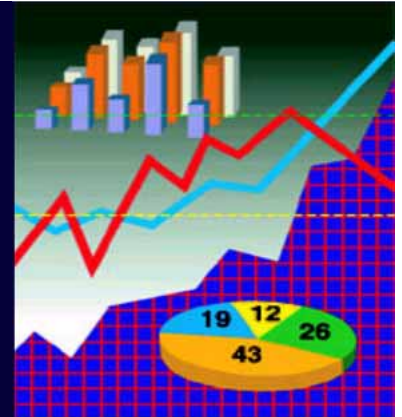


20131114



# **Business Outlook**

## **Global Electronics Industry**

### **(with emphasis on Europe)**

Custer Consulting Group  
[www.custerconsulting.com](http://www.custerconsulting.com)  
November 2013

# Topics of this Presentation

- **Business Cycles & Global Economy**
- **World & European Electronic Supply Chain Growth**
  - **Electronic Equipment**
  - **Active & Passive Components**
  - **EMS/ODM Companies**
  - **Materials and Process Equipment**
- **Summary & Forecasts**
- **Forecasting tools and how to use this information to predict your companies sales**

# Industry Dynamics

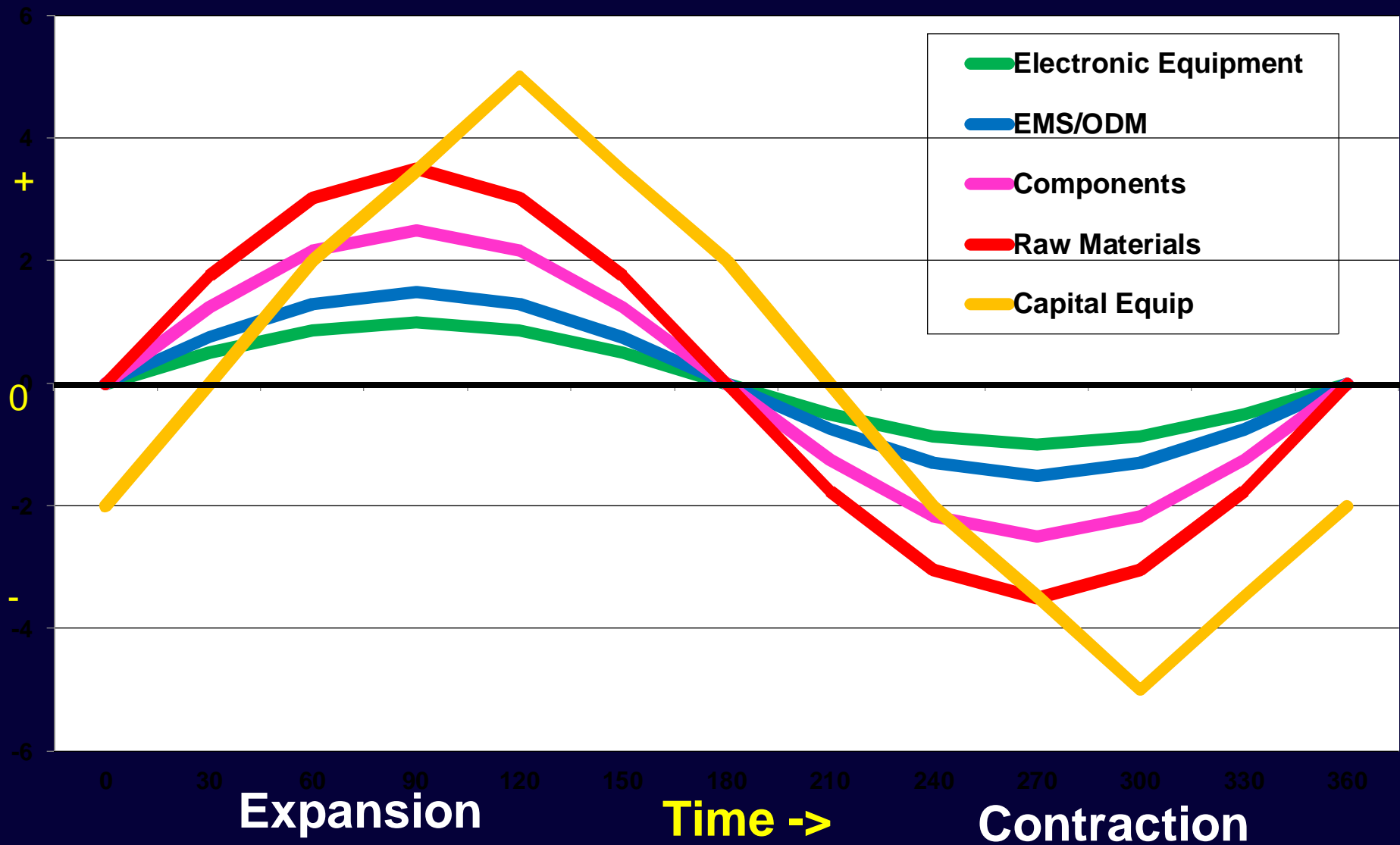


# BUSINESS CYCLE

20130915

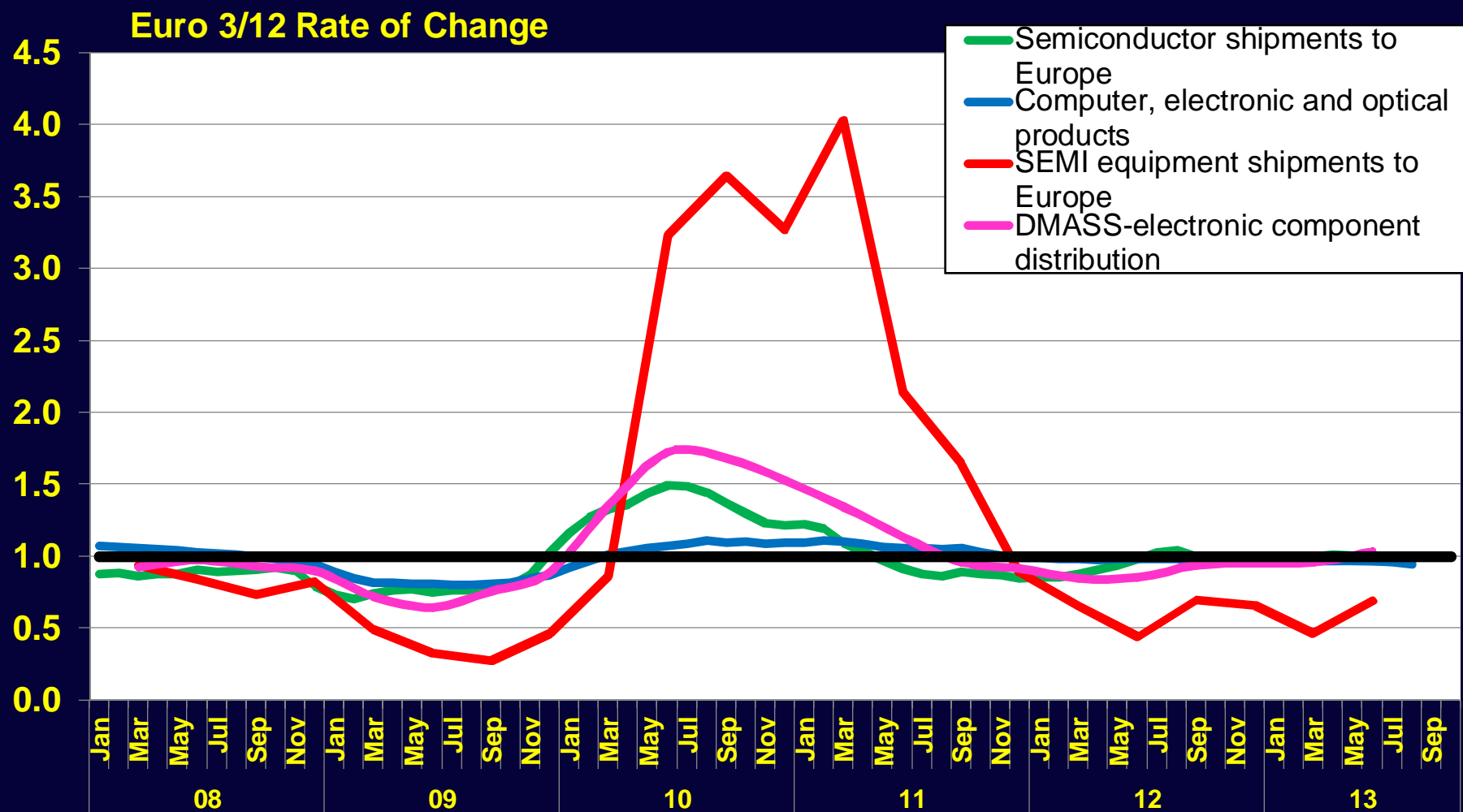
## Electronic Equipment, EMS/ODM Companies, Components, Materials & Capital Equipment

% Growth



20131104

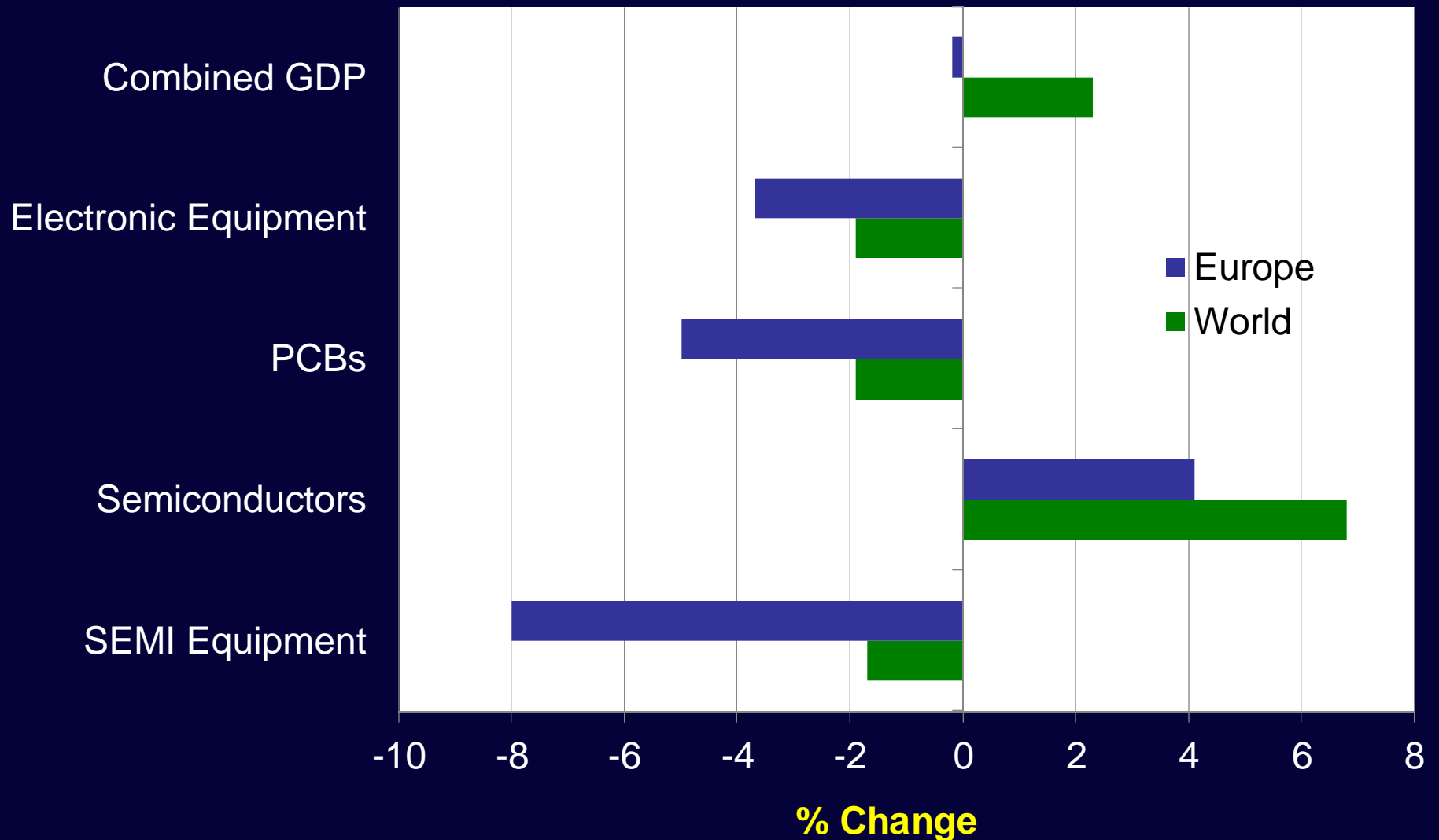
# European Computer, Electronic and Optical Products, Semiconductors, & SEMI Equipment Shipments



20131019

# Electronic Supply Chain Forecast

## 2013 vs. 2012



# **Global & European Economies**



# Industrial Production – World

% Change vs. One Year Earlier

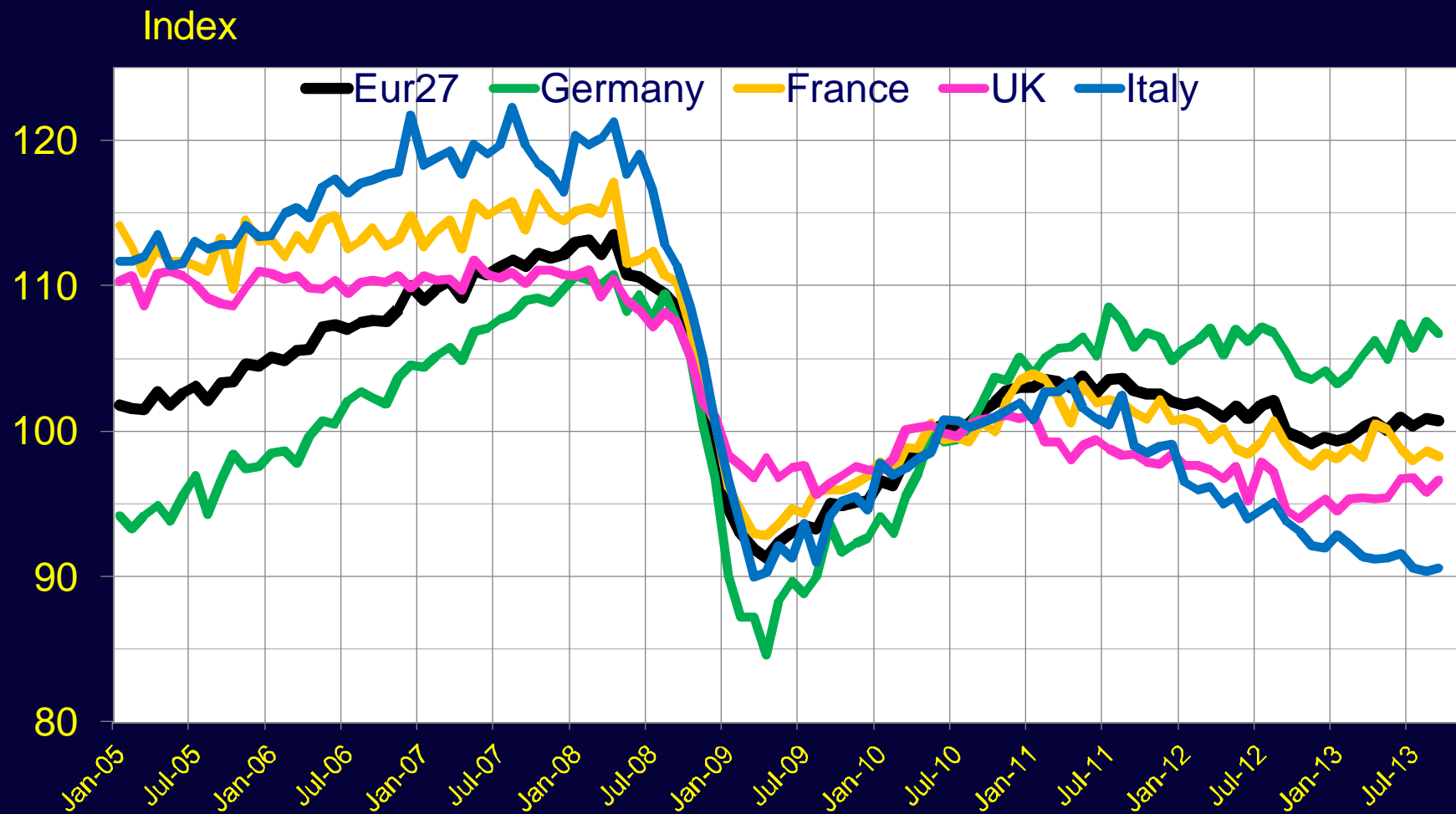
Britain	+ 2.2 Sep
Czech Republic	+ 7.1 Sep
France	- 0.9 Sep
Germany	+1.1 Sep
Italy	- 3.4 Sep
Netherlands	- 2.3 Aug
Russia	+ 0.3 Sep
Spain	+ 3.5 Sep
Euro Area	+ 0.7 Sep

Canada	+ 1.4 Aug
USA	+ 3.2 Sep
China	+10.2 Sep
India	+ 0.6 Aug
Malaysia	+ 2.3 Aug
Singapore	+ 9.3 Sep
S Korea	- 3.6 Sep
Taiwan	+1.1 Sep
Thailand	- 3.1 Aug
Japan	+ 5.4 Sep



# Industrial Production - Europe

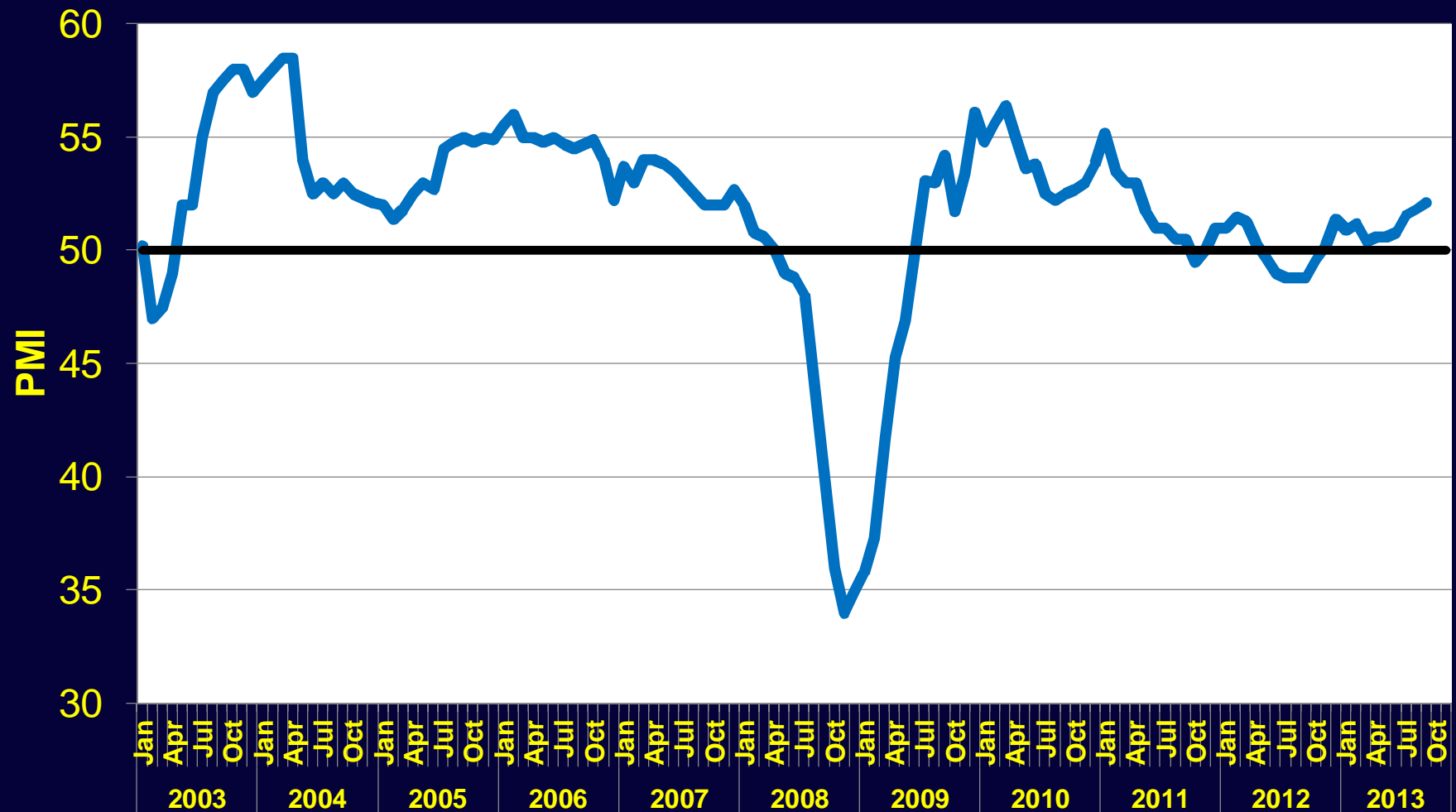
Index (2010 Avg. Month = 100, Seasonally Adjusted)



