
Subject Index

- AAGRs (average annual growth rates), 65–66, 89
- Age: of computer models, 1; effect in microcomputer market, 77; in hedonic equation, 6; in secondhand computer market, 21; of technology to estimate obsolescence, 97–98. *See also* Depreciation; Model age; Retirements, computer; Vintage
- Age concept: as component of best-technology computers, 33; effect on computer price, 42; to estimate depreciation, 97–98; to estimate price change, 21, 57; in estimating computer retirement, 38; in mainframe depreciation rates, 43–47; measure in computer pricing model, 22; price change related to, 36. *See also* Obsolescence
- Aircraft: component contracts for military, 308–9; learning curve for, 337–39; price-determining characteristics, 309–10, 312–30; price indexes for commercial and military, 13–14
- ASM (Annual Survey of Manufactures), 135–38
- ASP estimates. *See* Average selling price (ASP)
- Average price (AP) series, BLS, 241–48
- Average prices: in Dataquest data, 114; in PPI steel industry price indexes, 269
- Average selling price (ASP), 165–66
- Backwardation, normal: to estimate spot market price, 189; of forward prices, 172, 182; theory of, 171. *See also* Forward prices; Futures prices; Spot price
- Base price: calculation of, 330; for defense component contract values, 331t; derivation of, 327, 330–31; factors influencing, 339–41
- Bayes-Leamer factor asymptotic approximation, 75, 77nn13,14, 78n15, 83n19
- Benchmark measures (for microcomputer performance), 95–97
- Best-practice technology models, 2, 23–26, 30–36, 56–57. *See also* Nonbest technology models
- Bias: in BEA data, 57–58; in BLS price indexes, 164; with commodity substitution, 232–34; in consumer price measures, 11; in CPI, 210, 227–31; in CPI retail outlet substitution, 231–50, 256; in DRAM market forward prices, 181; in intermediate good price measurement, 2; in measured total factor productivity, 132; in new chip introductions, 201–2; potential in transaction price reporting, 281–82; in steel industry price indexes, 261
- Billing price (in chip contract), 165, 182–88
- Book prices: average, 165–66, 182; levels for sheet steel, 270–71; for PPI steel price indexes, 264–65, 266, 268, 270
- Capital goods: comparison of two price indexes for, 362–66; equating, 352–53; hedonic price deflation for, 133–35

- Capital stocks: BEA estimates of depreciation, 20, 49–58, 98; in semiconductor quality change analysis, 137–38
- Card (for chip mounting), 104
- CFE. *See* Contractor-furnished equipment (CFE)
- Characteristics: apparel, 211, 212; for comparable-quality prices, 210–11, 212–16; of computer models in BEA price index, 353–55; individual product as bundle of, 141; measures for hedonic methods of, 95; price-determining, 4, 30, 212–16, 308–11; quality issue in changing, 275. *See also* Specifications
- Chip/chips: effect of timing on price index, 116–18; as electronic product, 104; in logic package, 104; power consumption of, 159; prices and uses of new, denser, 106–10; using density as proxy, 24–25. *See also* CMOS (complementary metal-oxide semiconductor) chips; DRAM (Dynamic random access memory) chips; Memory chips; MOS (metal oxide on silicon) chips; NMOS (n-channel metal-oxide semiconductor) chips
- Chip manufacturers. *See* Original equipment manufacturers (OEMs)
- Chip market. *See* Contract prices; Futures prices; Grey market (chip market); Spot price
- Clayton Act. *See* Robinson-Patman Act (1936)
- CM (Census of Manufactures), 135–38
- CMOS (complementary metal-oxide semiconductor) chips: displace NMOS, 159; logic and memory improvements in, 105, 112
- Commodities: cost of search for, 233–36; pricing and marketing of apparel, 210. *See also* Steel industry
- Commodity indexes: in PPI, 262; substitution effect in, 232–33
- Comparisons: by BEA of computer characteristics, 8–9; of BLS average prices with CPI counterparts, 241–50; direct method for old and new prices, 311–12; of price levels, 235–41; quality price in apparel industry, 211, 212
