent demand for systemic broad- and medium-spectrum antibiotic pharmaceutical preparations of injectable, semisynthetic single penicillins at the aggregate level. Product and service offerings, and the actual identity of the players involved, while important for certain issues, are relatively unimportant for estimates of latent demand.

THE METHODOLOGY

In order to estimate the latent demand for systemic broad- and medium-spectrum antibiotic pharmaceutical preparations of injectable, semisynthetic single penicillins across the prefectures and cities of Japan, I used a multi-stage approach. Before applying the approach, one needs a basic theory from which such estimates are created. In this case, I heavily rely on the use of certain basic economic assumptions. In particular, there is an assumption governing the shape and type of aggregate latent demand functions. Latent demand functions relate the income of a prefecture, city, household, or individual to realized consumption. Latent demand (often realized as consumption when an industry is efficient), at any level of the value chain, takes place if an equilibrium is realized. For firms to serve a market, they must perceive a latent demand and be able to serve that demand at a minimal return. The single most important variable determining consumption, assuming latent demand exists, is income (or other financial resources at higher levels of the value chain). Other factors that can pivot or shape demand curves include external or exogenous shocks (i.e., business cycles), and or changes in utility for the product in question.
These sources will therefore aggregate across components of a category and report only the aggregate to order to protect private information from individual firms that might dominate a specific product-market.

Latent demand is therefore estimated using data collected for relatively efficient markets from independent data sources (e.g. Official Chinese Agencies, the World Resources Institute, the Organization for Economic Cooperation and Development, various agencies from the United Nations, industry trade associations, the International Monetary Fund, Euromonitor, Mintel, Thomson Financial Services, the U.S. Industrial Outlook, and the World Bank). Depending on original data sources used, the definition of “systemic broad- and medium-spectrum antibiotic pharmaceutical preparations of injectable, semisynthetic single penicillins” is established. In the case of this report, the data were reported at the aggregate level, with no further breakdown or definition. In other words, any potential product or service that might be incorporated within systemic broad- and medium-spectrum antibiotic pharmaceutical preparations of injectable, semisynthetic single penicillins falls under this category. Public sources rarely report data at the disaggregated level in order to protect private information from individual firms that might dominate a specific product-market. These sources will therefore aggregate across components of a category and report only the aggregate to
the public. While private data are certainly available, this report only relies on public data at the aggregate level without reliance on the summation of various category components. In other words, this report does not aggregate a number of components to arrive at the “whole”. Rather, it starts with the “whole”, and estimates the whole for all prefectures and cities in Japan (without needing to know the specific parts that went into the whole in the first place).

Given this caveat, this study covers “systemic broad- and medium-spectrum antibiotic pharmaceutical preparations of injectable, semisynthetic single penicillins” as defined by the NAICS coding system (pronounced “nakess”). The NAICS code for systemic broad- and medium-spectrum antibiotic pharmaceutical preparations of injectable, semisynthetic single penicillins is 325412P127. It is for this definition of systemic broad- and medium-spectrum antibiotic pharmaceutical preparations of injectable, semisynthetic single penicillins that the aggregate latent demand estimates are derived for the prefectures and cities of Japan.

Step 2. Filtering and Smoothing

Based on the aggregate view of systemic broad- and medium-spectrum antibiotic pharmaceutical preparations of injectable, semisynthetic single penicillins as defined above, data were then collected for as many geographic locations as possible for that same definition, at the same level of the value chain. This generates a convenience sample of indicators from which comparable figures are available. If the series in question do not reflect the same accounting period, then adjustments are made. In order to eliminate short-term effects of business cycles, the series are smoothed using an 2 year moving average weighting scheme (longer weighting schemes do not substantially change the results). If data are available for a geographic region, but these reflect short-run aberrations due to exogenous shocks (such as would be the case of beef sales in a prefecture or city stricken with foot and mouth disease), these observations were dropped or “filtered” from the analysis.

Step 3. Filling in Missing Values

In some cases, data are available on a sporadic basis. In other cases, data may be available for only one year. From a Bayesian perspective, these observations should be given greatest weight in estimating missing years. Assuming that other factors are held constant, the missing years are extrapolated using changes and growth in aggregate national, prefecture and city-level income. Based on the overriding philosophy of a long-run consumption function (defined earlier), prefectures and cities which have missing data for any given year, are estimated based on historical dynamics of aggregate income for that geographic entity.

Step 4. Varying Parameter, Non-linear Estimation

Given the data available from the first three steps, the latent demand is estimated using a “varying-parameter cross-sectionally pooled time series model”. Simply stated, the effect of income on latent demand is assumed to be constant unless there is empirical evidence to suggest that this effect varies (i.e., the slope of the income effect is not necessarily same for all prefectures or cities). This assumption applies along the aggregate consumption function, but also over time (i.e., not all prefectures or cities in Japan are perceived to have the same income growth prospects over time). Another way of looking at this is to say that latent demand for systemic broad- and medium-spectrum antibiotic pharmaceutical preparations of injectable, semisynthetic single penicillins is more likely to be similar across prefectures or cities that have similar characteristics in terms of economic development.

This approach is useful across geographic regions for which some notion of non-linearity exists in the aggregate cross-region consumption function. For some categories, however, the reader must realize that the numbers will reflect a prefecture’s or city’s contribution to latent demand in Japan and may never be realized in the form of local sales.

Step 5. Fixed-Parameter Linear Estimation

Nonlinearities are assumed in cases where filtered data exist along the aggregate consumption function. Because Japan consists of more than 1,000 cities, there will always be those cities, especially toward the bottom of the consumption function, where non-linear estimation is simply not possible. For these cities, equilibrium latent demand is assumed to be perfectly parametric and not a function of wealth (i.e., a city’s stock of income), but a function of current income (a city’s flow of income). In the long run, if a prefecture has no current income, the latent demand for systemic broad- and medium-spectrum antibiotic pharmaceutical preparations of injectable, semisynthetic single penicillins is assumed to approach zero. The assumption is that wealth stocks fall rapidly to zero if flow income falls to zero (i.e., cities which earn low
levels of income will not use their savings, in the long run, to demand systemic broad- and medium-
spectrum antibiotic pharmaceutical preparations of injectable, semisynthetic single penicillins. In a
graphical sense, for low income cities, latent demand approaches zero in a parametric linear fashion with a
zero-zero intercept. In this stage of the estimation procedure, a low-income city is assumed to have a latent
demand proportional to its income, based on the cities closest to it on the aggregate consumption function.

Step 6. Aggregation and Benchmarking

Based on the models described above, latent demand figures are estimated for all major cities in Japan.
These are then aggregated to get prefecture totals. This report considers a city as a part of the regional and
national market. The purpose is to understand the density of demand within a prefecture and the extent to
which a city might be used as a point of distribution within its prefecture. From an economic perspective,
however, a city does not represent a population within rigid geographical boundaries. To an economist or
strategic planner, a city represents an area of dominant influence over markets in adjacent areas. This
influence varies from one industry to another, but also from one period of time to another. I allocate latent
demand across areas of dominant influence based on the relative economic importance of cities within its
prefecture. Not all cities (e.g. the smaller towns) are estimated within each prefecture as demand may be
allocated to adjacent areas of influence. Since some cities have higher economic wealth than others within
the same prefecture, a city's population is not generally used to allocate latent demand. Rather, the level of
economic activity of the city vis-à-vis others is used. Figures are rounded, so minor inconsistencies may exist
across tables.

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