20131105

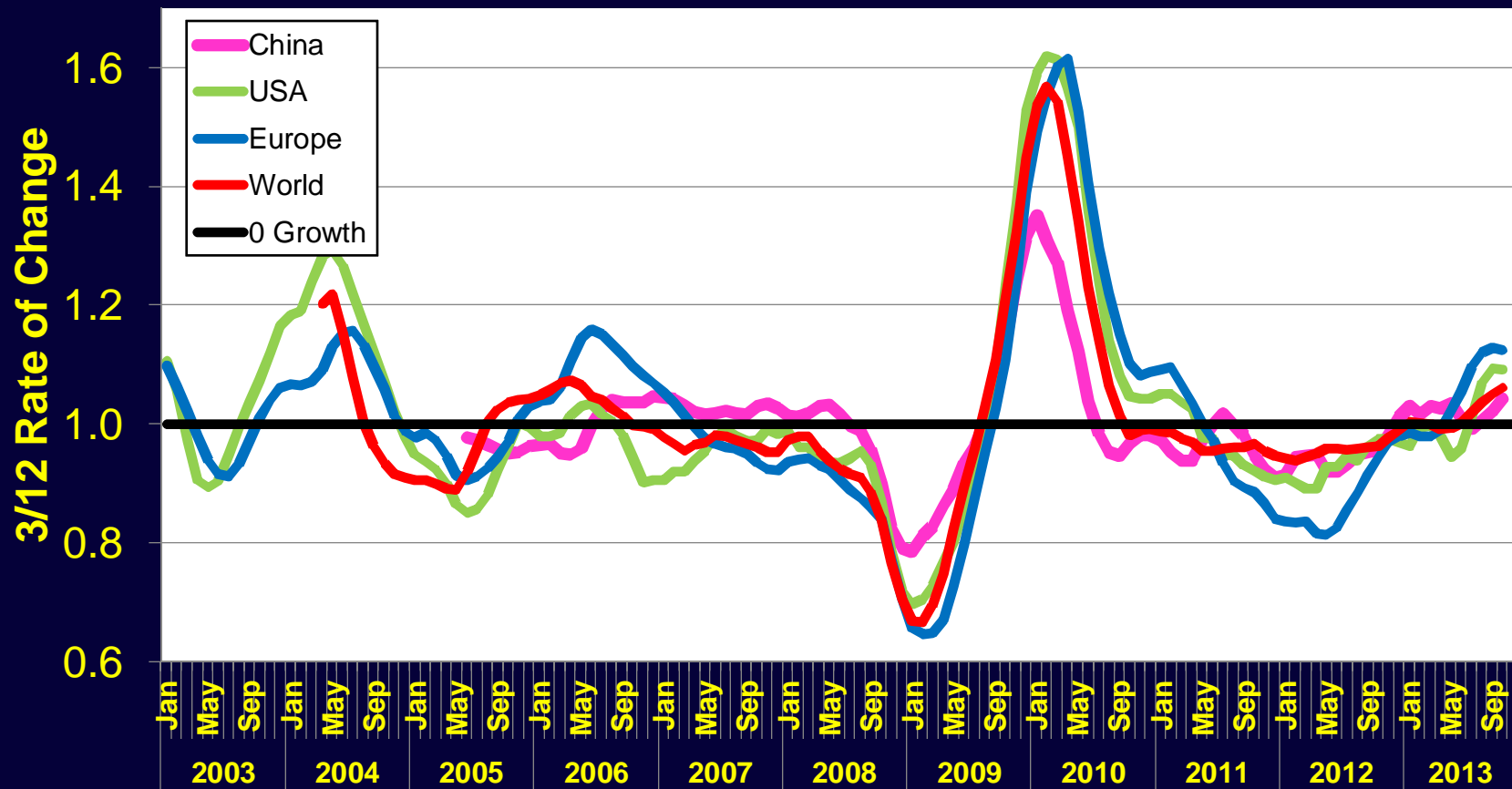
# Global "Purchasing Managers" Index

Diffusion Index, >50 = Growth



# World Purchasing Managers Index

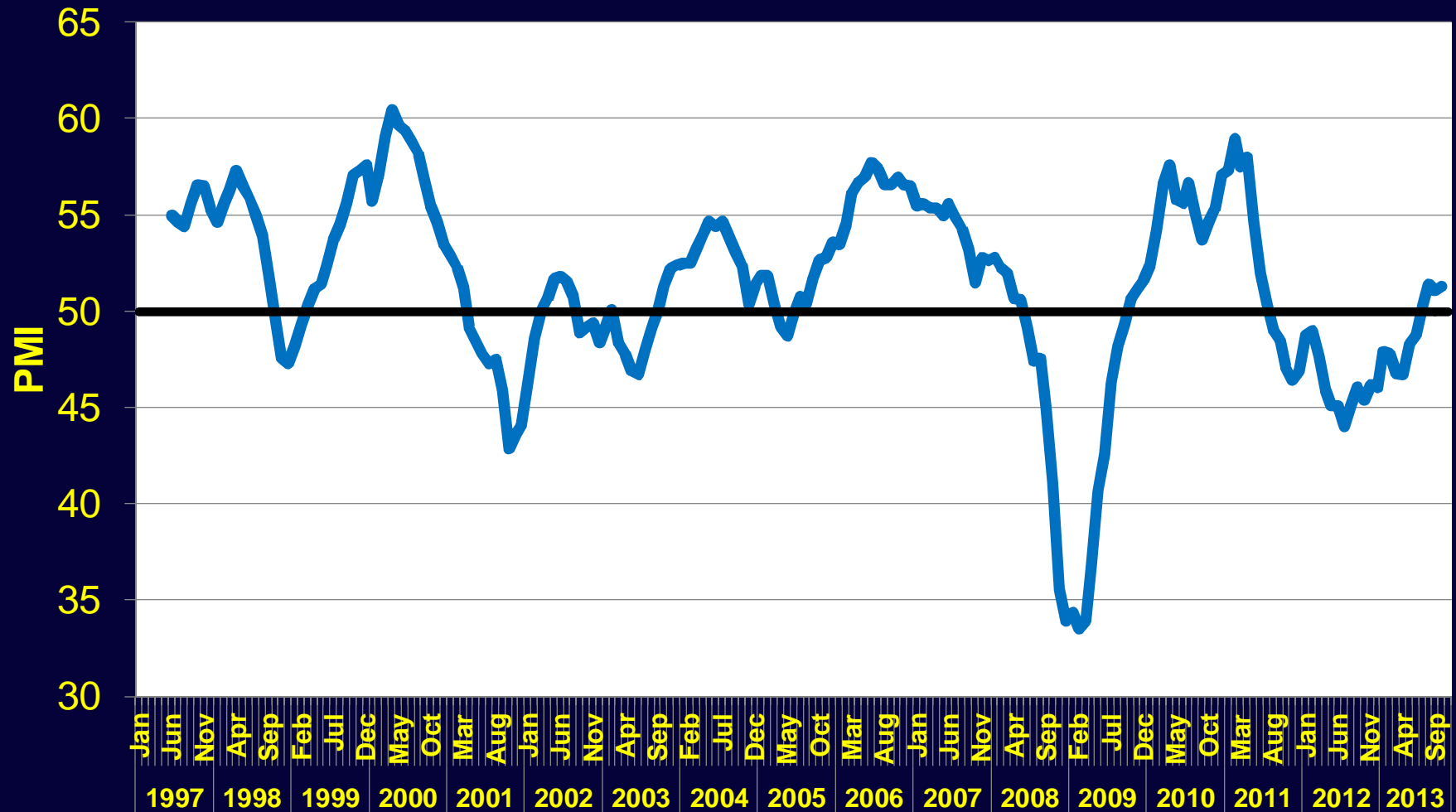
## 3/12 Rate of Change



20131105

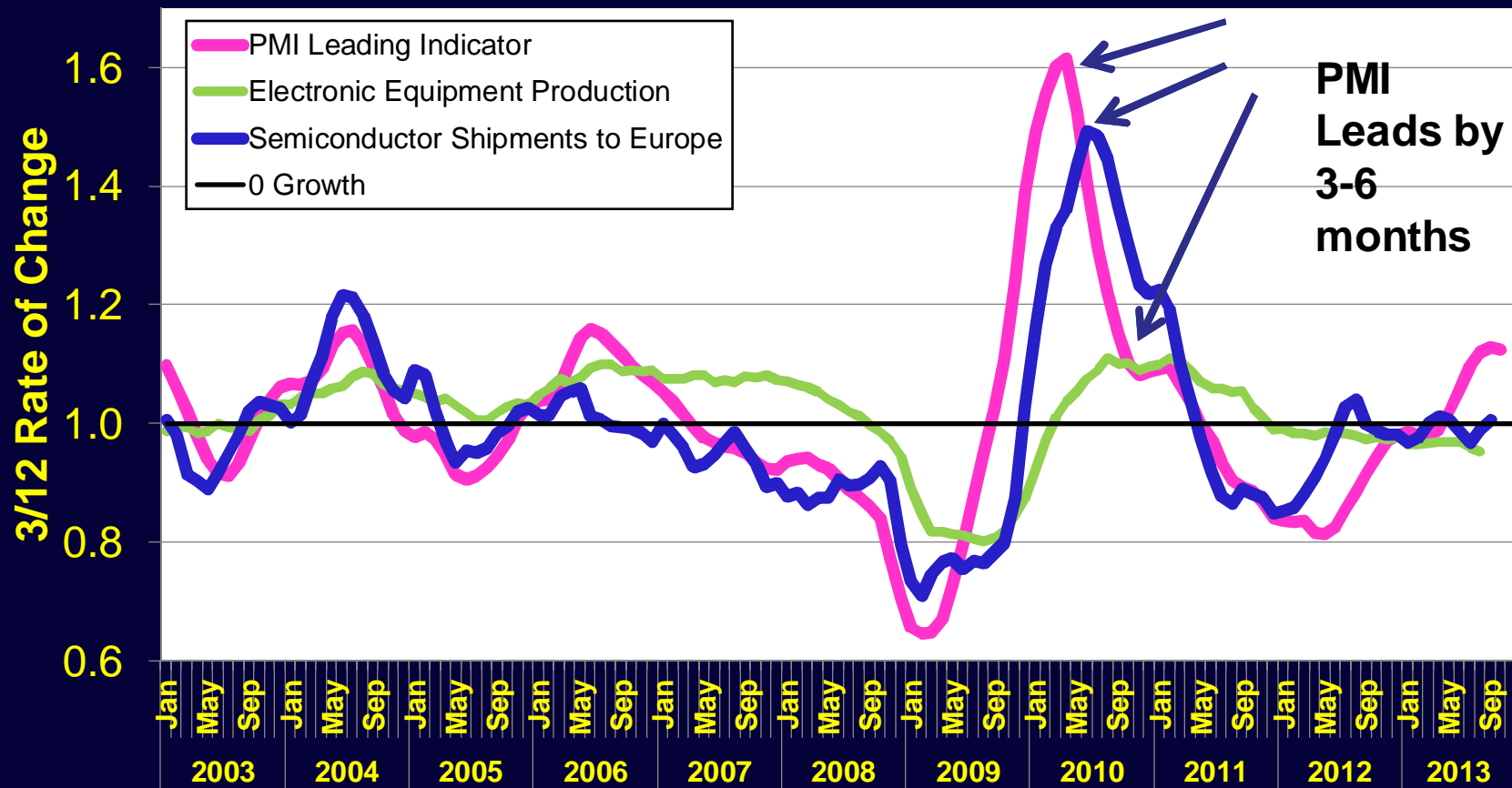
# Eurozone "Purchasing Managers" Index

Diffusion Index, >50 = Growth



# European PMI Leading Indicator vs. European Electronic Equipment Production & Semiconductor Shipments to Europe

## 3/12 Rate of Change



# Conclusions

- **Leading indicators can “forecast” industry and individual company sales**
- **Capital equipment forecasts can provide a 6-9 month outlook**
- **Components and material forecasts provide 2-4 month outlook**
- **Collecting monthly (or quarterly) sales data on your industry and company are key**
- **Much industry data already exists**

# **Electronic Equipment**



# World Electronic Equipment by Region 2013 @ 2012 Exchange Rates

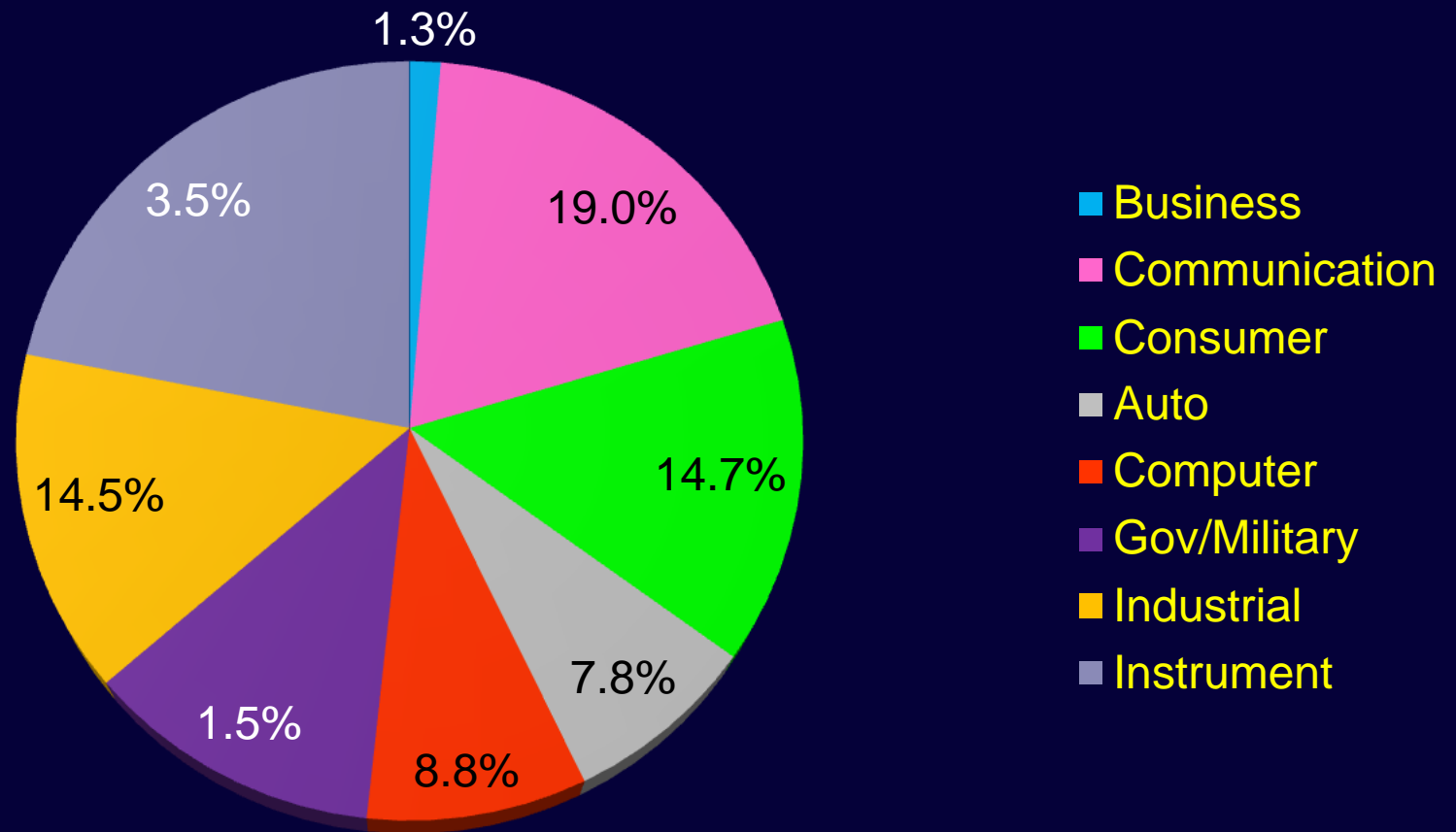
Final  
Assembly



Total Production: \$2,002 Billion

# Total Europe Equipment Production by Type 2013 @ 2012 Exchange

20130101



**TOTAL: Eur 353 Billion**

# Methods to Measure Electronic Industry Growth

**Sector composites based upon financial reports of similar companies**

- Typically quarterly, semiannually or monthly

**Government and trade organization statistics**

- Typically monthly

- **TIMELY DATA REPORTED ON A CONSISTENT BASIS IS KEY**

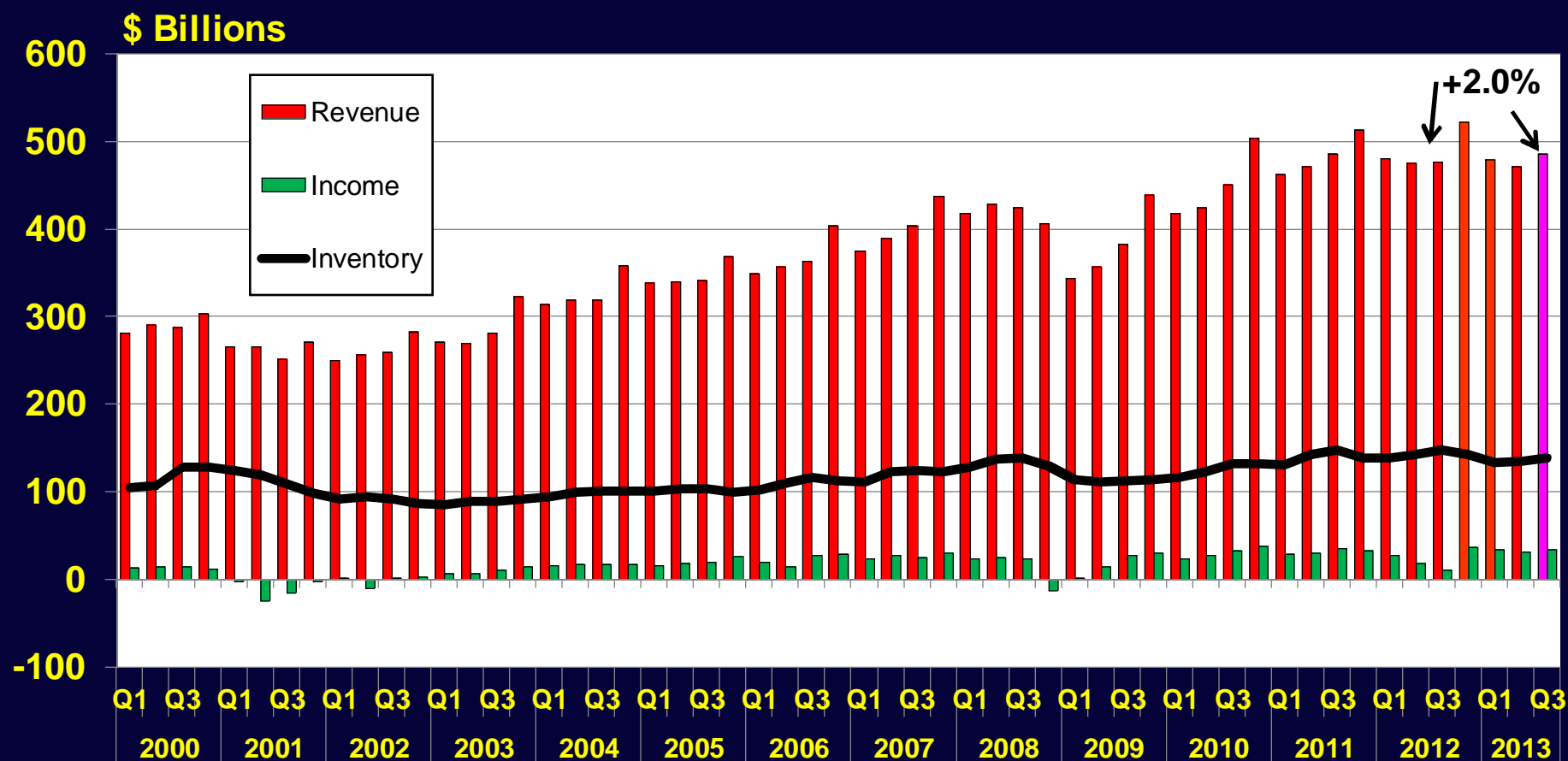
# **Sector Analyses based on Company Financial Reports**