- Competition: among DRAM manufacturers, 161, 164; in steel industry, 266–67, 302
- Computer industry: disequilibrium in market of, 63, 94–95; role of semiconductor technology in, 24–25, 125, 127–35. *See also* Mainframe computer market; Microcomputer (PC) market; Second-hand computer market
- Computer price change model, 24–26
- Computer price index (BEA): based on linked price indexes, 353; behavior and effect of, 351–52; effect of, 351–55; weighting of, 355–56
- Computer processors: CPU cycle time in, 110–12; electronic products used in, 104; logic performance in, 110–12; PPI components and deflator for, 112–13; quality-adjusted price declines, 121–23
- Computers: logic components in, 104–5, 110–12; measurement of long-run price behavior, 2; price decline of, 3, 19–20; price index for equipment, 3; pricing of best and nonbest technology, 24–25, 30–31. *See also* Microcomputer (PC) market; Microcomputers (PCs); Office and computing equipment (OCE)
- Confidentiality, 263, 283, 290–91
- Consumer price index (CPI): apparel commodities in, 11; comparison with BLS AP series, 241–48; differences from average price (AP) series, 242–50, 252t; effect of retail store change on, 227; imputed price change in, 210; outlet sample rotation in, 231–32, 235–41; outlet substitution bias in, 232–41; price changes measured by, 209–10; price changes not in, 311; treatment of substitution in, 2. *See also* Continuing Point of Purchase Survey (CPOPS), BLS
- Consumer search, 233–36
- Continuing Point of Purchase Survey (CPOPS), BLS: outlet sample rotation of, 238–39; outlet sampling frame of, 231, 236
- Contractor-furnished equipment (CFE), 317, 322, 324, 341
- Contract prices: analysis of chip market, 7, 162–63, 168–81, 188; as forward prices in chip market, 170–73; Japan does not report, 167. *See also* Spot price
- Cost function estimations (FIML method), 140
- Cost function modeling, 145
- CPI. *See* Consumer price index (CPI)
- CPOPS. *See* Continuing Point of Purchase Survey (CPOPS), BLS

- CPU (central processing unit). *See* Computer processors
- Data: Census Bureau, 115, 118–20; splicing price, 311–12, 318–20, 337–39. *See also* Price series
- Data collection: of CPI old and new outlet samples, 236–37; legal issues influencing, 288, 290–96; proposed for outlet characteristics and items, 250–51; proposed low-cost DRAM-related, 196; for revised PPI steel index, 264, 268–70. *See also* Confidentiality; Response rates, survey; Surveys
- Dataquest data. *See also* Average selling price (ASP)
- Data sources: for aircraft prices, 312–18; for BEA price derivation, 315, 317; for computer retirement estimates, 37–38; to create computer processor price index, 113–14, 118–19; Current Industrial Report (CIR), 115; Dataquest, 6, 66, 105, 107i, 113–18, 158, 165–68, 174–77, 179–80; for DRAM price analysis, 7, 165, 167–68, 179; to estimate semiconductor quality change, 7, 135–39; factors influencing response from, 288–90; for mainframe computer price change, 20, 21, 26–27; for mainframe depreciation, 48, 56; for mainframe retirement distribution, 37, 38, 48; for microcomputer price index analysis, 64, 66–67; for price linking of women's clothing, 255; for prices of IBM mainframe computers, 5–6; problems in existing DRAM price, 181–82; for secondhand computer market, 20, 94; for semiconductor technological characteristics, 139–40; for value of shipments by computer model, 88
- Daughter boards. *See* Card (for chip mounting)
- Defense purchases: base price adjustment in constant-dollar, 324–27; data in NIPA of weapons systems, 308–9; measured in constant prices with deflator, 307; military and civilian compensation as, 307–8; price indexes for, 307–9; recording of prices for aircraft, 308–9; specification pricing for, 309–11. *See also* Learning curve
