A Nonlinear Growth Analysis of Integrated Device Manufacturers' Evolution to the Nanotechnology Manufacturing Outsourcing

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Received 12 January 2012; received in revised form 18 February 2012; accepted 17 March 2012

Abstract

With the increasing cost of setting up a semiconductor fabrication facility, coupled with significant costs of developing a leading nanotechnology process, aggressive outsourcing (asset-light business models) via working more closely with foundry companies is how semiconductor manufacturing firms are looking to strengthen their sustainable competitive advantages. This study aims to construct a market intelligence framework for developing a wafer demand forecasting model based on long-term trend detection to facilitate decision makers in capacity planning. The proposed framework modifies market variables by employing inventory factors and uses a top-down forecasting approach with nonlinear least square method to estimate the forecast parameters. The nonlinear mathematical approaches could not only be used to examine forecasting performance, but also to anticipate future growth of the semiconductor industry. The results demonstrated the practical viability of this long-term demand forecast framework.

Keywords: semiconductor, nonlinear growth model, forecast, inventory

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