20131108

# Electronic Equipment Suppliers

## Composite of 139 Public Companies

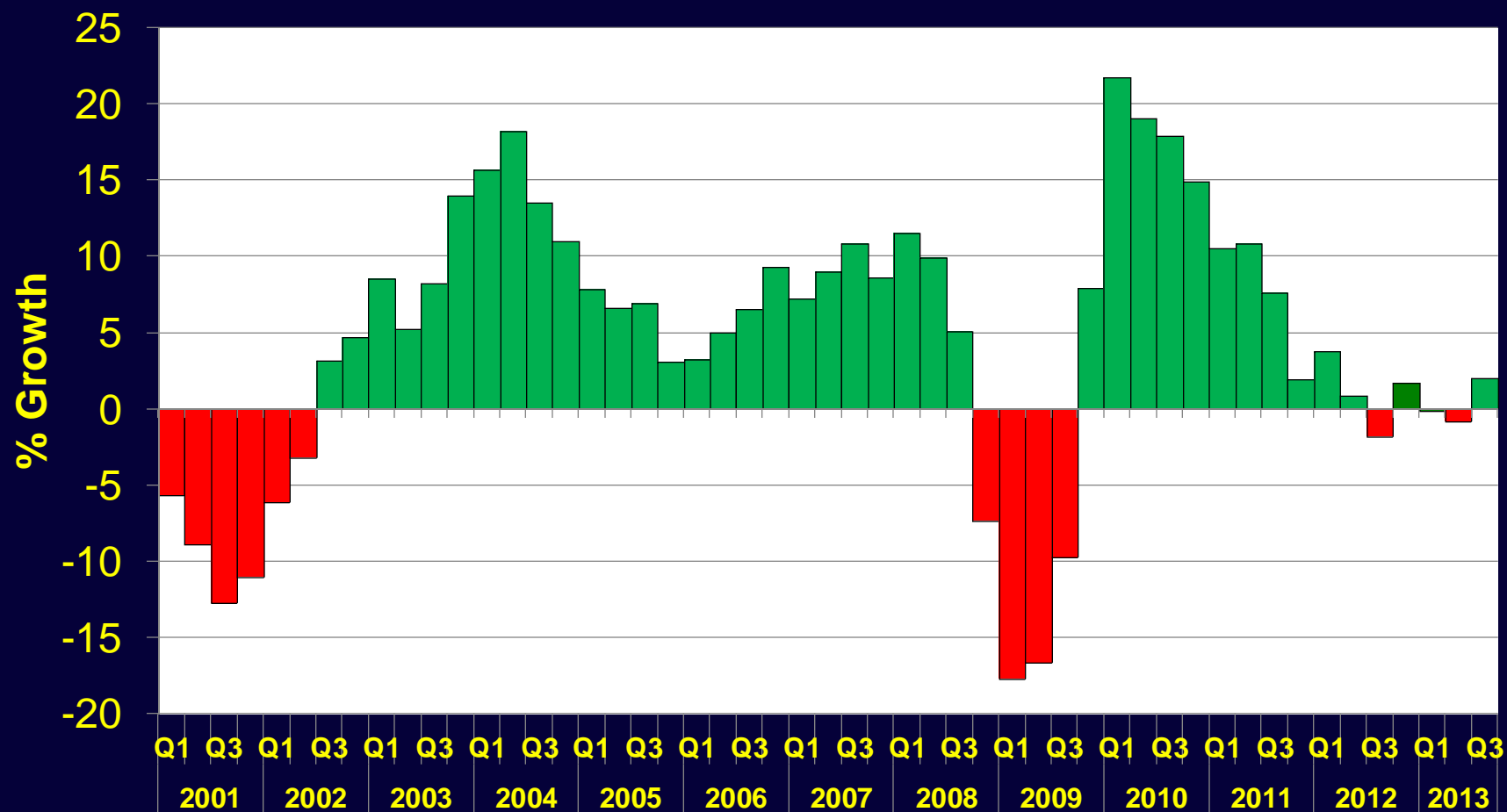
### Revenue, Net Income & Inventory



Computer 13, Internet 9, Storage 10, Communication 20, SEMI 20, Medical 23, Instruments 11, Military 6, Business & Office 3, Consumer 13, Automotive 11

20131108

# Electronic Equipment Suppliers Composite of 139 Public Companies Quarterly Revenue Growth

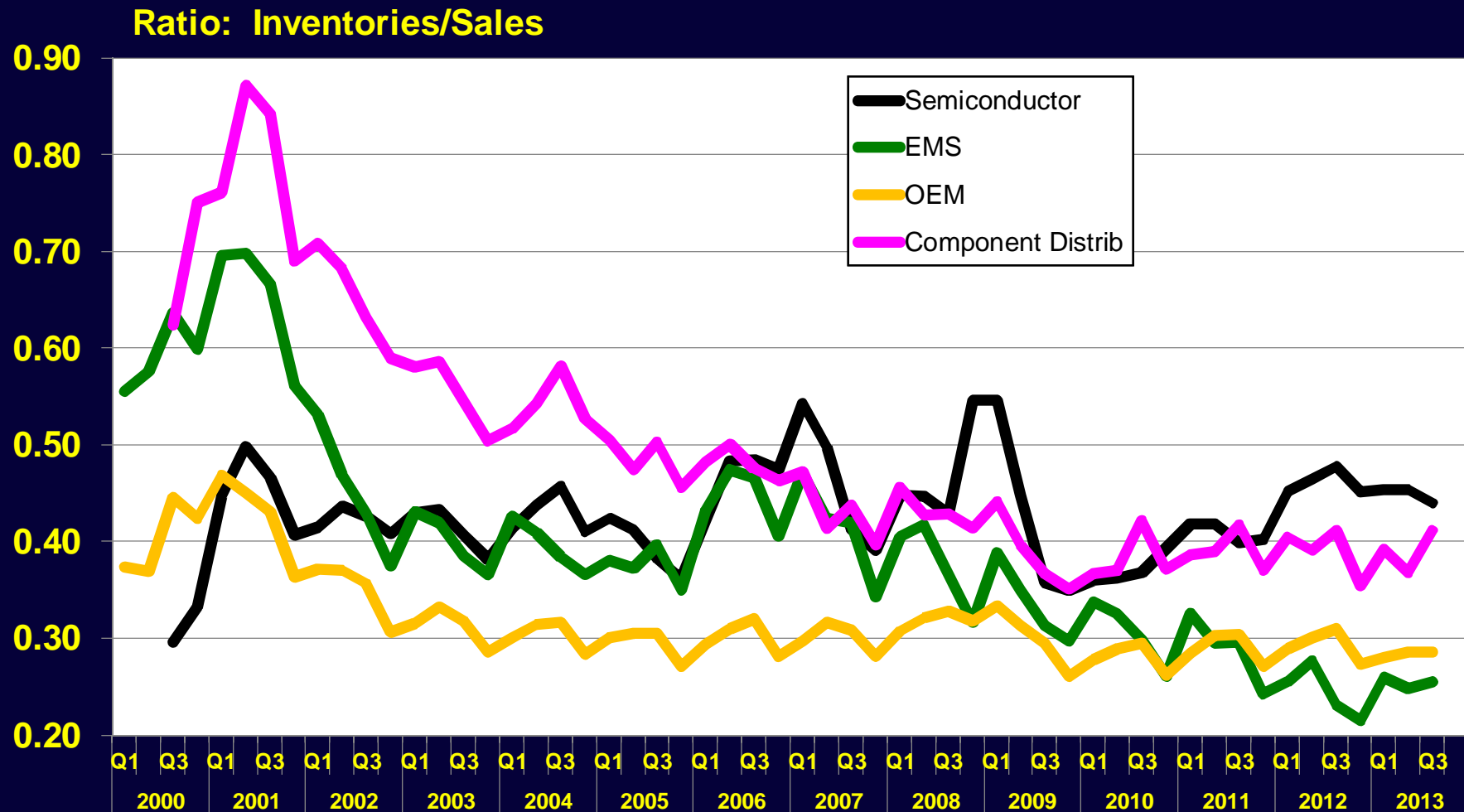


Computer 13, Internet 9, Storage 10, Communication 20, SEMI 20, Medical 23, Instruments 11, Military 6, Business & Office 3 + Media tablets from all vendors, Consumer 13, Automotive 11

20131108

# Inventory/Sales Ratios

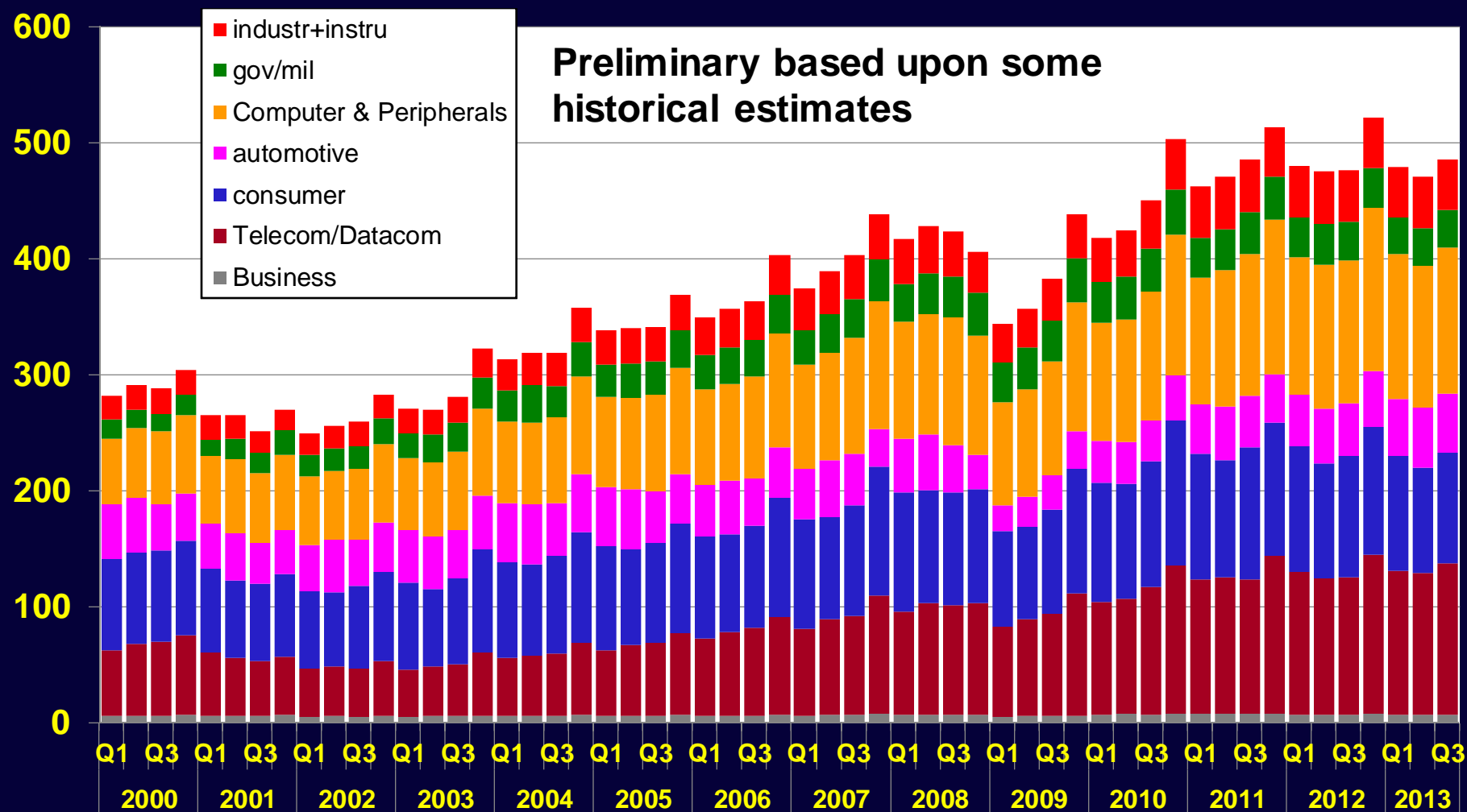
Large Component Distributors, Semiconductor, EMS & OEM Companies



Custer Consulting Group based upon company financials



# World Electronic Equipment Production By Type



# **Regional Data from Government, Industry & Trade Organization Statistics**

Europe

Japan

Taiwan/China

S Korea

USA

# **Eurostat Data (NACE Rev 2)**

## **Electronic Equipment Production by Country**

- C254 weapons & ammunition
- C26 computer, electronic & optical products
- C261 electronic components & boards
- C2611 electronic components
- C2612 loaded electronic boards
- C262 computers & peripheral equipment
- C263 communication equipment
- C264 consumer electronics
- C2651 instruments & appliances for measuring, testing and navigation
- C266 irradiation, electromedical & electrotherapeutic equipment
- C2733 wiring devices
- C2751 electric domestic appliances
- C2823 office machinery & equipment (except computers & peripherals)
- C291 motor vehicles
- C2931 electrical & electronic equipment for motor vehicles
- C303 air & spacecraft and related machinery
- C304 military fighting vehicles

Monthly indices where average month in CY2005=100

20131113

# European Computer, Electronic & Optical Products Production

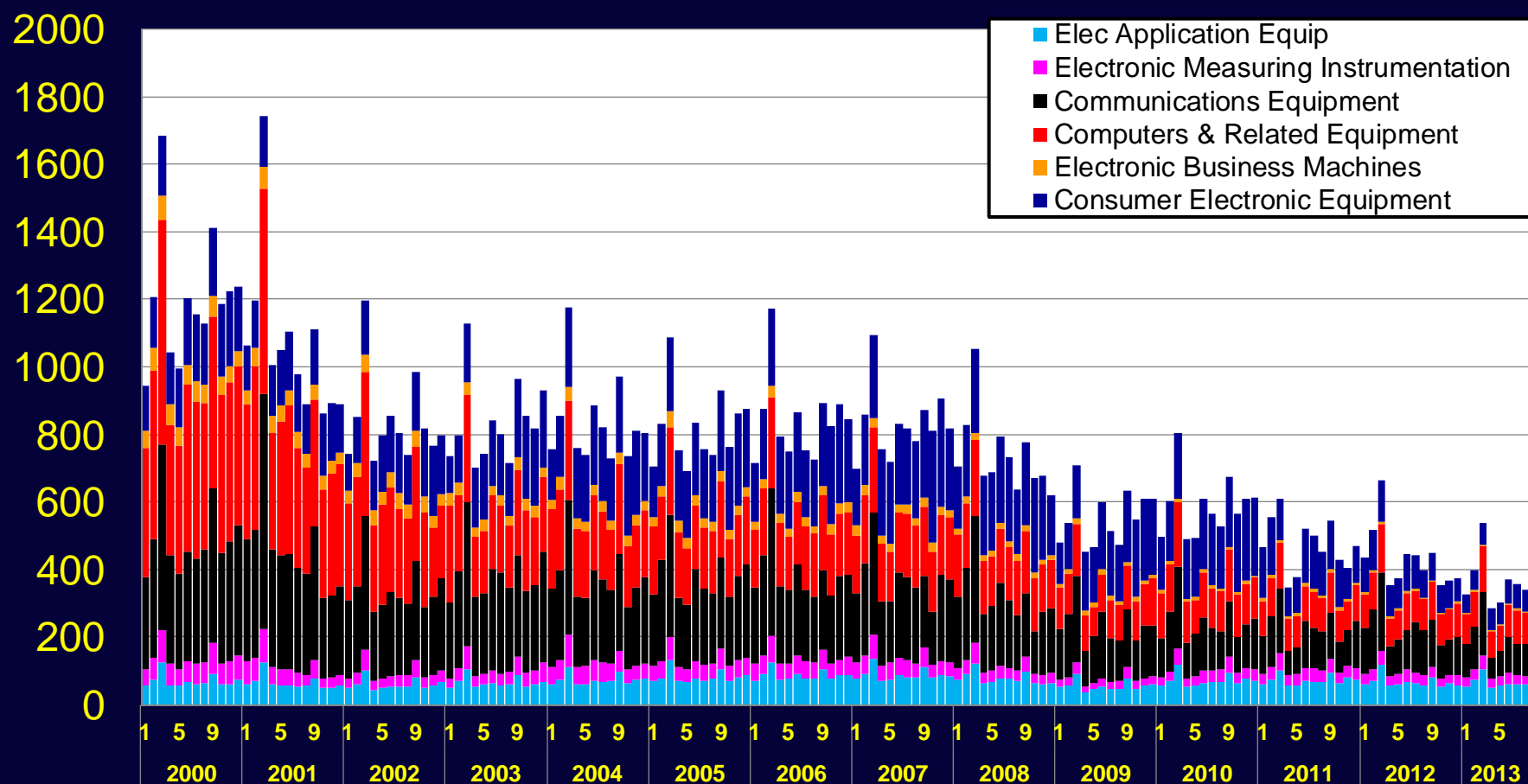


Eurostat, C26 category, EU 27 countries

20131026

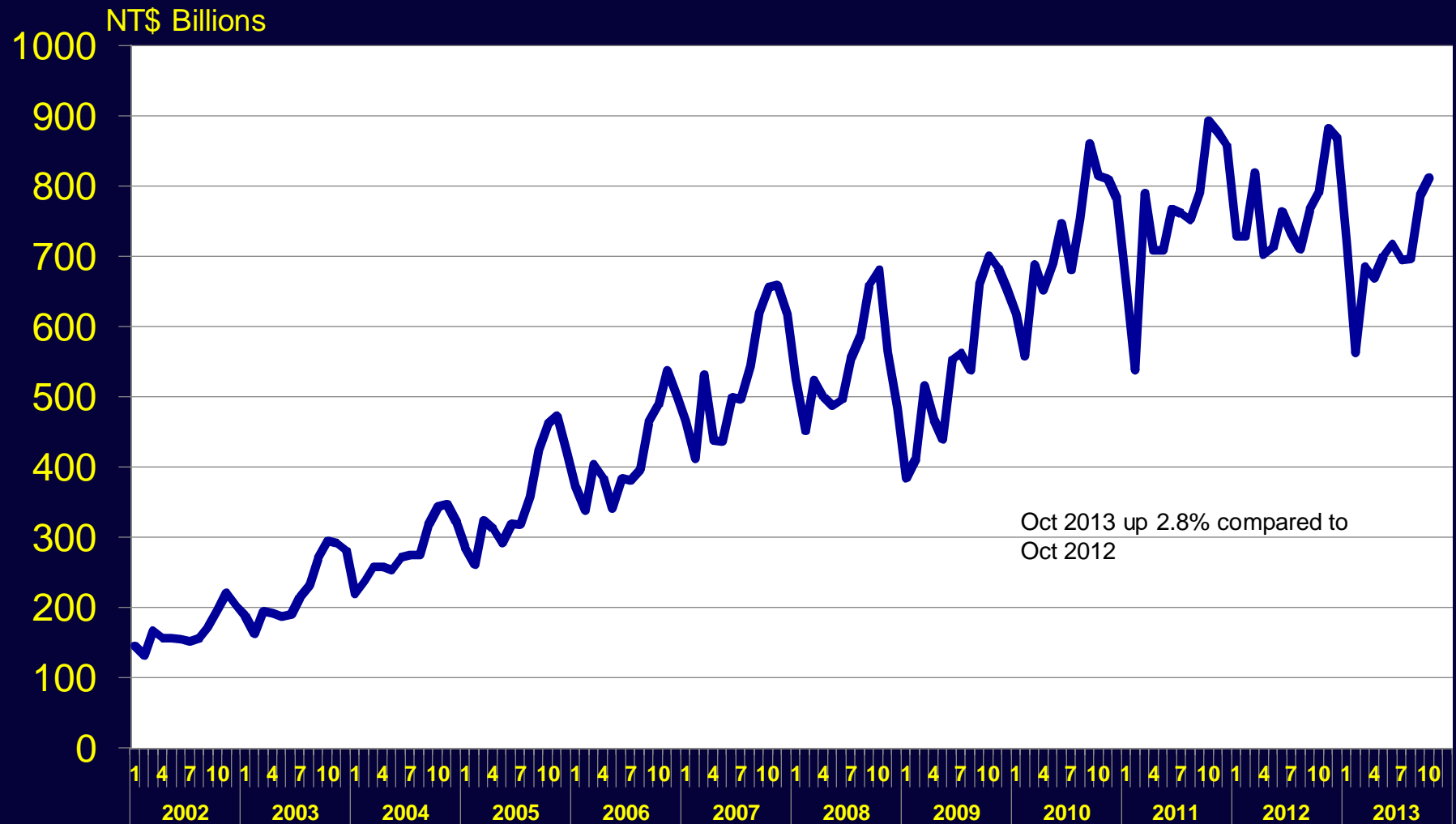
# Japan Electronic Equipment Production by Month 2000 to Present