- Deflators/deflation: in BEA computer price index, 351–55; in conventional hedonic function, 133–35; in defense purchases price indexes, 318, 307, 332t, 335t, 343–44; in Harrod residual, 366; hedonic price index for semiconductor, 143–44; for output in PPI, 139; technique to obtain price series for, 353
- Depreciation: data construction in quality change analysis, 137–38; estimates of mainframe, 20, 42–47, 57; estimating obsolescence in, 97; factors in increased rate of, 98–99; measurement of mainframe, 36; partial, 57, 98; rate of mainframe, 20, 23. *See also* Obsolescence
- Direct link procedure, 311–12, 339
- Direct price index, 6–7
- Discount price: defined, 64; inferring IBM computer, 27–30
- Discounts: age of microcomputers with, 67–68; of best relative to nonbest computer models, 33; on IBM mainframe computers, 27–30; survey response rates to, 295; for volume pricing, 162. *See also* Outlets; Retail establishments; Wholesale clubs
- Distribution network (chip manufacturers), 162–63
- DRAM (dynamic random access memory) chips: bit capacity, design, and speed of, 158–61; forward pricing of, 170–73; heterogeneity of products and markets for, 181–94; Japanese export licensing for, 163–64; in main memory, 105–10; market organization for, 161–64; 1M DRAM version, 159; price indexes for, 7; prices of, 157. *See also* CMOS (complementary metal-oxide semiconductor) chips; MOS (metal-oxide on silicon) chips; NMOS (n-channel metal-oxide semiconductor) chips
- Economic growth sources, 352
- Electronic components: in computer processors, 103–12, 118–23; as source of quality-adjusted price declines, 121–23; value of, 120–21. *See also* Chip/chips; Computer processors; Logic chips; Memory chips
- Electronic packages, 104. *See also* Card (for chip mounting); Chip/chips; Computer processors; Electronic components
- Employment cost index, 285–86

- Expectations (chip market), 171. *See also* Futures prices
- Export licensing system, Japan, 163–64
- Externalities, 359
- Factors of production (in quality change estimation), 135–39
- Fashion (as characteristic), 213
- Federal Trade Commission (FTC), 265, 291–94, 302
- FIML (full information maximum likelihood) estimations, 132–33, 140
- FIOPI (fixed input-output price index), 262
- Fisher Ideal price index: construction and use of, 185–87; formula for, 115–17. *See also* TGFPI (Time-series Generalized Fisher Ideal) price indexes
- Forward prices: at beginning of contract, 169; DRAM contract prices as, 170–73, 182; normal backardation of, 172; related to chip market spot prices, 173–79
- Futures markets (Stein's model), 172
- Futures prices, 171. *See also* Forward prices; Spot price
- Government-furnished equipment (GFE), 317, 322–24, 341
- Grey market (chip market), 163, 164, 168. *See also* Spot market
- Harper and Row, Publishers, Inc., et al., 293n10*
- Harrod residual, 363, 365–66, 374
- Hedonic function: conventional and short-run applications, 133–35; to create data to construct price indexes, 69–83; estimates using list and secondhand prices, 30–32; in mainframe price change analysis, 23; modification of, 4
- Hedonic method: as alternative to PPI methods, 202; for apparel, 11; for BEA computer price index, 3; for Census Bureau single-family house price index, 3n3; to derive implicit price, 210–12; to estimate price change and quality adjustment, 2; to measure implicit price of quality change, 210–11; new product introductions using, 202; use of, 356
- Hedonic price indexes: cost function-based, 144–45, 148–50; for defense product quality change, 345–46; transaction price errors in, 202–3
- Hedonic regression models, BLS, 225
- Indexes. *See* Consumer price index (CPI); Fisher Ideal price index; Hedonic price indexes; Laspeyres price index; Matched-model indexes; Net output indexes; Paasche price index; Producer price index (PPI), BLS; Productivity index (BLS); State-of-processing indexes