Yen Billion



20131109

# Taiwan/China Electronic Equipment Producers Composite of 101 Manufacturers Consolidated Revenue

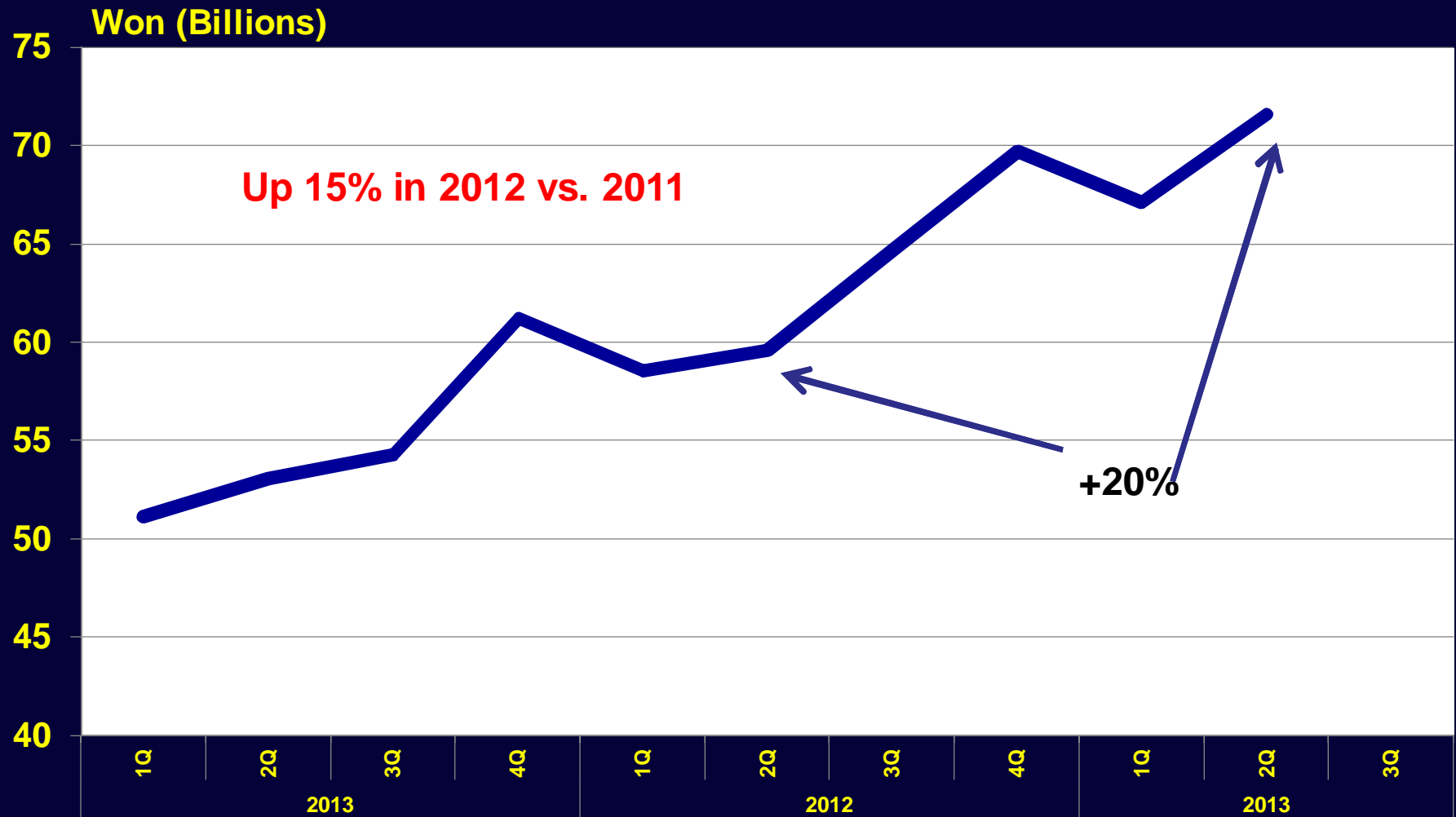


Taiwan listed companies, often with significant manufacturing in China

20130922

# S. Korean Electronic Equipment Companies

## Composite of 3 Korea-listed Manufacturers



Calendar Year

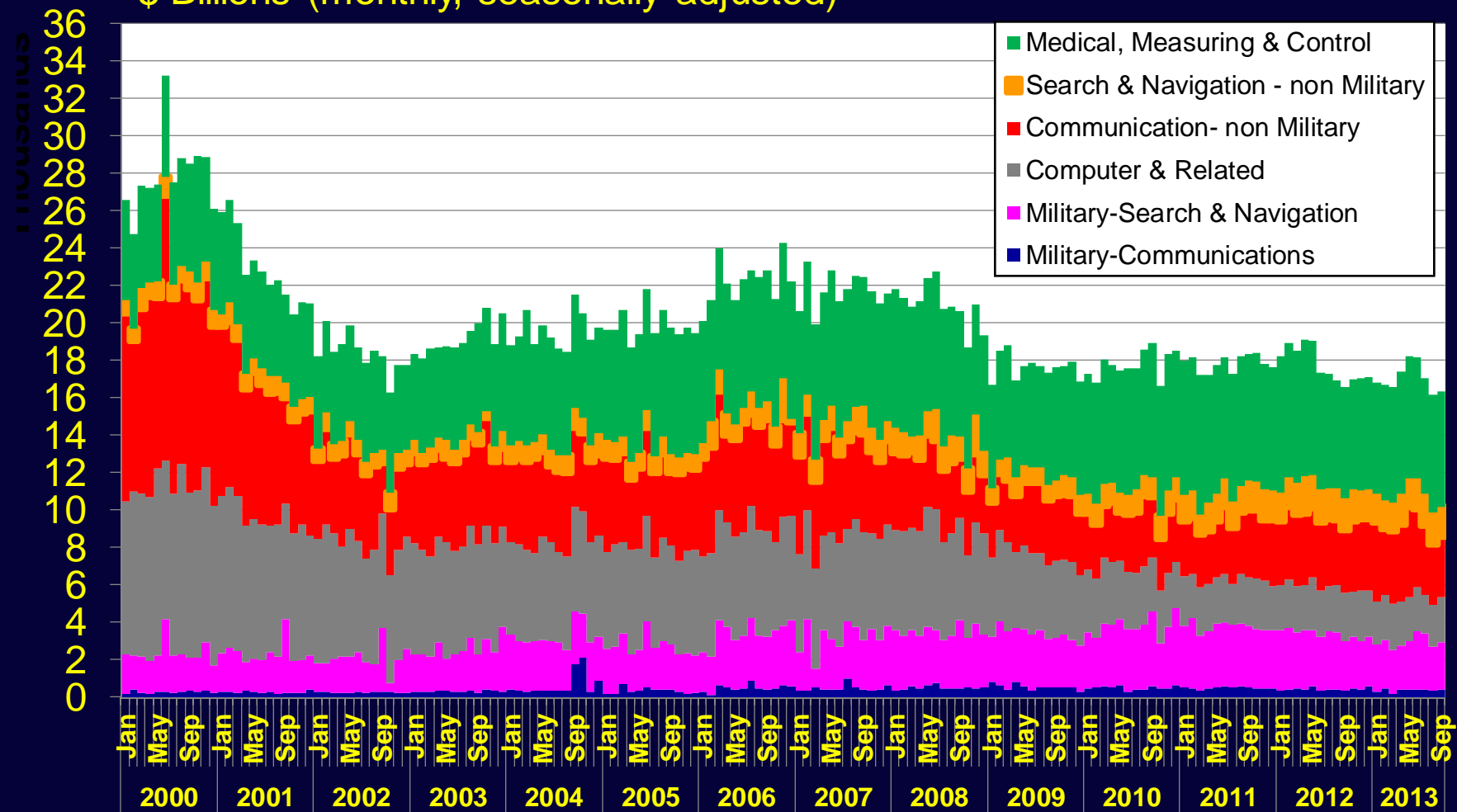
Samsung Electronics, LG Electronics, Dongbu HiTek



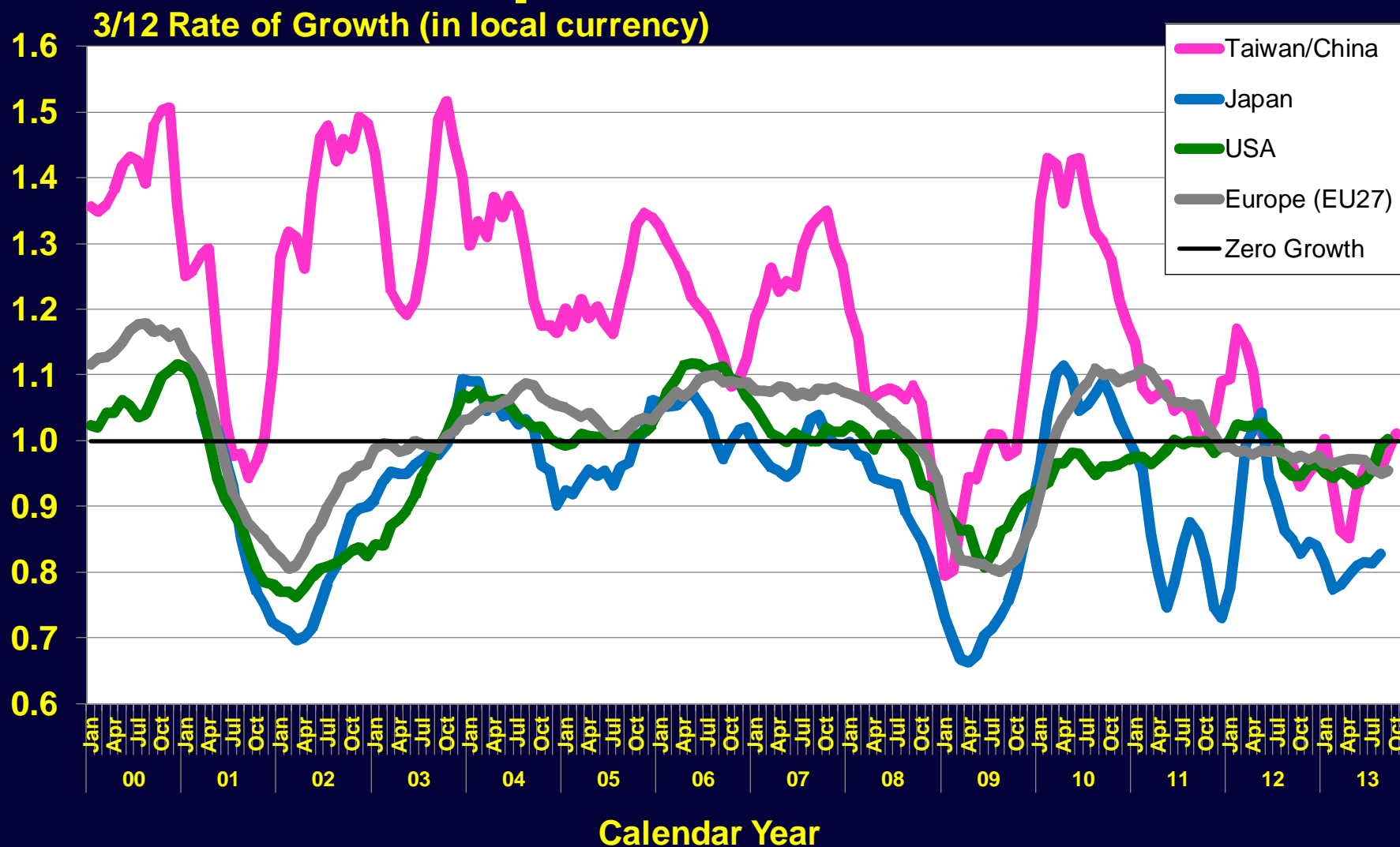
# U.S. Electronic Equipment Orders

## Monthly Data

\$ Billions (monthly, seasonally adjusted)



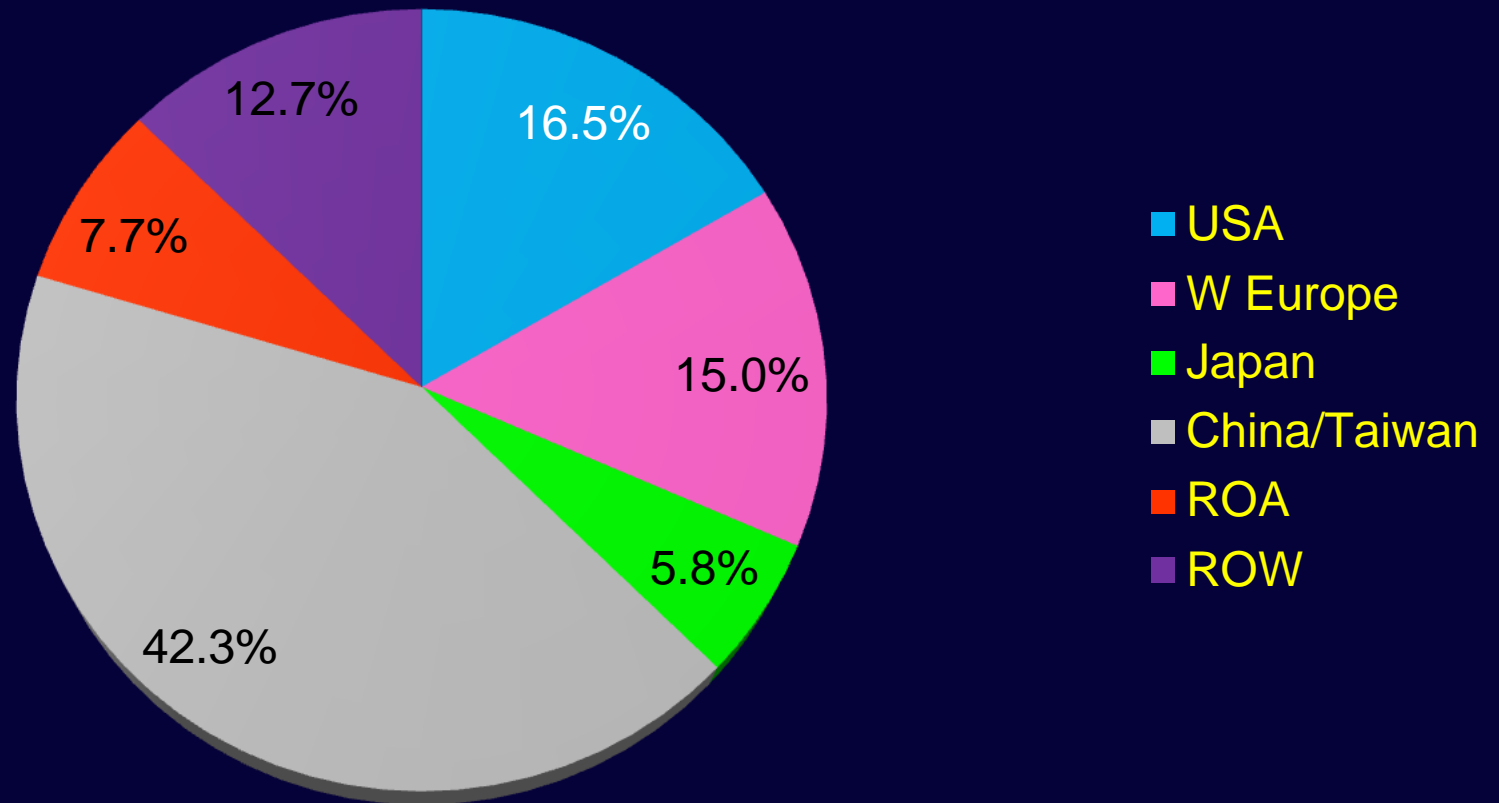
# Regional Electronic Equipment Shipment Growth



Sources: IPC, JPCA, Taiwan/China composite; Eurostat "wiring devices" for Europe

# World Electronic Equipment Production by Region

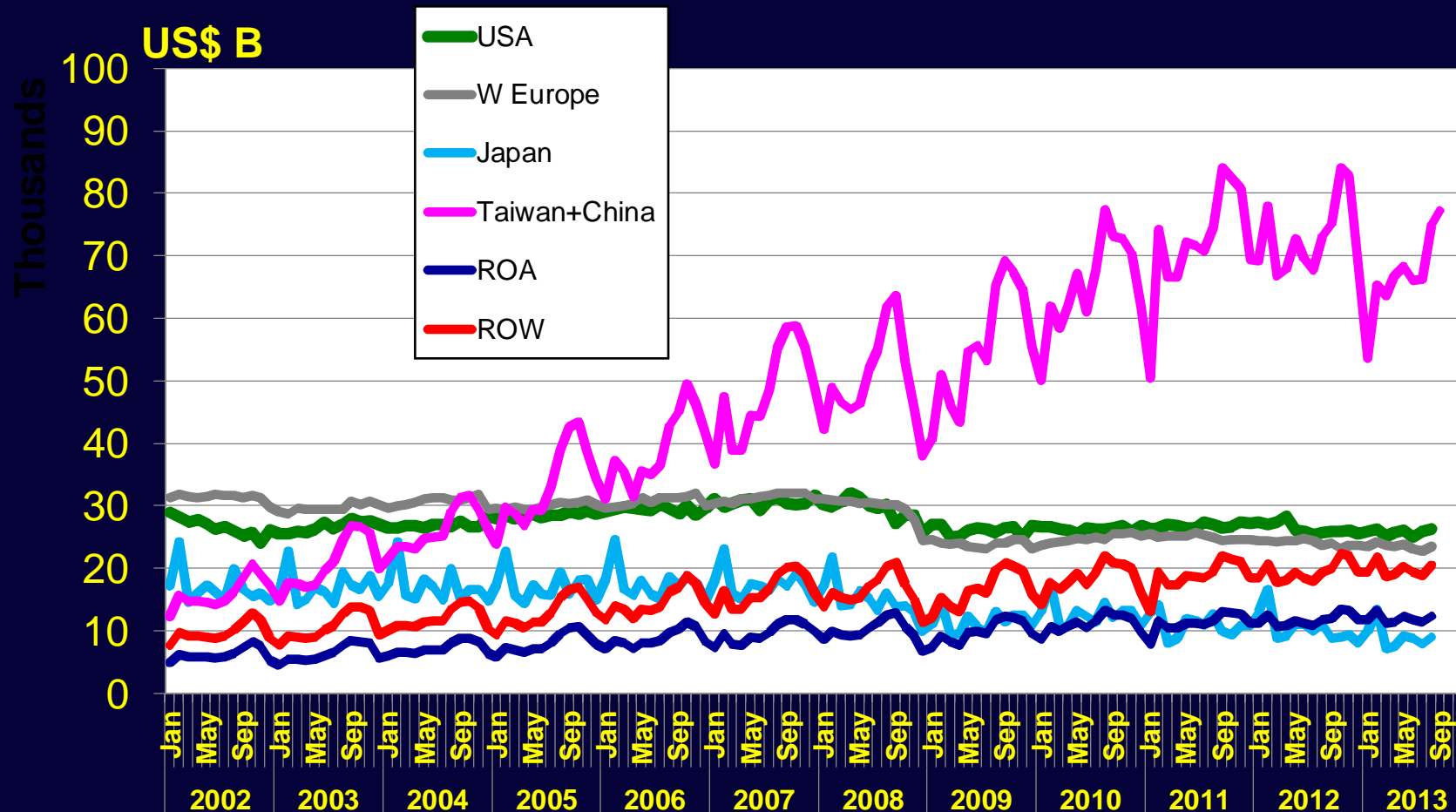
20130101



**2012 TOTAL: \$1,991 Billion**

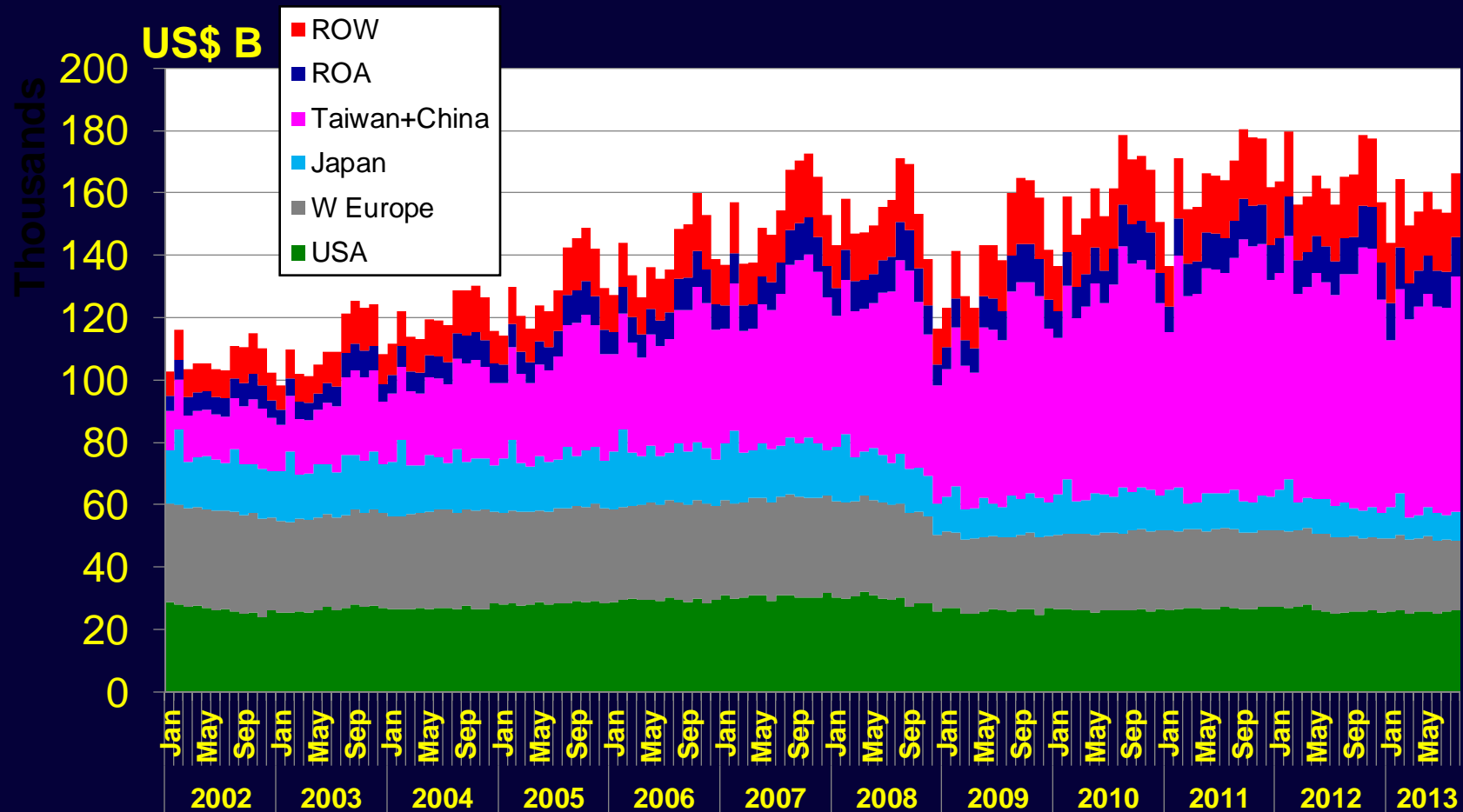
# World Electronic Equipment Monthly Shipments