- Information, price, 276–77. *See also* Confidentiality; Data collection; Price rigidity; Response rates, survey; Robinson-Patman Act (1936); Surveys
- Input: data construction for cost of labor, 135–36; deflation of semiconductor, 143–44; in modern economic systems, 362; quality-adjustment function for, 125–35, 138–40
- Integrated circuits (ICs): matched-model producer price indexes (BLS), 164; memory chip in consumption of, 158
- International Data Corporation (IDC), 37, 88
- International price program, BLS, 285
- Inventories, holding, 137, 138–39. *See also* Perpetual inventory method
- Investment tax credit, 25, 28
- Japan: export and domestic DRAM pricing, 163–64; price data of, 167; role of MITI in chip market, 164
- Lancaster's theory of demand, 141, 144
- Laspeyres price index: chaining in PPI component, 115, 118–19; formula for, 115–17; PPI as modified, 262; in TGFPI price index, 190, 191–92
- Learning curve: in deriving splice price, 337, 339; in determining defense purchase prices, 312, 315, 319–20, 334; forms of, 337
- Legal issues, 288, 290–96. *See also* Regulation; Robinson-Patman Act (1936)
- Liggett Group Inc. v. Brown & Williamson Tobacco Corp.*, 294n13, 295n14
- Linking: direct and back link methods, 311–12, 325–26, 339; in introducing substitute item, 254–56; to obtain price series for deflation, 353; old to new prices, 4, 311–12, 301, 339; of price indexes, 254–55, 353; of prices in CPI, 241, 251; of prices with specification change, 4. *See also* Direct link procedure; Splicing

- List prices: defined, 64; different regimes for mainframes, 30–32; discounting from, 280–81; to infer transaction price, 27–30; in PPI and PPIR, 275, 279–80; as proxies for IBM mainframe computer prices, 5–6; as proxies for net transaction prices, 271–72; ratio to asking price for IBM mainframes, 28–30; as reflection of transaction prices, 279–80; in steel industry, 261, 264–68, 270–72, 275, 301–2
- Logic chips, 105, 110–12
- Mail order market (microcomputer), 64
- Mainframe computer market: disequilibrium in, 22–23, 32–33, 56–57, 63–64, 94; estimates of price change in, 34–36; price indexes used in, 63–64; prices in secondhand, 20, 25–33, 56. *See also* Secondhand computer market; Technology class
- Mainframe computers: constant-quality price estimates for IBM, 27–36; econometric model for pricing, 24–26; retirement distribution estimates for, 37–42; technology class depreciation rate for, 43–47; variables in pricing model for, 21–24
- Market niches, 57
- Markets. *See* Computer industry; Grey market (chip market); Mainframe computer market; Microcomputer (PC) market; Secondhand computer market; Spot market; Supermarkets
- Matched-model indexes, BEA, 4, 6, 64–65, 97, 123, 357
- Matched-model indexes, BLS, 164
- Materials (communication and computers), 136
- Measurement: bias in, 2, 276–77; of depreciation, 36; of price change, 2, 209–10, 262; problems of, 103, 356–59; of total factor productivity, 359–66. *See also* Price measurement; Quality change
- Memory: components and capacity of main, 105–10; semiconductor, 157
- Memory chips: DRAM differentiation, 160–61, 170, 181–82; DRAM market organization, 161–64; historical data on DRAM prices, 164–68; price trajectory over time of, 164, 165f; as segment of semiconductor market, 158–60; technological advances in, 105–10
- Memory package, 105–10
- Microcomputer (PC) market: changes in, 66, 67; composition of, 67–68; discount and list prices in, 64, 67–68; model age composition of, 67–68; selectivity in, 72, 77
- Microcomputers (PCs): BEA price index for, 4; characteristics related to price, 67–68
- Ministry of International Trade and Industry (MITI), Japan, 164
- MIPS (millions of instructions processed per second): as measure of processor speed, 95–96; rating of, 24, 26–27
- Model age: effect on price in IBM mainframe market, 21–22, 36–49; to estimate obsolescence, 97–98; in microcomputer market, 67–68
- MOS (metal-oxide on silicon) chips: price indexes for, 112–13, 164, 114–18; in processor memory, 105