Converted @ Constant 2012 Exchange Rates



# World Electronic Equipment Monthly Shipments

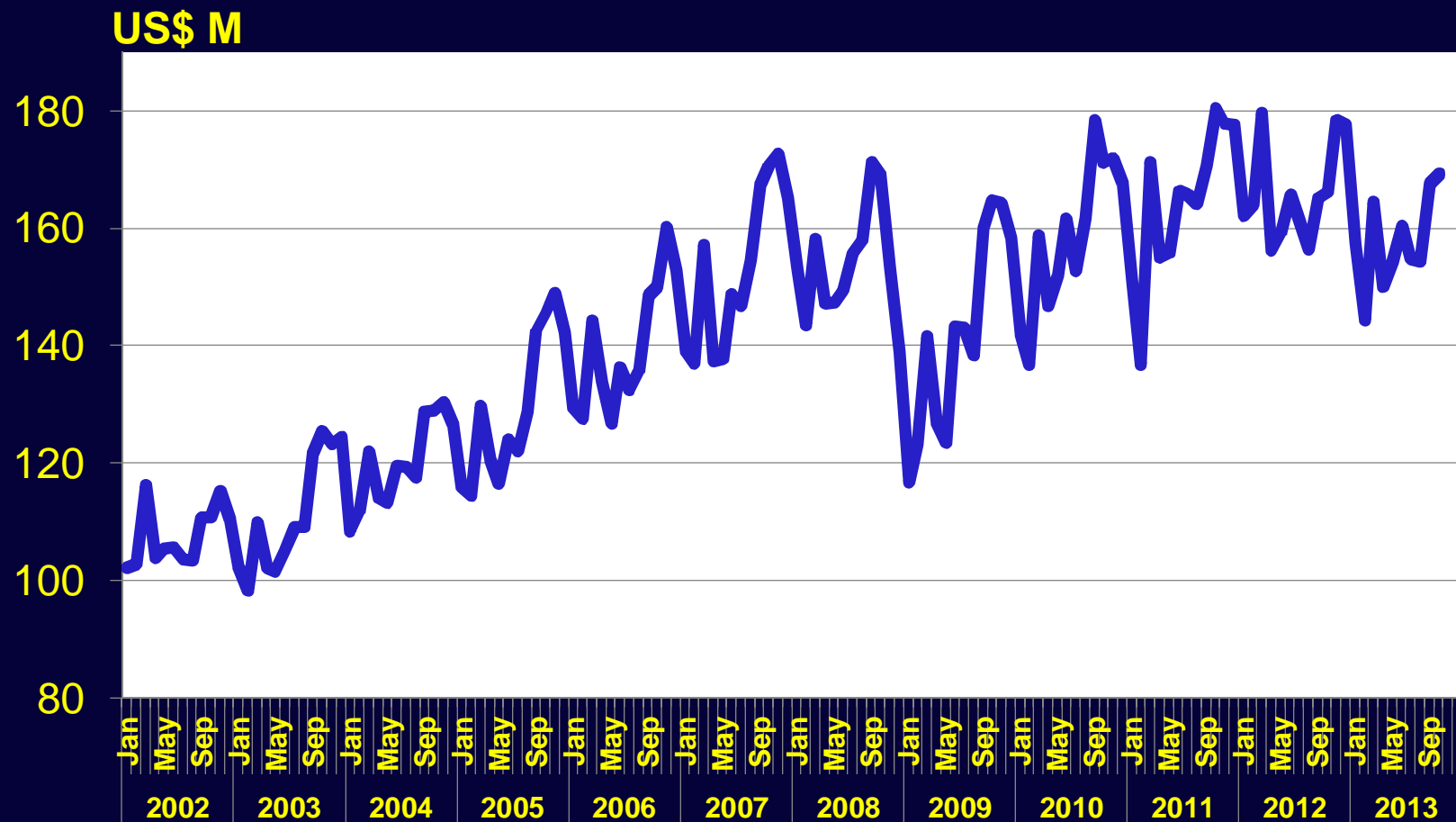
Converted @ Constant 2012 Exchange Rates



20131113

# World Electronic Equipment Monthly Shipments

Converted @ Fluctuating Exchange Rates



Source: Custer Consulting Group & Electronic Outlook Corp

# Market Segments

**Volume (Shift to Low Cost Areas)**

**Personal Computers**

**Mobile Phones**

**Other Consumer Electronics**

**Datacom/Telecom**

**Automotive**

**"Protected"**

**Military**

**Medical**

**Instruments & Controls**

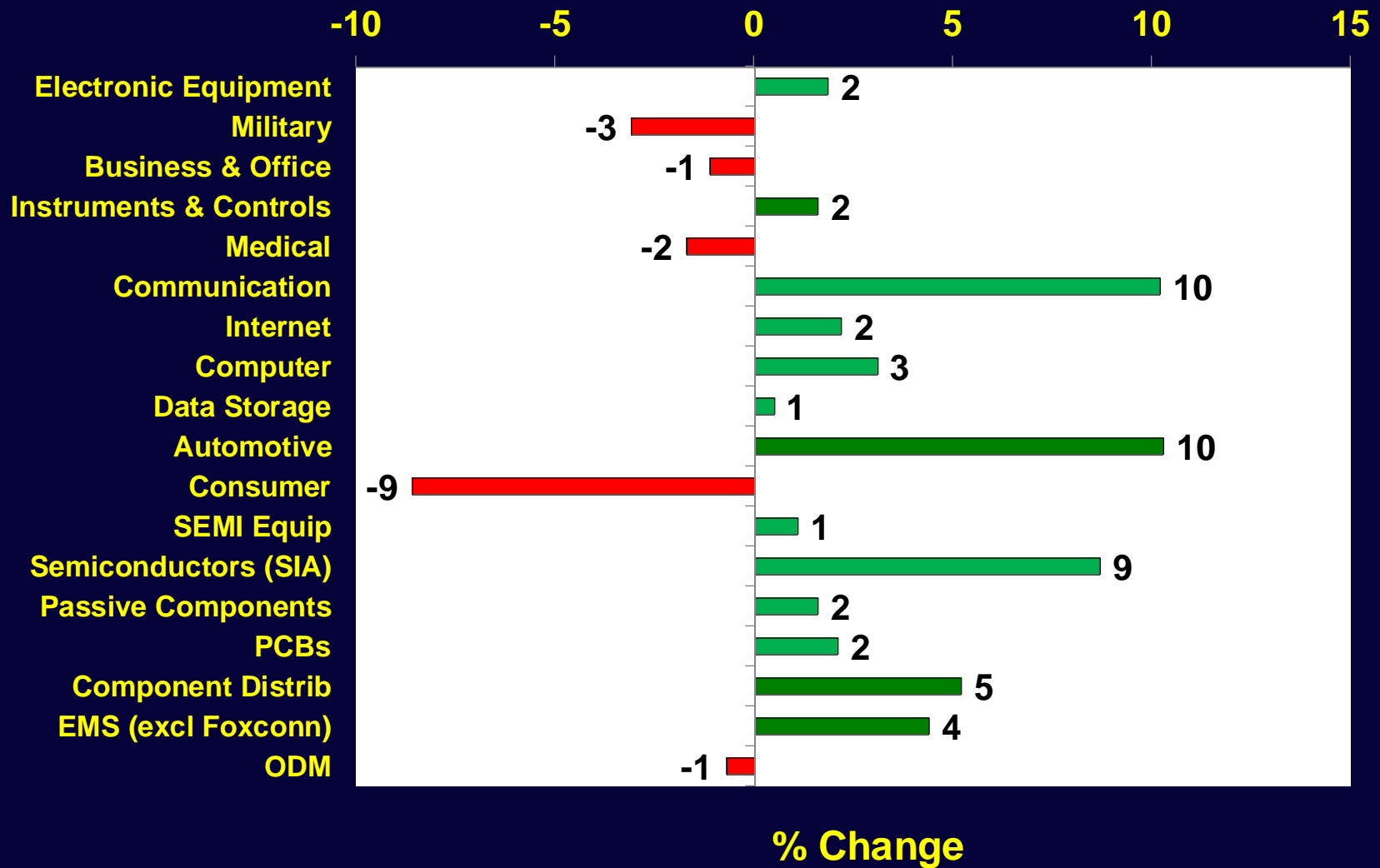
**High IP Content**

**Prototype, Quick Response, Short Run, Need for Local Support**



# Global Electronic Supply Chain Growth

## 3Q'13 vs. 3Q'12 (Preliminary results)



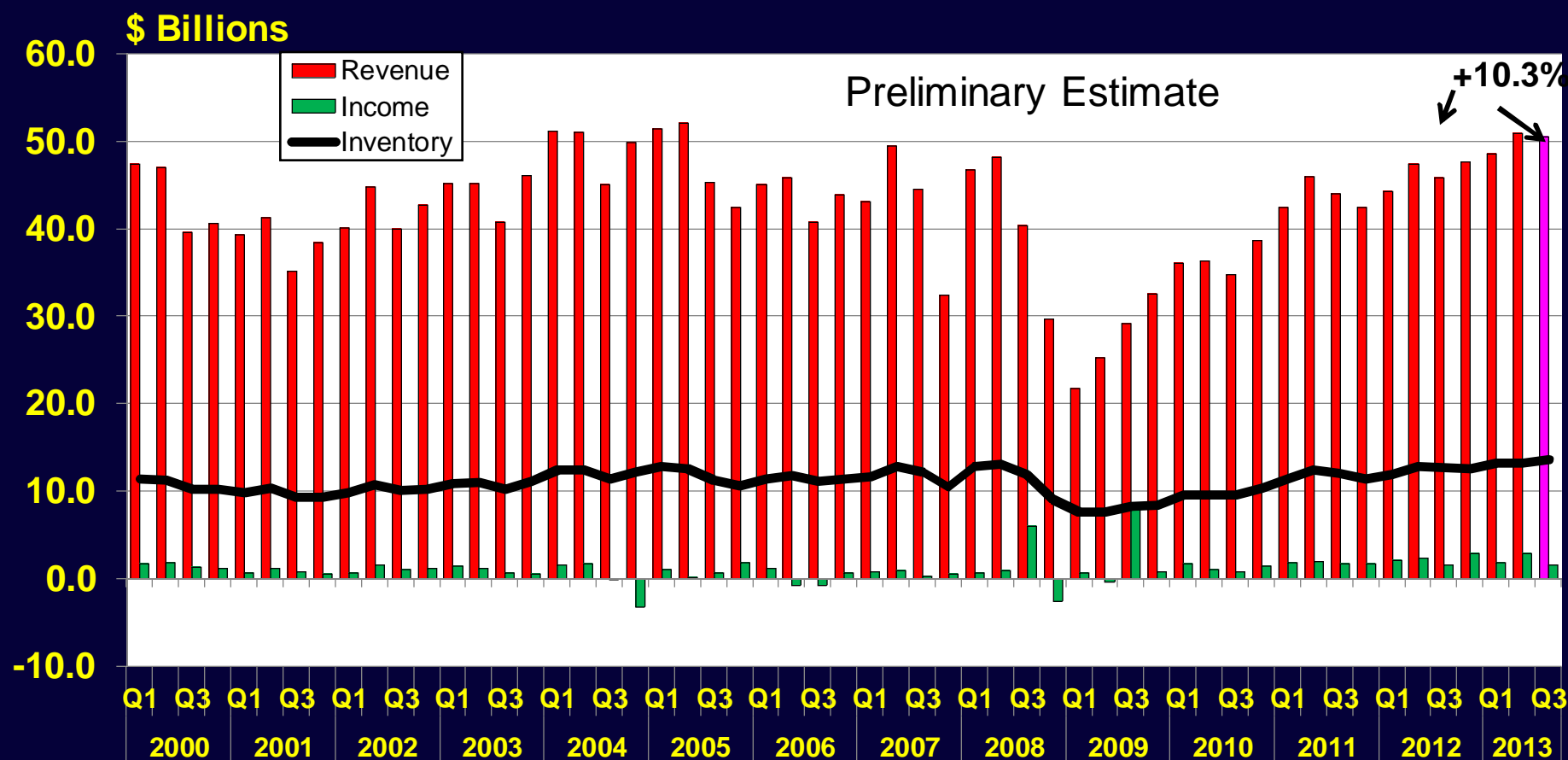
US\$ equivalent at fluctuating exchange; based upon industry composites including acquisitions

# **Automotive Electronics**

20131108

# Automotive Equipment Suppliers Composite of 11 Public Companies

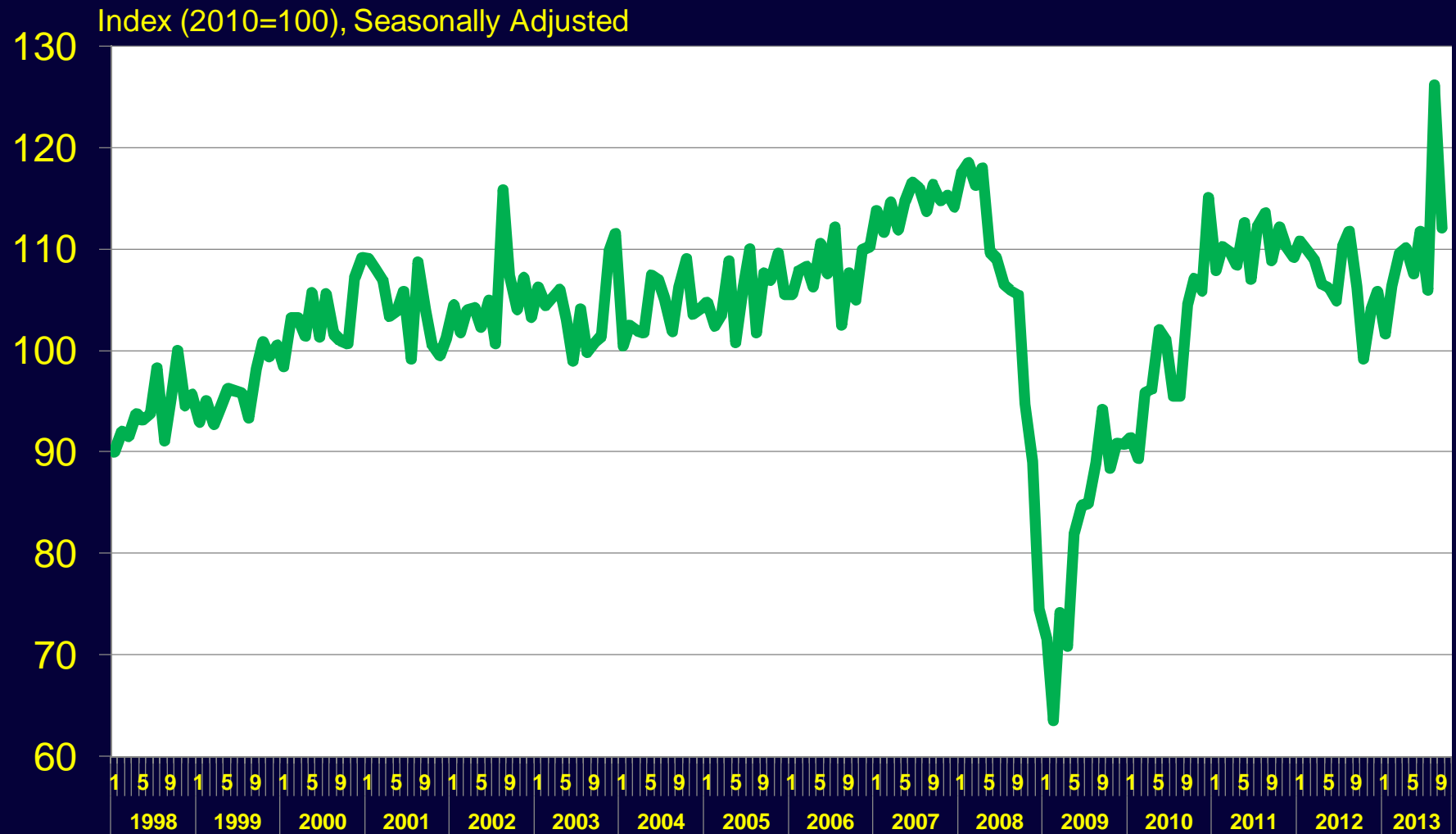
## Revenue, Net Income & Inventory



Autoliv, Borg Warner, Continental AG, Delphi, Federal Mogul, Gentex, Johnson Controls, Lear, TRW Automotive, Valeo, Visteon

20131113

# European Motor Vehicle Production



Eurostat, C291 category, EU 27 countries

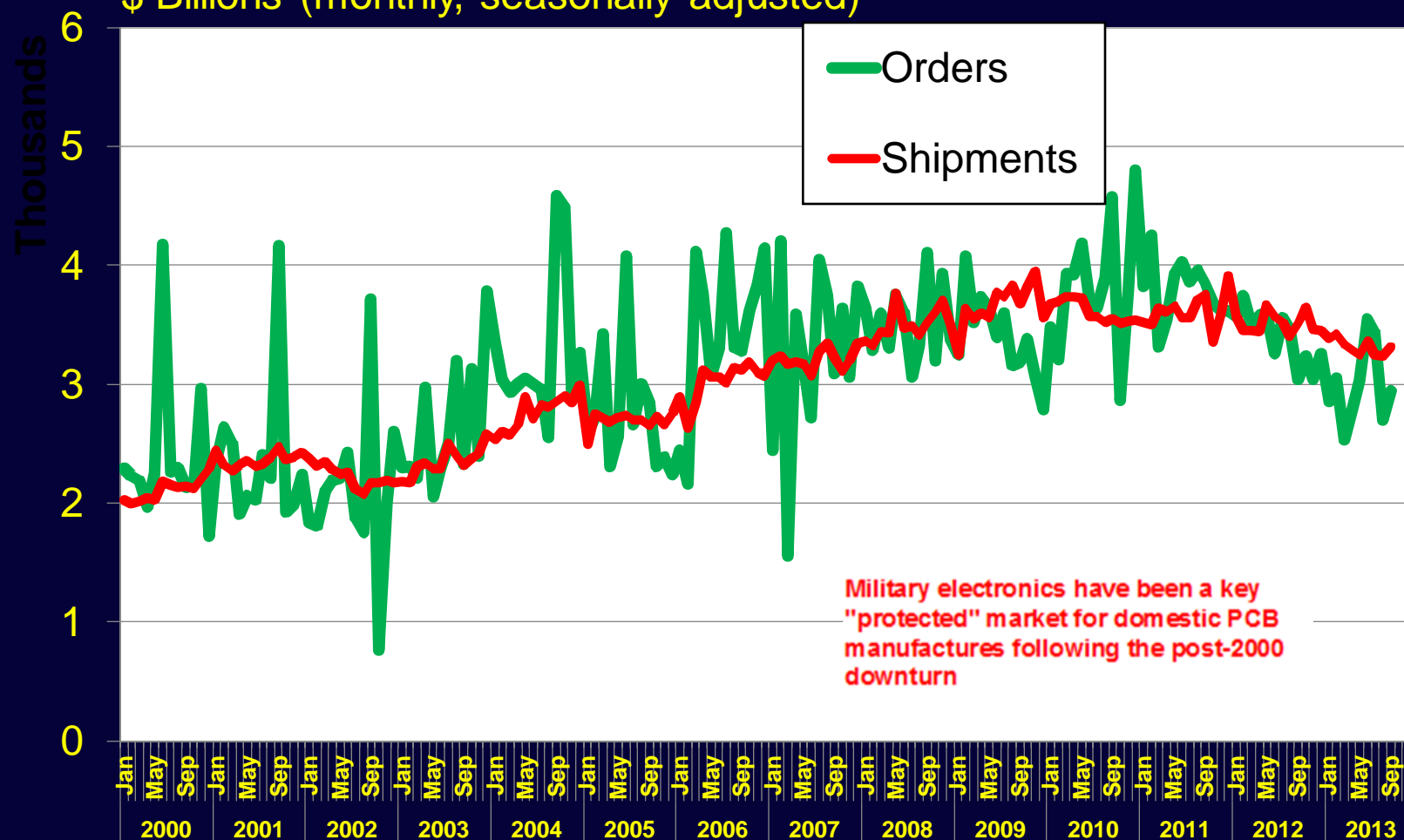
# **Aviation, Government & Military Electronics**

20131105

## 5 U.S. Military Electronics Orders & Shipments

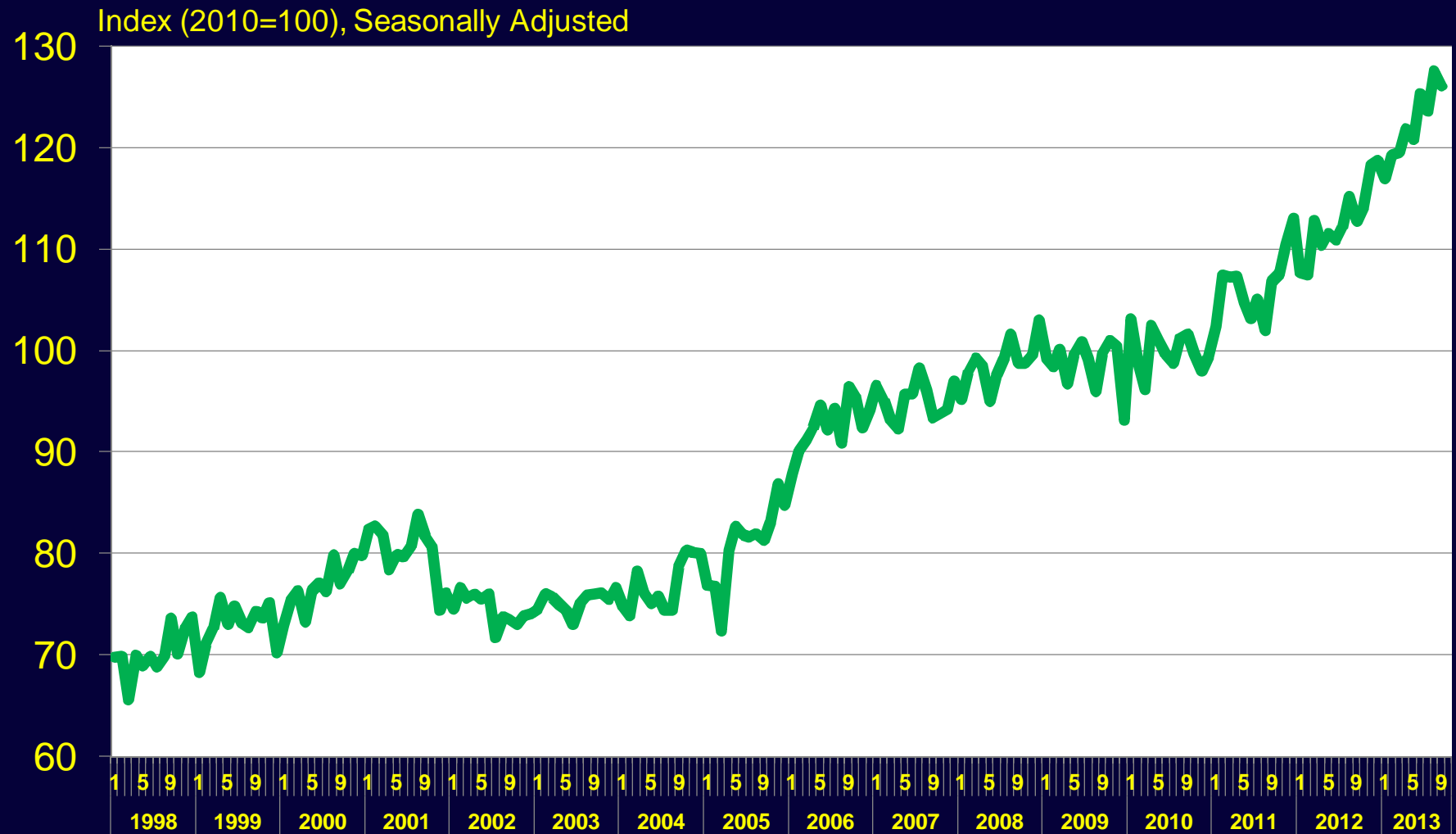
### Defense Communication & Search & Navigation Equipment

\$ Billions (monthly, seasonally adjusted)



20131113

# European Production - Aircraft, Spacecraft & Related Equipment



Eurostat, C303 category, EU 27 countries

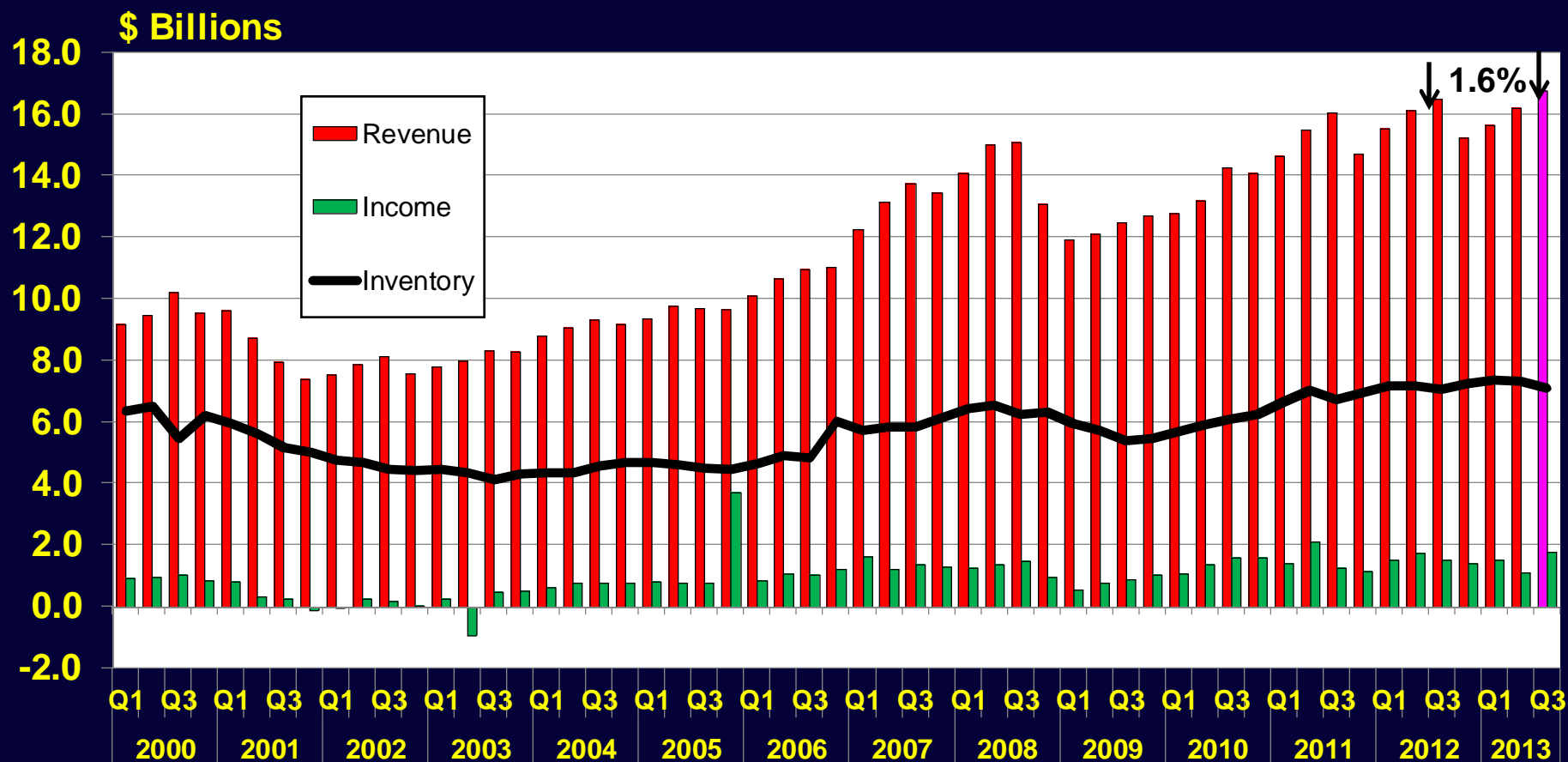
# **Instruments & Control Equipment**



20131108

# Instruments & Control Equipment Composite of 12 Public Companies

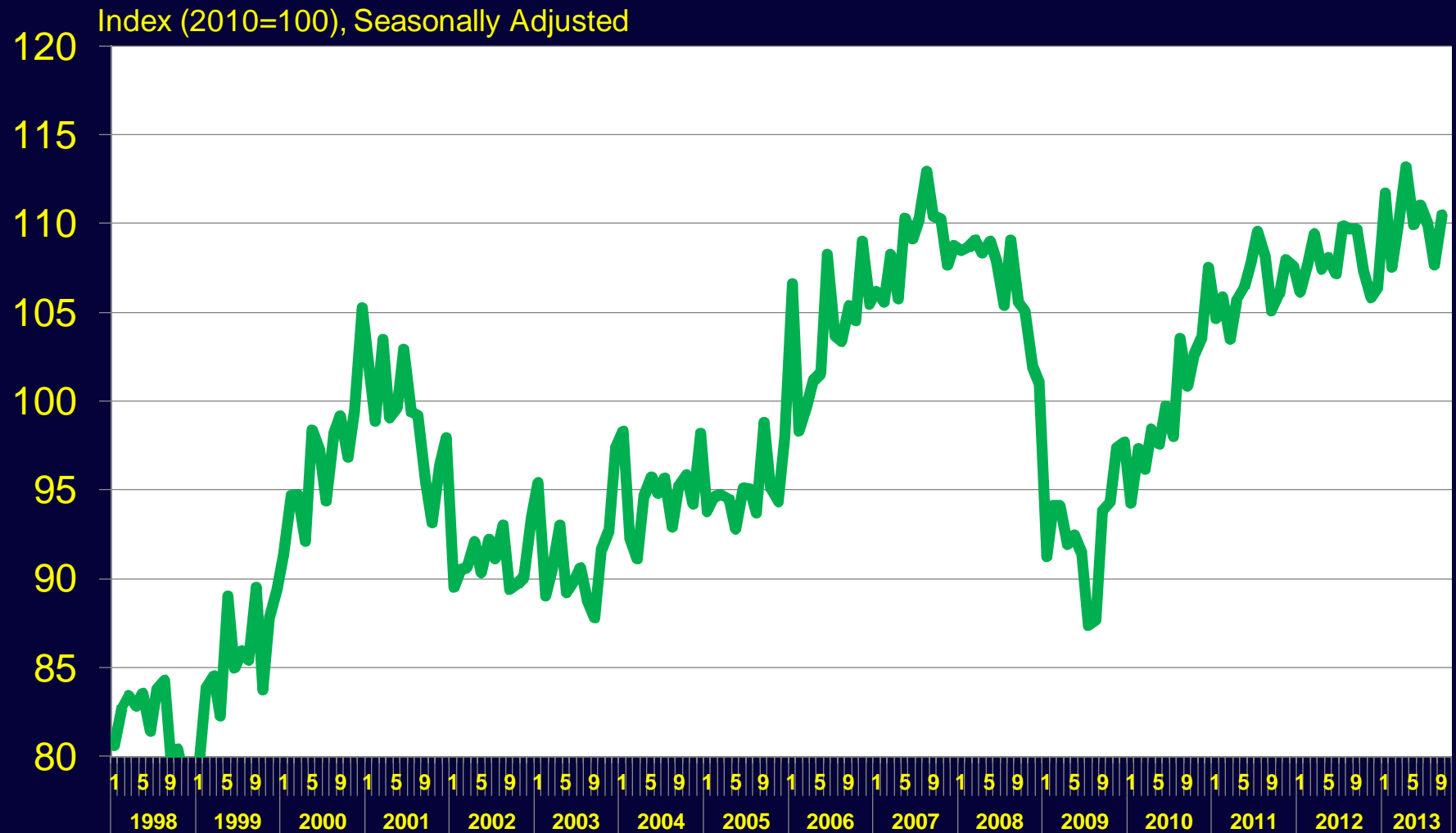
## Revenue, Net Income & Inventory



Agilent, Ametek, Emerson, Itron, Keithly, LeCroy, PerkinElmer, Rockwell Automation, Teledyne, ThermoFisher, Varian, Woodward Governor

20131113

## European Production - Instruments & Appliances for Measuring, Testing & Navigation

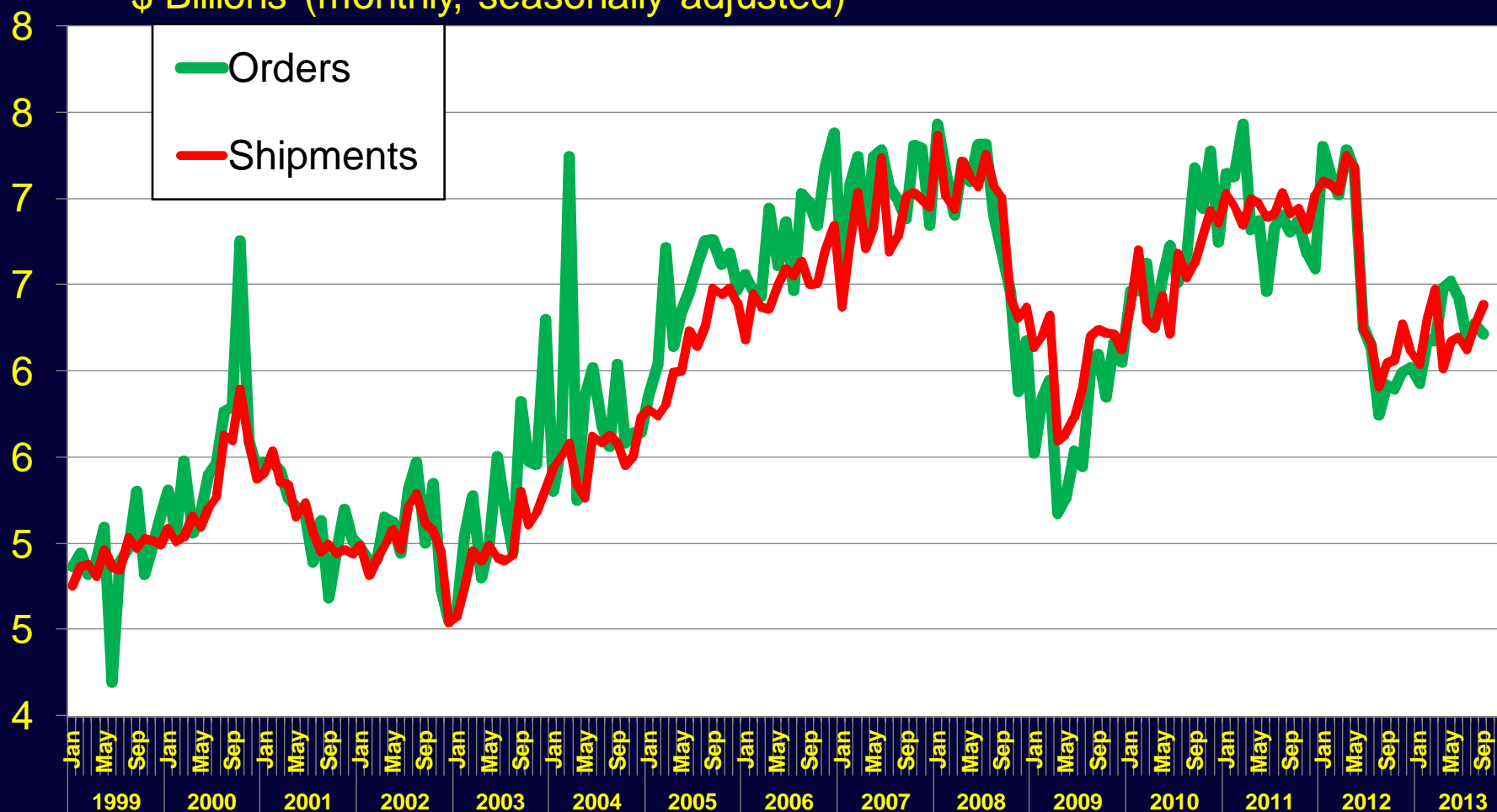


Eurostat, C2651 category, EU 27 countries

20131105

# U.S. Electromedical, Measurement & Control Equipment Orders & Shipments

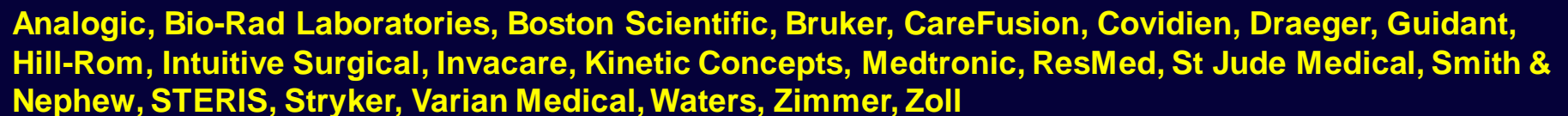
\$ Billions (monthly, seasonally adjusted)