- Mother boards, 104
- Multichip modules (MCMs), 104
- National income and product accounts (NIPA), 3, 308–9
- Net output indexes (PPI), 262
- NMOS (n-channel metal-oxide semiconductor) chips, 159
- Nonbest technology models, 23–26, 30–36, 56–57
- NSTL (National Software Testing Laboratories) benchmark, 95–97
- Obsolescence: as criterion for retirement, 39; effect on price of, 36; factors in early, 99; of processors and microcomputers, 98
- OEMs. *See* Original equipment manufacturers (OEMs)
- Office and computing equipment (OCE): BEA investment depreciation of, 48–49; *Census of Manufactures* data for, 119–20; estimates of gross and net capital stock, 50–58; I-O table values of electronic products, 120–21; Winfrey S-3 and L-2 retirement distributions, 39–42, 48–49
- Original equipment manufacturers (OEMs): contract pricing by, 168–70; role in DRAM market, 162–63, 169–70
- Outlets: competition of, 228; consumer choice of retail, 229–30; evolution of

- Outlets (*continued*)
 lower-priced retail, 235; quality of services in, 256
- Outlet substitution: effect on CPI food and fuel components of bias, 250, 256; bias in CPI for, 232–35; in BLS average price (AP) series, 241–42; simultaneous with item substitution, 256; testing approaches for bias in CPI, 235–50
- Output: adjustment for quality change, 125–35; calculating computer industry, 19; grouping in semiconductor industry of, 141; identifying sources of growth in, 9–10; in modern economic systems, 362; PPI measurement of, 262; problems in measurement of, 103
- Paasche price index: formula for, 115–17; in TGFI price index, 190, 191–92t
- PC market. *See* Microcomputer (PC) market
- Performance/cost-of-production method, 343–46
- Performance measures: in logic chips and packages, 110–12; model-specific, 91; processor and computer levels, 95–96
- Perpetual inventory method, 137–38
- Point-of-purchase survey (POPS), BLS, 235–41, 256–57. *See also* Continuing point-of-purchase survey (CPOPS), BLS
- PPI. *See* Producer price index (PPI), BLS
- PPIR. *See* Producer price index revision (PPIR), BLS
- PPS. *See* Probability-proportionate-to-size (PPS)
- Price change: characteristics in defense purchases as, 311; for computers, 19–23; constant-quality, 34–36; of defense products, 344–45; in defense purchases, 319, 344–45; in DRAM market, 182–94; estimates in mainframe computer market, 34–36; estimates of computer, 19–20; imputed CPI, 210; measurement by CPI of, 209–10; measures in defense purchases, 307, 308; PPI measurement of, 262; price data to measure steel industry, 271; in price index formulas, 115–16. *See also* Characteristics; Specifications
- Price-determining characteristics: in apparel industry indexes, 212–16; defined, 309–10; for mainframe computers, 30; as price changes in defense purchases, 311; use with hedonic function of, 4
- Price discrimination: omission in survey responses of data on, 295–96; under Robinson-Patman Act, 12, 276, 292–96
- Price dispersion (retail markets), 229
- Price floors (DRAM market), 168
- Price indexes: average annual growth rates (AAGR) for microcomputer, 65–66, 85, 89, 91; based on hedonic estimates, 83–91, 93; for chip level, packages, and processors, 112–13; comparison of AP-based and CPI-based, 241–50; comparison of relative microcomputer, 65–66; construction for DRAMs, 182–87; construction for MOS chips, 113–18; for defense purchases and aircraft, 334–36; effect of chip introduction delay on, 6–7, 116–18, 200–201; fixed input-output price index (FIOPI), 262; in mainframe computer market, 63–64; methodology for constructing PPI, 198–204; for microcomputers, 4; practical construction of, 1–2; price linking for, 254; quality-adjusted microcomputer, 94; recalculation with adjusted apparel price data, 219–25; suggested research for, 13–14. *See also* Hedonic price indexes
- Price indexes, BEA: for computers and computer equipment, 3–5, 9–10, 197, 351–55; matched-model, 4, 6, 64–65, 97, 123, 357
- Price indexes, BLS: for chips and electronic packages in PPI, 112, 114–15; for computers and semiconductors, 3, 5; matched-model, 164; of PPI for steel (1990), 268–71; procedure for PPI, 114–15. *See also* Producer price index (PPI), BLS
- Price indexes, NIPA, 3, 308–9
- Price index formulas, 115–17, 123
- Price information. *See* Data collection; Data sources; Information; Surveys
- Price linking: by BLS with specification change, 4; CPI, 241, 251; process of, 254n1; using back link method, 325–26
- Price measurement: bias in reporting and, 276–77; problems of, 103; at producer level, 276, 277–81; resource-cost approach, 5. *See also* Price change; Specification change; Specifications
- Price/prices: adjustment for quality change, 217–18, 310–11; based on, 67–69, 109–10; commodity substitution with change

- in, 232–33; comparison of levels in CPI retail outlet samples, 235–41; determination in DRAM market of, 161–62; differences in semiconductor, 204; effect of declines in memory, 157; of electronic products in processors, 103; estimation of constant-quality, 19–20, 27; future research in, 13–14; of IBM mainframe computers, 21–23; implicit, 210–12; linking old to new, 4, 311–12; multiple microcomputer, 64, 94; quality-adjusted memory chip, 109–10, 118–19; real computer, 351, 357; regional differentials in DRAM, 163; related to age and vintage (microcomputer market), 63, 66–75; relation to mainframe depreciation, 43–47; reporting under Robinson-Patman of, 276–77, 290–96; in steel market, 268, 275. *See also* Average prices; Average selling price (ASP); Billing price; Comparisons; Direct link procedure; List prices; Response rates; Splice price; Transaction prices
- Price rigidity, 276–78
- Price series: development for defense price index, 308–9; development for defense purchase indexes, 315–30; with replacement of old with new product, 311; with shifts of groups within, 340–42, splicing of old and new, 311–12, 318–20, 337–39
- Probability-proportionate-to-size (PPS) sampling techniques, 263, 264, 275
- Producer price index (PPI), BLS: components and deflator for computer processors, 112–13; conceptual design of, 12, 262; coverage by and response to, 282–85, 296; effect of measurement problems on, 103; methodology for estimating, 112, 114–15, 197–206; MOS memory index, 198t, 199; price change measurement by, 262; price changes not in, 311; revised, 3, 205, 264, 279; revised steel industry price indexes in, 261; reweighting procedures for, 262; sampling techniques of, 7–8; for semiconductors, 197–202; structures of indexes in, 262; weights in, 115, 263–64. *See also* International price program, BLS; Sampling, probability
- Producer price index revision (PPIR), BLS, 113, 261, 275
- Productivity analysis, 359–62
- Productivity change: in defense purchase indexes, 345t, 346; measurement using BEA computer price index, 351–56; reallocation of multifactor, 203; total factor productivity as measure of, 359–60. *See also* Total factor productivity (TFP)
- Productivity index (BLS), 248–50
- Product modification: adjustment in price index for, 318–20; effect on price-determining characteristics, 310–11. *See also* Quality change; Splicing
- Public policy effect: on DRAM market, 161, 163–64; of Robinson-Patman Act, 276–77, 292–96, 302–3
- Quality: adjustment for differences in, 217–18; characteristics of computer, 24; making apparel price comparisons, 211, 212; standards in DRAM manufacture, 160; substitution in CPI, 209–10