# Medical Equipment

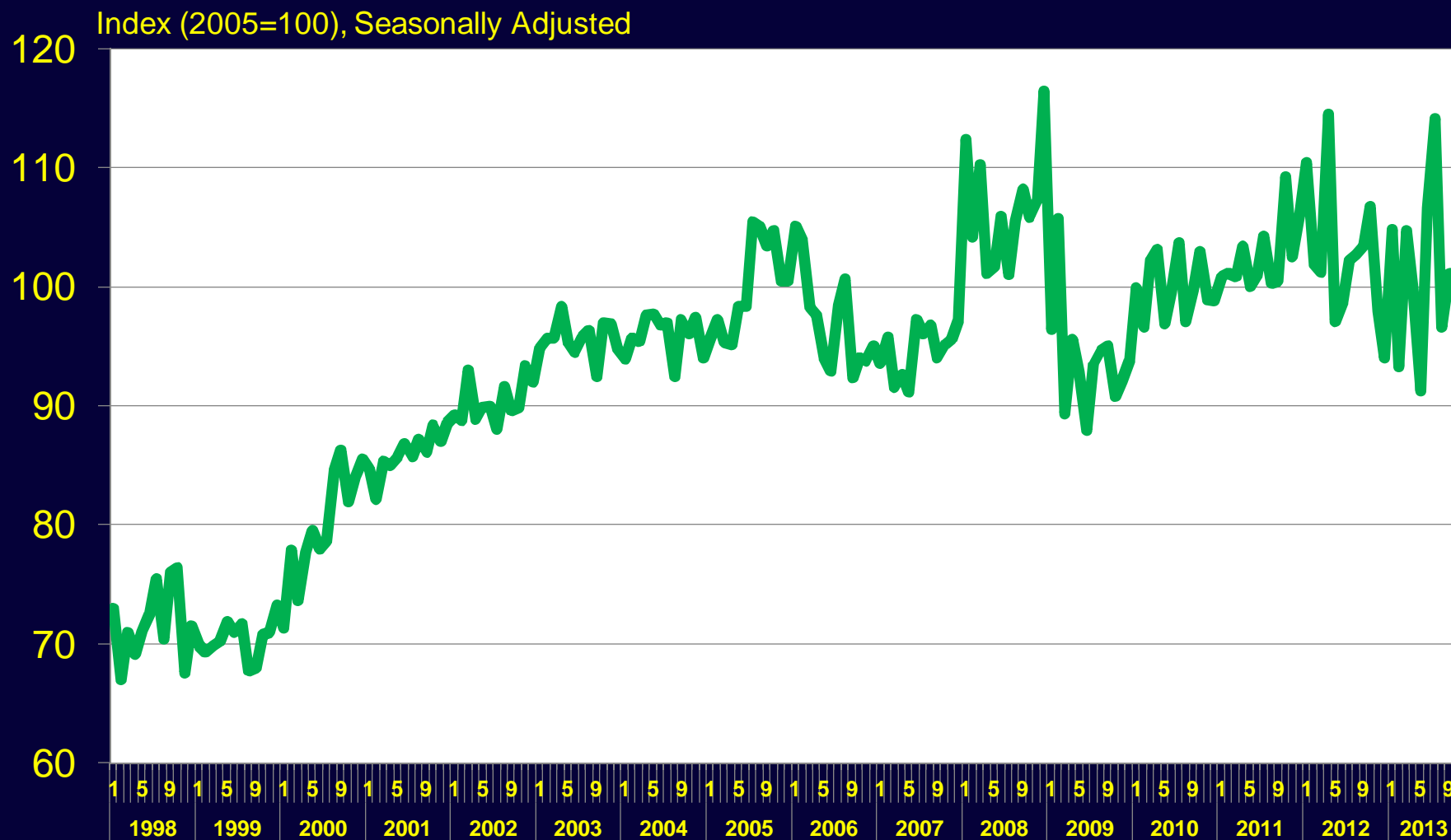
## Composite of 23 Public Companies

### Revenue, Net Income & Inventory



20131113

## European Production - Irradiation, Electromedical & Electrotherapeutic Equipment



Eurostat, C266 category, EU 27 countries

# **Communication Equipment**

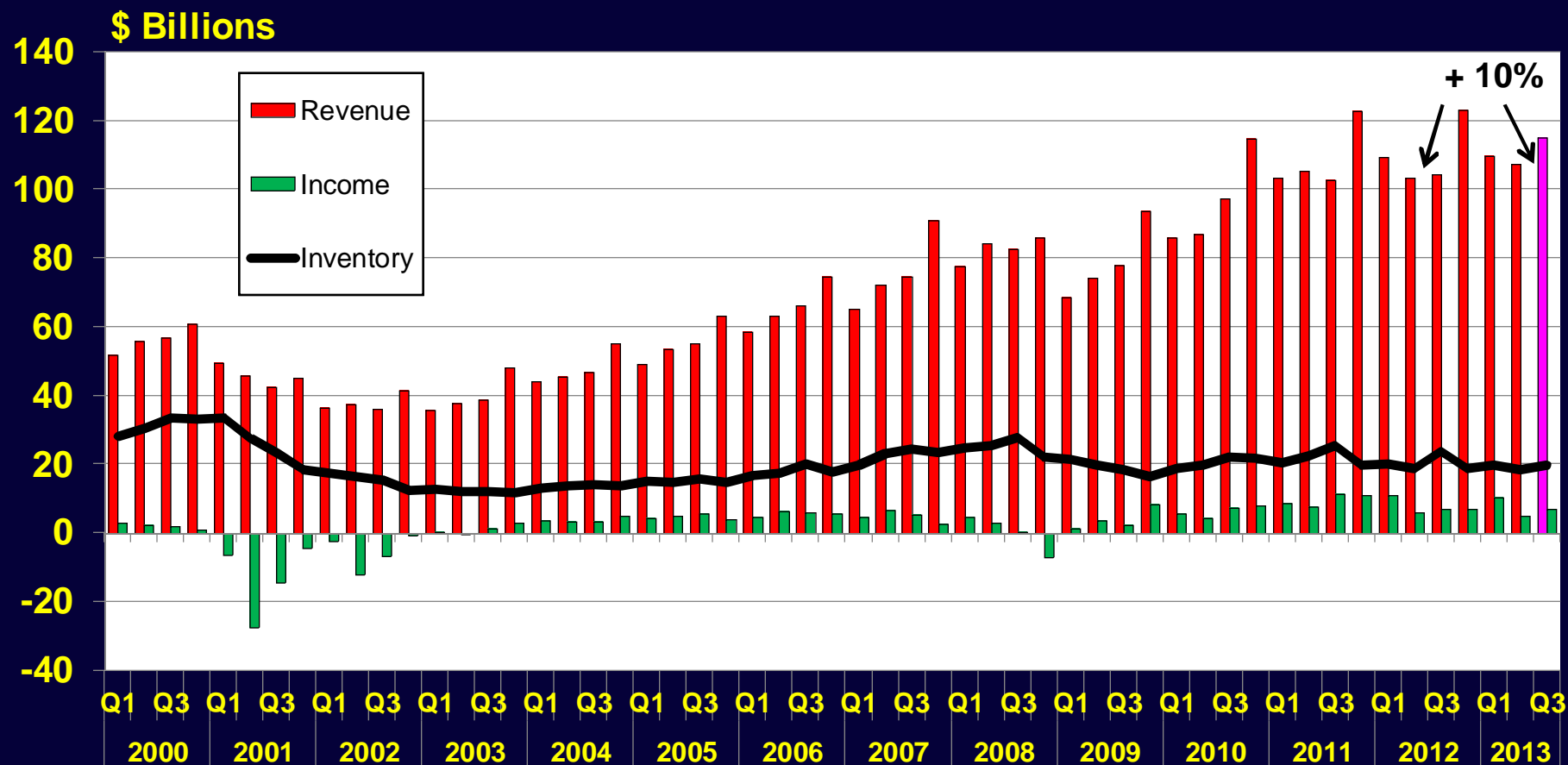
# Communication Equipment Suppliers

## Composite of 20 Companies

20131108

10 mobile phone makers, 10 other telecom equipment makers plus estimate of other mobile makers

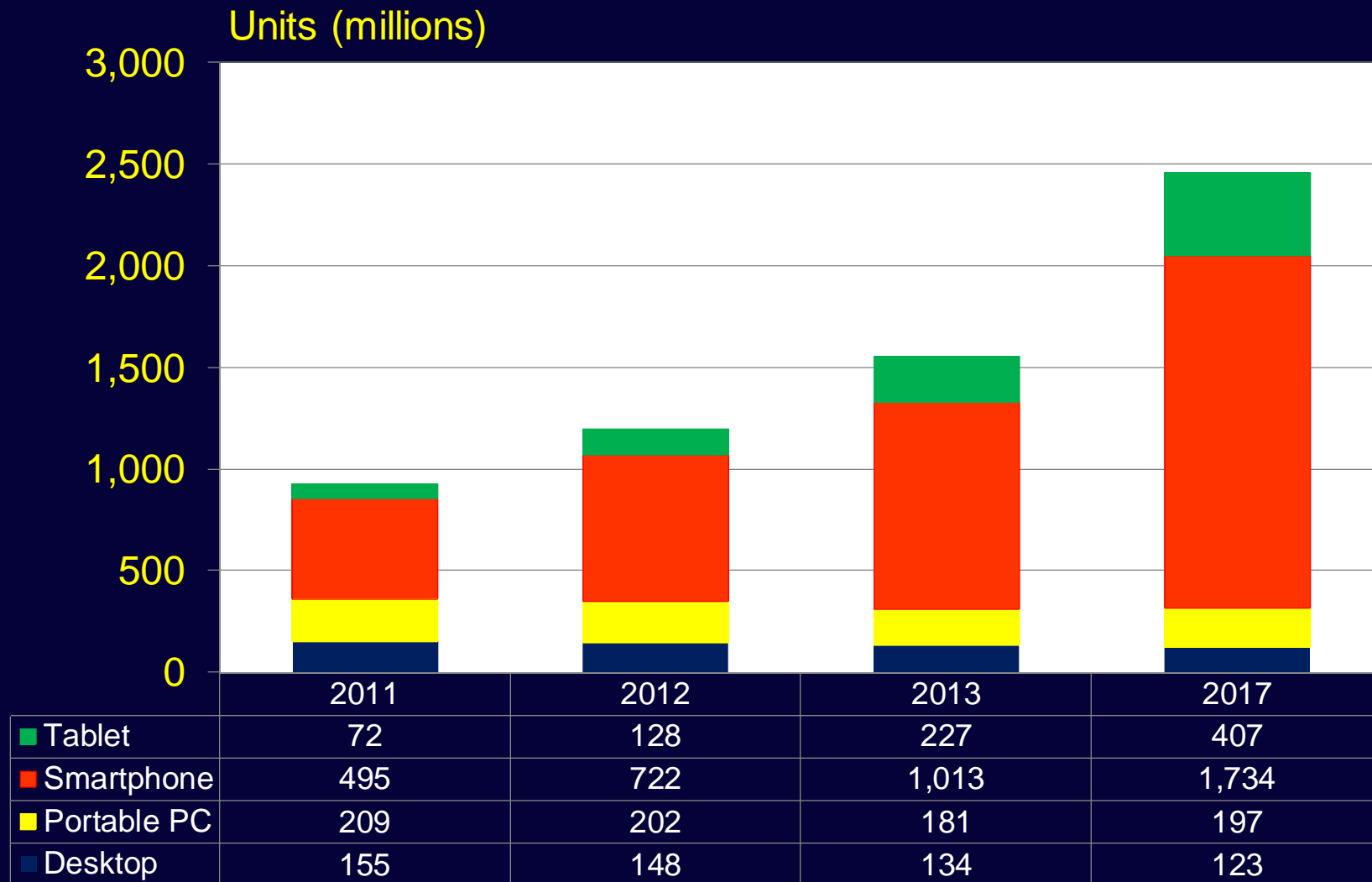
### Revenue, Net Income & Inventory



3COM, ADC Telecom, Alcatel+Lucent, Ciena, Ericsson, Motorola Solutions,, Nokia, Polycom, TellLabs, Palm ; Apple iPhone, HTC, Huawei Device, LG, Motorola Mobility, Nokia, RIM, Samsung, Sony Mobility, ZTE; Euros & Krona converted at fluctuating exchange; mobile phone volumes from company reports & Gartner Dataquest quarterly unit shipment estimates; historical data included for acquired companies

20130914

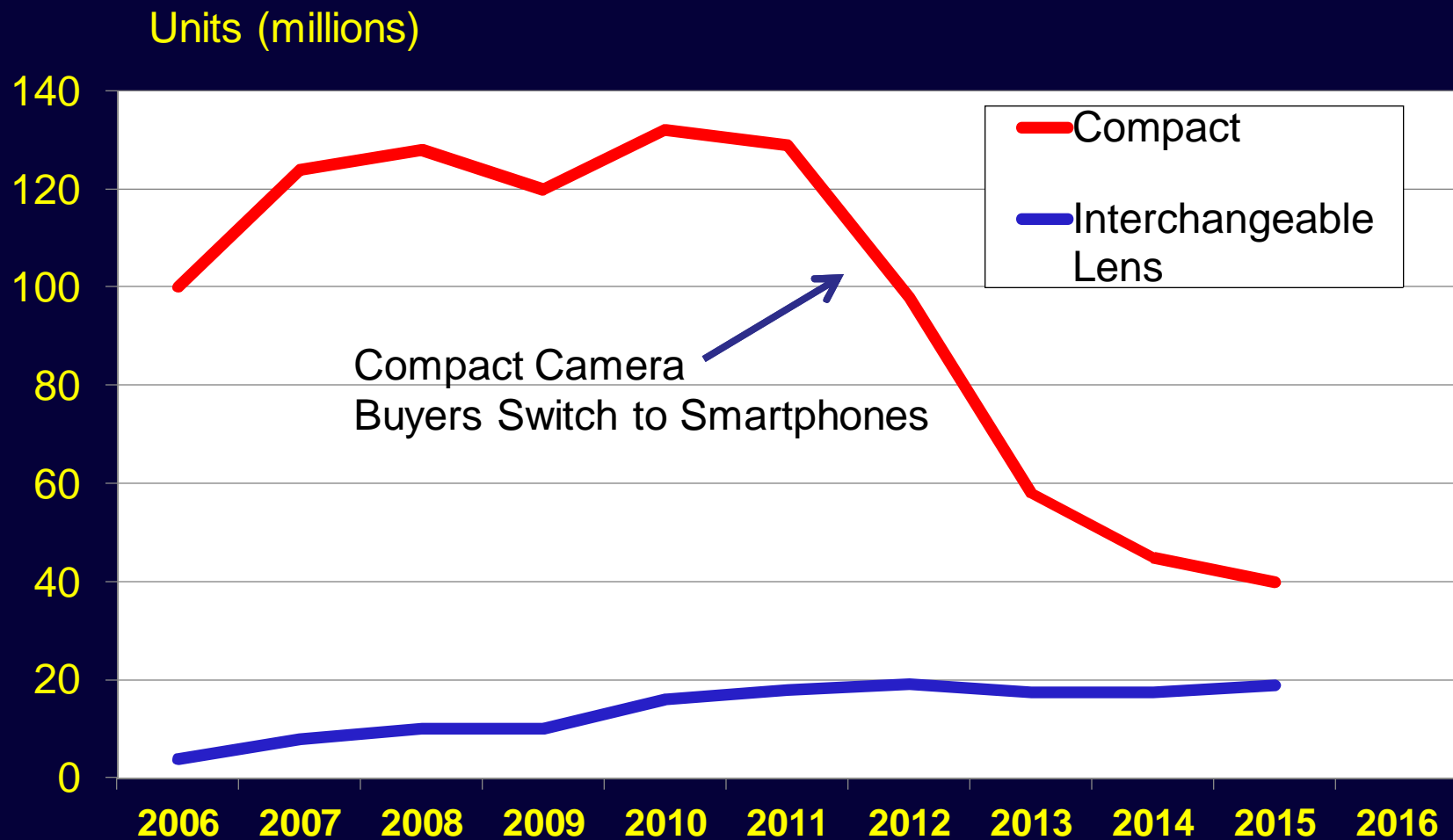
# Smart Connected Device Market by Type





# Global Camera Shipments

## Compact & Interchangeable Lens Cameras



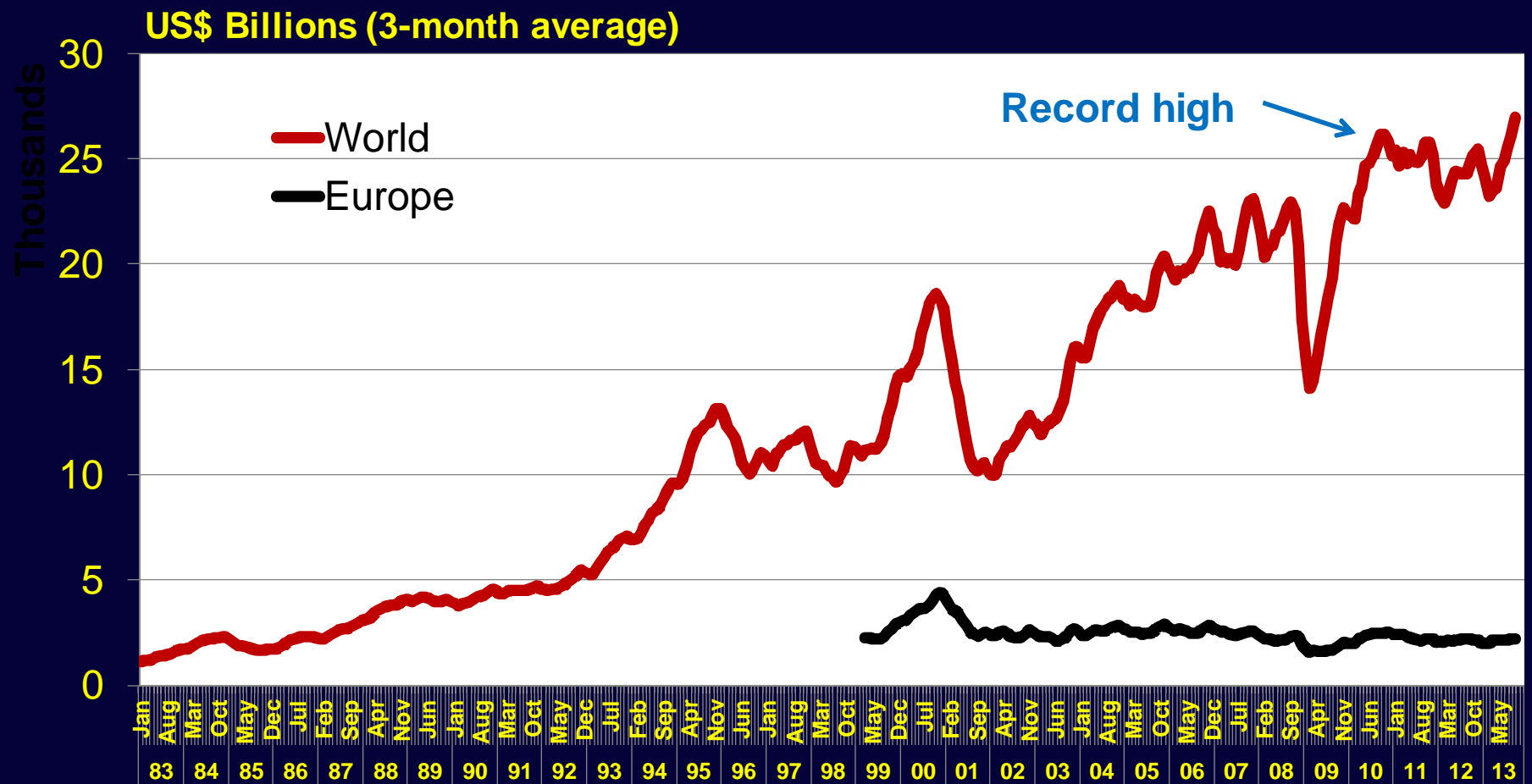
# Semiconductors

## 2013 Worldwide Semiconductor Sales Leaders (US\$ millions, including Foundries)

<u>Rank</u>	<u>Maker</u>	<u>2013F</u>	<u>2013/2012</u>
1	Intel	48,321	-2%
2	Samsung Electronics	33,590	4%
3	TSMC	19,804	17%
4	Qualcomm	17,145	30%
5	SK Hynix	13,040	44%
6	Toshiba	12,197	9%
7	Texas Instruments	11,474	-5%
8	Micron	10,551	32%
9	STMicroelectronics	8,184	-2%
10	Broadcom	8,110	4%
11	Renesas	7,827	-16%
12	Infineon	5,265	7%
13	AMD	5,244	-3%
14	Sony	4,889	-14%
15	NXP	4,787	11%
16	MediaTek	4,515	34%
17	GlobalFoundries	4,261	6%
18	Freescale	3,942	4%
19	UMC	3,919	5%
20	Nvidia	3,752	-5%
	Total Top 20	230,817	7%