- Quality change: adjustment in aircraft price series for, 318–30, 337–39; analysis of semiconductor and computer industries, 126–27, 144; associated with semiconductor input and output, 125–35; BLS producer price index approach to, 3–4; with change in product specification, 209; cost as measure of, 344; cost of purchased services in analysis of, 137; defense purchase criteria and adjustment for, 310; indirect measurement of semiconductor, 127–35; measurement of, 34–46, 127–35, 309–11, 343–44; measuring implicit price of, 210–11; methods of adjusting for, 310–11, 322; performance/cost-of-production to measure, 343–46; price series in determining, 309; in pricing new replacement for old product, 312; valuation of defense purchase, 320–24; weapons system pricing with, 312. *See also* Quality factors
- Quality factors: deriving, 340–42; to express value of quality change, 324–29. *See also* Base price
- Regulation: effect of Robinson-Patman, 276–77, 291–96, 302–3; in futures market, 171n20; influence on DRAM consumers, 161–64; on price floors for DRAMs, 168
- Rent's rule, 106f
- Repricing: of mainframe computers, 22–23; survey response rate in, 281–85, 295

- Research: directions for future price, 13–14; proposal for telecommunications industry, 145–46
- Resource allocation, price and nonprice, 276
- Resource-cost approach, 5
- Response rates, survey: for BLS and Census Bureau price collection surveys, 281–89; effect of IRS regulations on survey, 291; effect of Robinson-Patman act on survey, 291–92, 295–96; factors influencing, 288–92; recommendation to elicit higher, 296–97. *See also* International price program, BLS; Producer price index (PPI)
- Retail establishments: cause and effect of changes in, 227–28, 235; replacement of small by large, 227–28; shift of market share to lower-priced, 11, 229. *See also* Outlets; Outlet substitution; Supermarkets; Wholesale clubs
- Retirement distributions (mainframe computers), 20, 37–42, 98. *See also* Winfrey L-2 retirement distribution; Winfrey S-3 retirement distribution
- Retirements, computer: combined with depreciation for mainframe, 48–49; differences in patterns of, 41–42; FIFO and proportional methods of, 38–42; obsolescence as factor in, 39
- Reweighting. *See* Producer price index (PPI), BLS
- RMSE (root mean squared error), 75, 77–78, 80, 83
- Robinson-Patman Act (1936), 12, 276–77, 292–96, 302–3
- Sampling: BLS outlet frame for, 231; clustered for CPOPS, 236; for PPI indexes, 262–63; probability-proportionate-to-size (PPS) techniques, 263, 265, 275
- Sampling, probability; for BLS international price program, 285; in Census Bureau sales surveys, 286–89; under employment cost index, 285–86; under international price program, 285; for PPI, 7–8, 200–202, 263, 282–85; for PPI revision, 263–64, 272, 275, 277, 279
- Secondhand computer market: hedonic price equation for, 30–32; prices of mainframes in, 20, 25–33, 56, 94; pricing model for, 21–26
- Semiconductor industry: advances in, 158–60; effect of technology for, 125, 144; output estimates of, 204
- Semiconductors: BLS producer price index for, 2; device density and bit rating of products, 125–26; differences in computer and telecommunications products, 204; direct price index approach for, 6–7; memory chips in markets for, 158; price declines in memory, 157; quality-adjusted price index for, 7; quality change analysis, 136, 139–40, 147t
- Semiconductor Trade Arrangement (STA), (1986), 157, 163, 167, 170n19
- Service life: factors in decline of, 98–99; for IBM mainframes, 42. *See also* Depreciation; Obsolescence; Retirement distribution
- Solow residual, 363–64
- SORITEC program, 133n9, 140
- Specification change: measurement for PPI of, 3–4; in price measures of defense purchases, 307, 309–30; with quality change, 209; in semiconductor quality, 126–27
- Specifications: in data substitution (apparel), 216–20; in forward pricing of DRAMS, 170–79
- Spirit index formula, 115–17
- Splice price, 337–38
- Splicing: for defense purchase price series, 318–20; price and learning for weapons systems, 337–39; prices of old and new prices, 311–12
- Spot market: in chip market, 163, 167–69; in steel market, 301
- Spot price: deviation of forward price from, 171; in integrated circuit market, 162–63; in U.S. DRAM chip market, 171–81, 187–88. *See also* Billing price
- STA. *See* Semiconductor Trade Arrangement (STA)
- State-of-processing indexes, 262
- Steel industry: effect of foreign competition for, 266; list and transaction prices in, 261, 264–68, 270–72, 275–76, 301–2; price indexes for, 268–71. *See also* Average price; Book prices
- Stein's model of futures markets, 172
- Stigler Report (1961), 278, 281, 292–93, 297
- Stigler-Kindahl Report (1970), 12, 265, 278, 281, 289–90, 295, 302

- Substitution: in apparel industry, 216–20; brand and variety, 230; of commodities, 232–35; of comparable quality in CPI, 209–10, 211; in computer mainframe market, 21; by consumers in retail purchases, 229–30; item and outlet simultaneous, 256; of outlets, 232–35; price linking for price indexes, 254; in semiconductor industry of DRAMs, 160
- Supermarkets: consumer shift to, 2–3; with low-priced strategy, 228
- Surveys: for BLS international price program, 285; burden of, 288–89; from Census Bureau, 286–88; to collect BLS data for employment cost index, 285–86, 287t; to collect BLS price data, 282–85; Dataquest quarterly price, 166–67; employment cost index, 285–86; factors influencing response rates to, 288–96; proposed for defense product quality change, 346; quality of response to BLS, 279–80; response rate for Census Bureau sales, 286–89; response rate to BLS and Census Bureau, 276–77, 282–88, 302–3. *See also* Continuing point-of-purchase survey (CPOPS), BLS; Point-of-purchase survey (POPS), BLS; Response rates, survey
- Technological change: in computer market, 63, 94; in DRAM chips, 158–60, 182; effect of, 146; in electronic components, 103–12; price decline estimates with rapid, 164; role of semiconductor technology in, 125; in semiconductor memory, 157
- Technology class: constant-quality price change and depreciation in, 26–27, 59–60t; defined, 57; economic life (age) and depreciation rate of, 43–47, 57; for levels of embodied technology, 24–26; mainframe retirement distribution based on, 36–42, 46–47
- Telecommunications services industry, 125, 145
- TGFI (Time-series Generalized Fisher Ideal) price indexes, 190–94
- Thermal conduction modules (TCMs), 104
- Time factor: in computer discount pricing, 28–30; in falling price, 36; in hedonic equation, 6; of prices for defense price indexes, 308–9; related to product introduction, 9
- Tornqvist index formula, 115–17
- Total factor productivity (TFP): conventional and alternative concepts, 359; measurement of semiconductor industry, 132; measuring alternative, 360–62. *See also* Harrod residual; Solow residual
- Transaction prices: BLS methods to obtain and use, 278–80; collection for PPI, 263, 264; in discount market, 64; effect of Robinson-Patman on reporting of, 276–77; inferred behavior of IBM, 27–36, 56; levels for sheet steel, 270–71; for new steel PPI index, 268, 275–76; PPI measures changes in, 12; in PPI revisions, 275; problems of obtaining, 279–92; proposals to improve reporting of, 296–97; in steel industry PPI revision, 261, 265–68, 270–72, 275–76, 301–2; value for PPI steel indexes, 272. *See also* Average price (AP); Discounts; List price
- Triangle Steel Conduit* case, 303
- Value: as component of best-technology computers, 33; of defense purchase price and quality changes, 310–11, 319; of electronic components, 120–21; quality factors to express quality change, 324–29
- Vintage: in hedonic equation, 6; price related to, 63, 66–75
- Wald test (for price differentials), 176, 177n28, 179n31
- Weapons systems: adjustment for quality change, 310–11; price data derivation for defense, 308–9; splicing price and learning for, 337–39
- Weights. *See* deflators/deflation; Producer price index (PPI), BLS
- Whetstone benchmark, 95–97
- Wholesale clubs, 228
- Wholesale price index (WPI), 277, 278–279
- Winfrey L-2 retirement distribution, 40, 42, 48–51
- Winfrey S-3 retirement distribution, 39–40, 42, 48–49, 98