# World Semiconductor Shipments

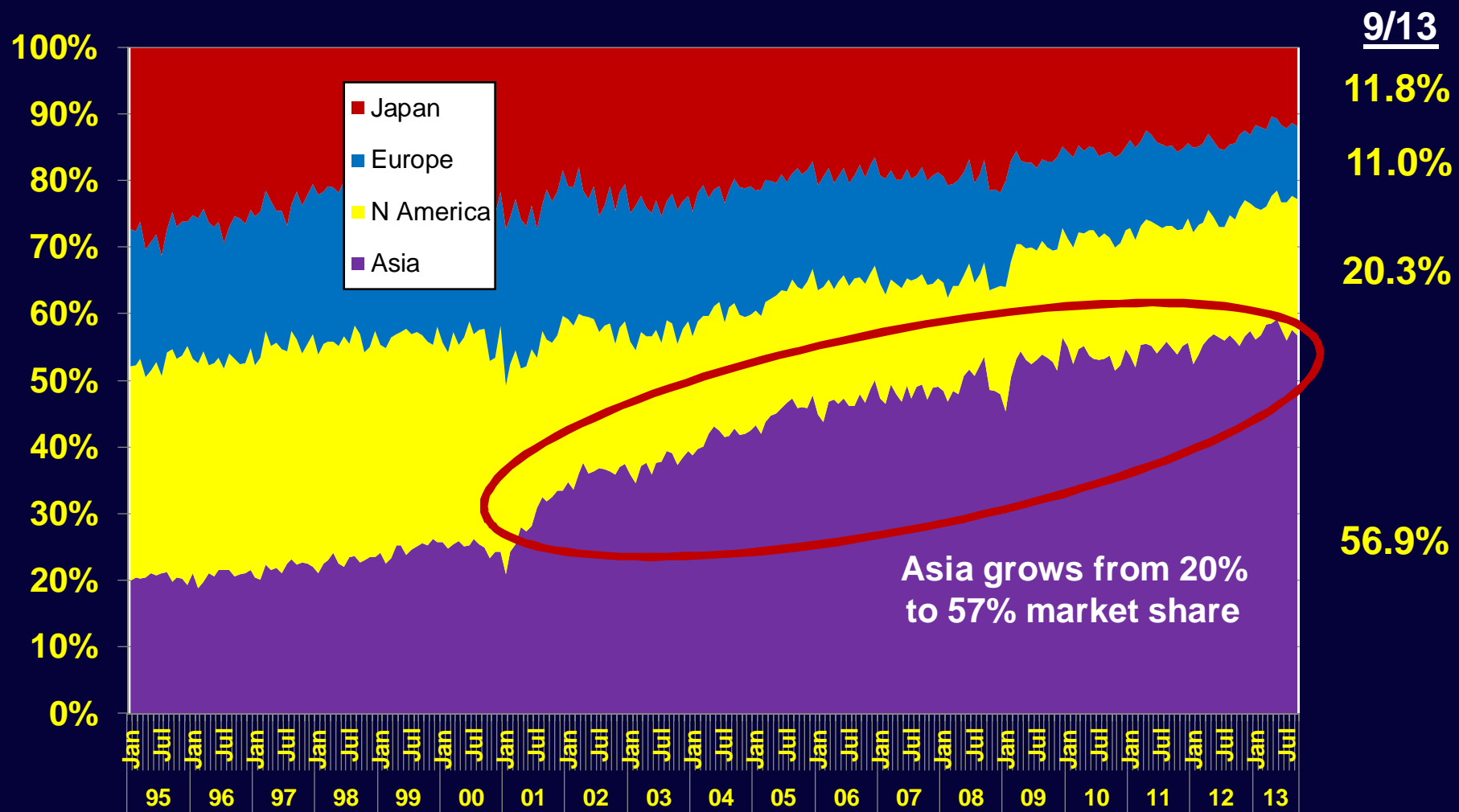
## Monthly US\$



20131104

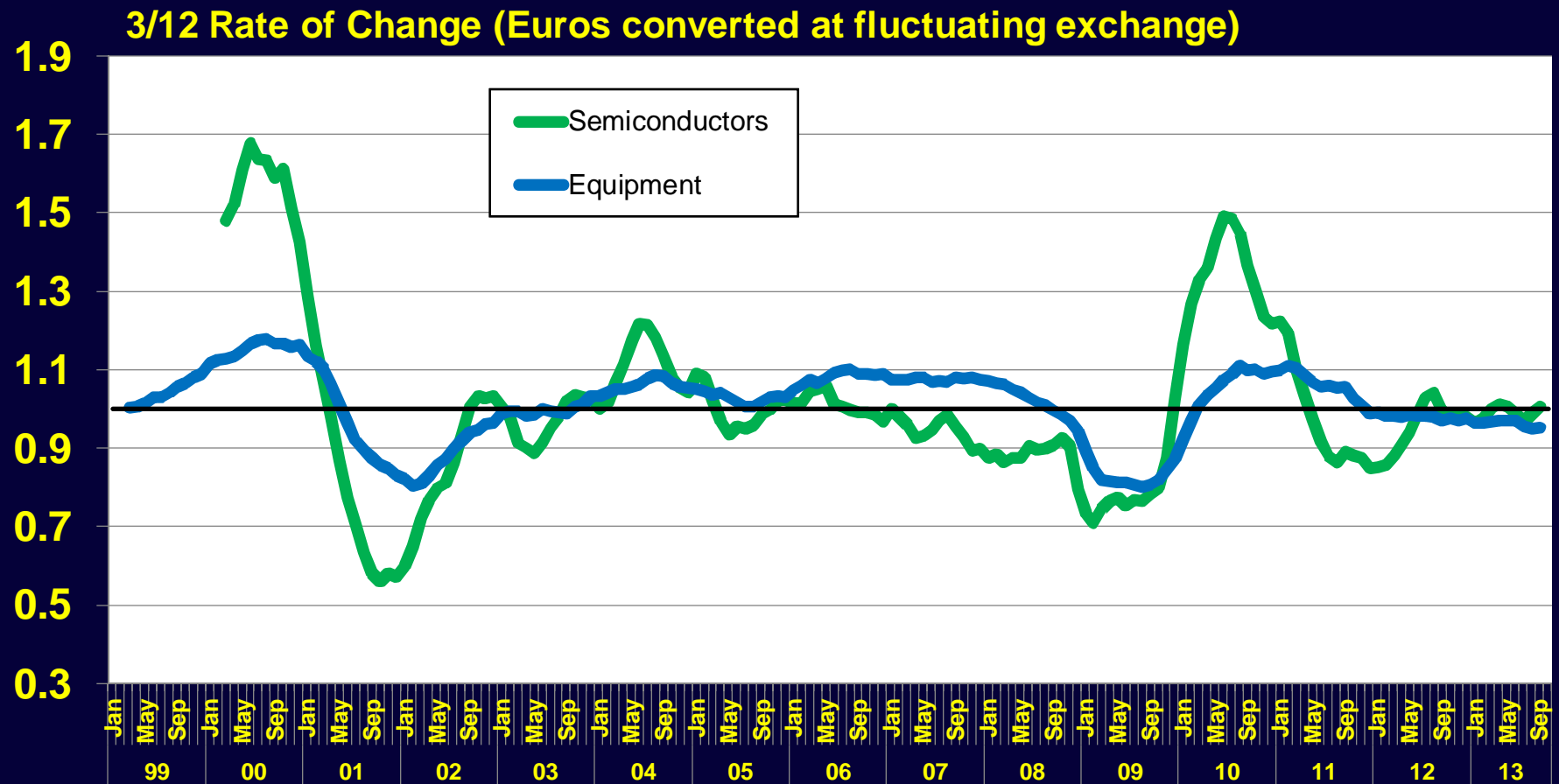
# Total Semiconductor Shipments to an Area

## Monthly Shipments - Reporting Firms



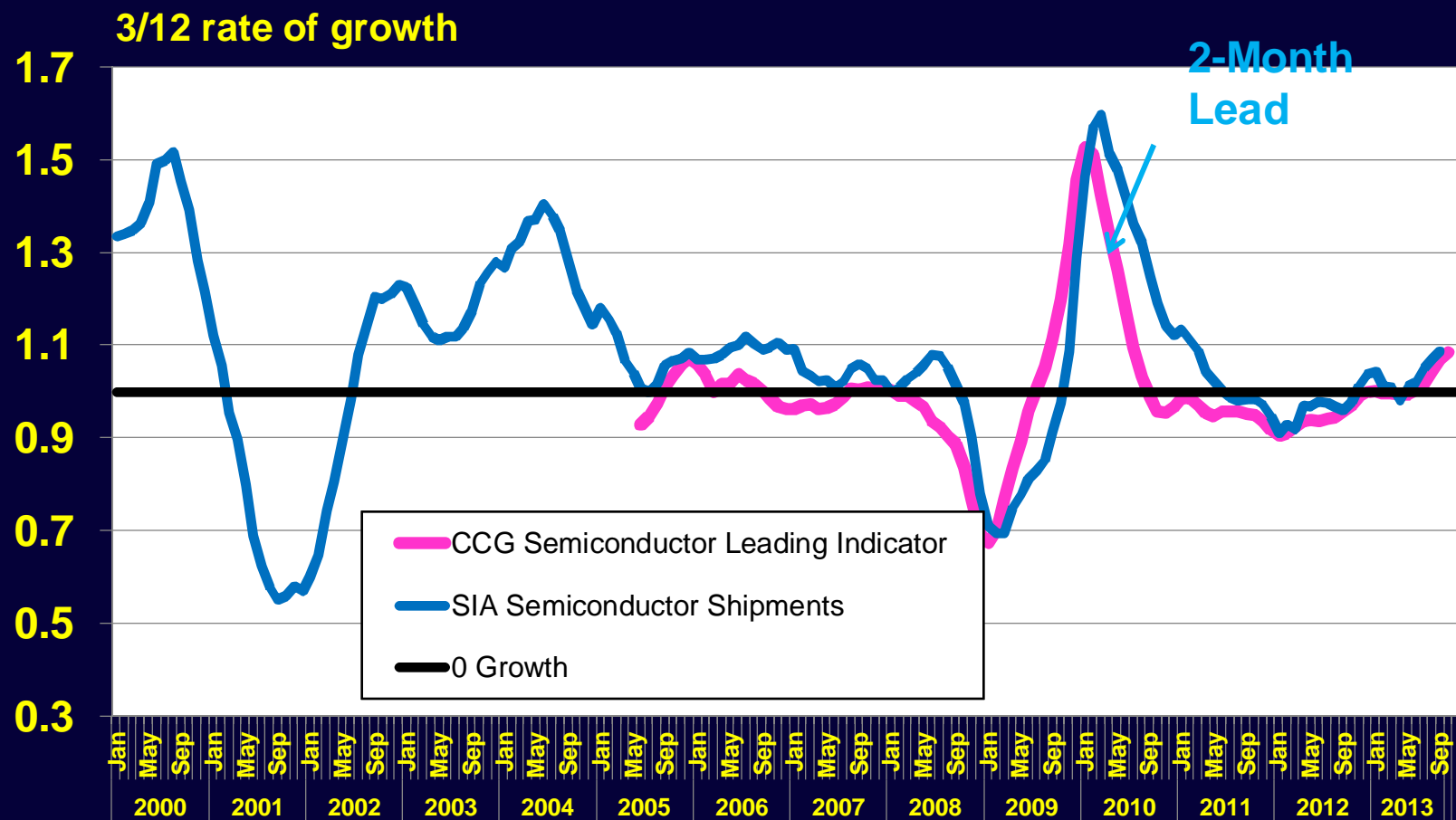
SIA website: [www.sia-online.org/](http://www.sia-online.org/)

# Semiconductor Shipments to Europe vs. European Electronic Equipment Production

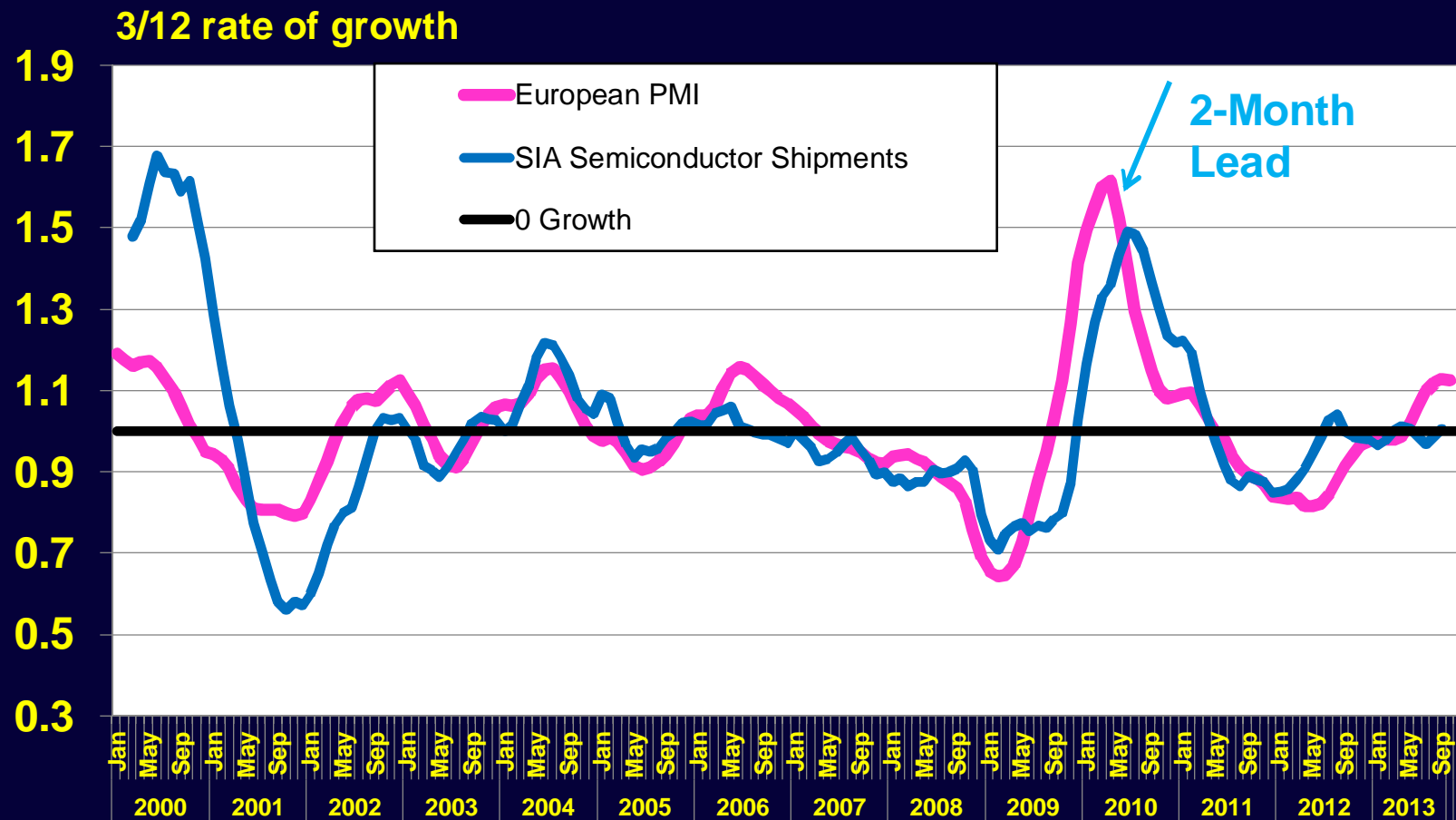


Total \$ Semiconductor Shipments from All Countries to Europe [www.sia-online.org/](http://www.sia-online.org/),  
Eurostat class C26, EU27, European Computer, Electronic & Optical products Production

# CCG Semiconductor Leading Indicator vs. Global Semiconductor Shipments



# European PMI Leading Indicator vs. Semiconductor Shipments to Europe



**Sources: Markit Economics & SIA**



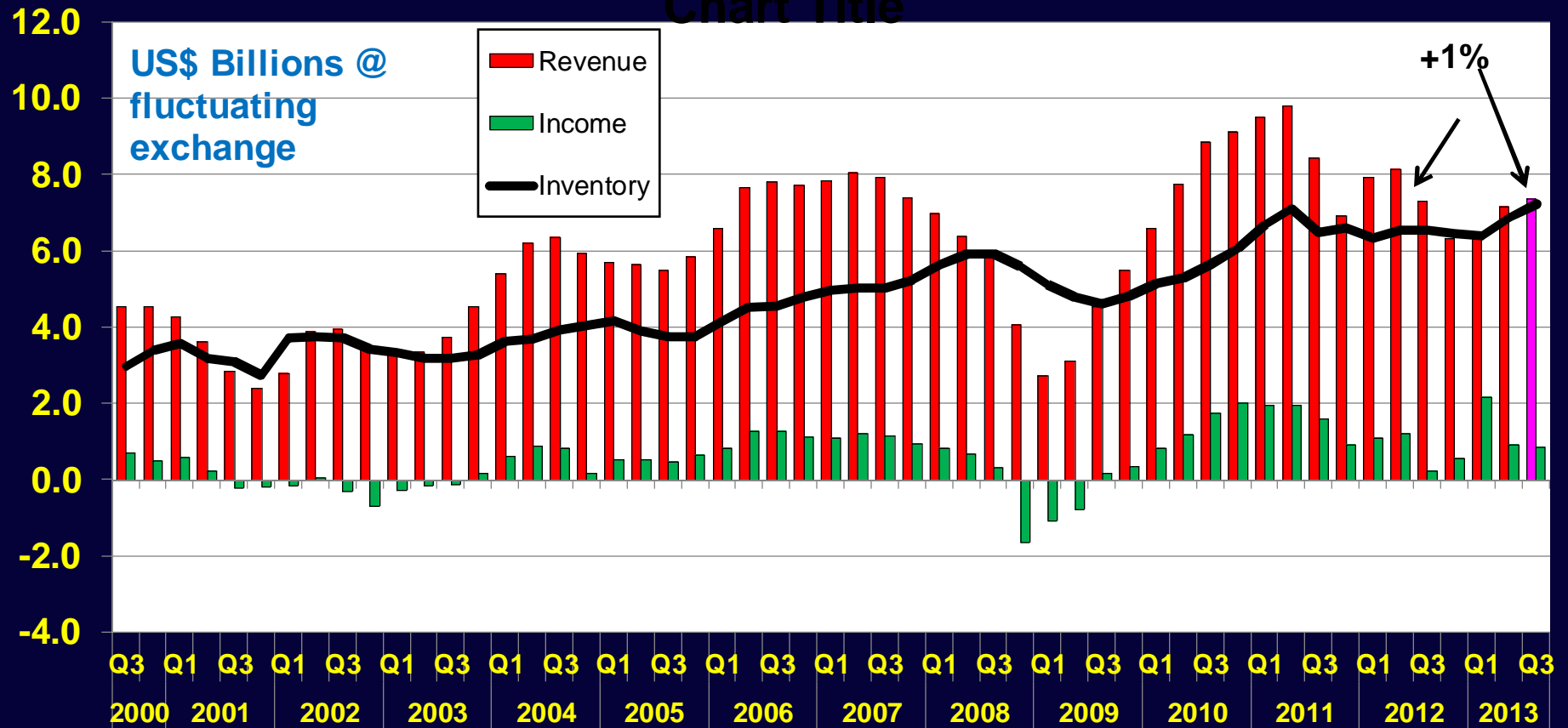
# **Semiconductor Fab, Assembly, Packaging, Test & Measurement Equipment**

# Semiconductor Fab, Test & Measurement Composite of 20 Public Companies

20131104

## Revenue, Net Income & Inventory

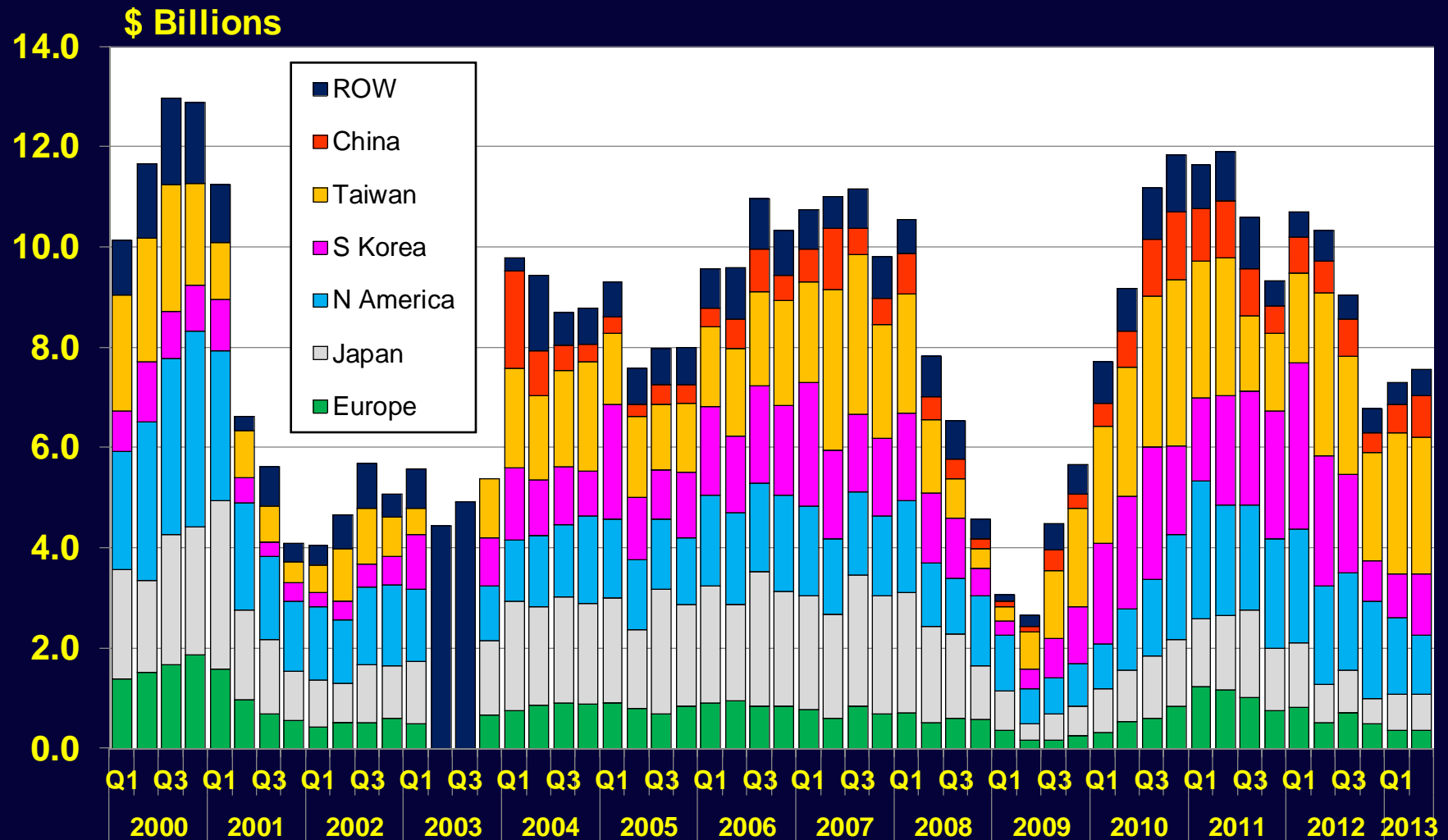
Chart Title



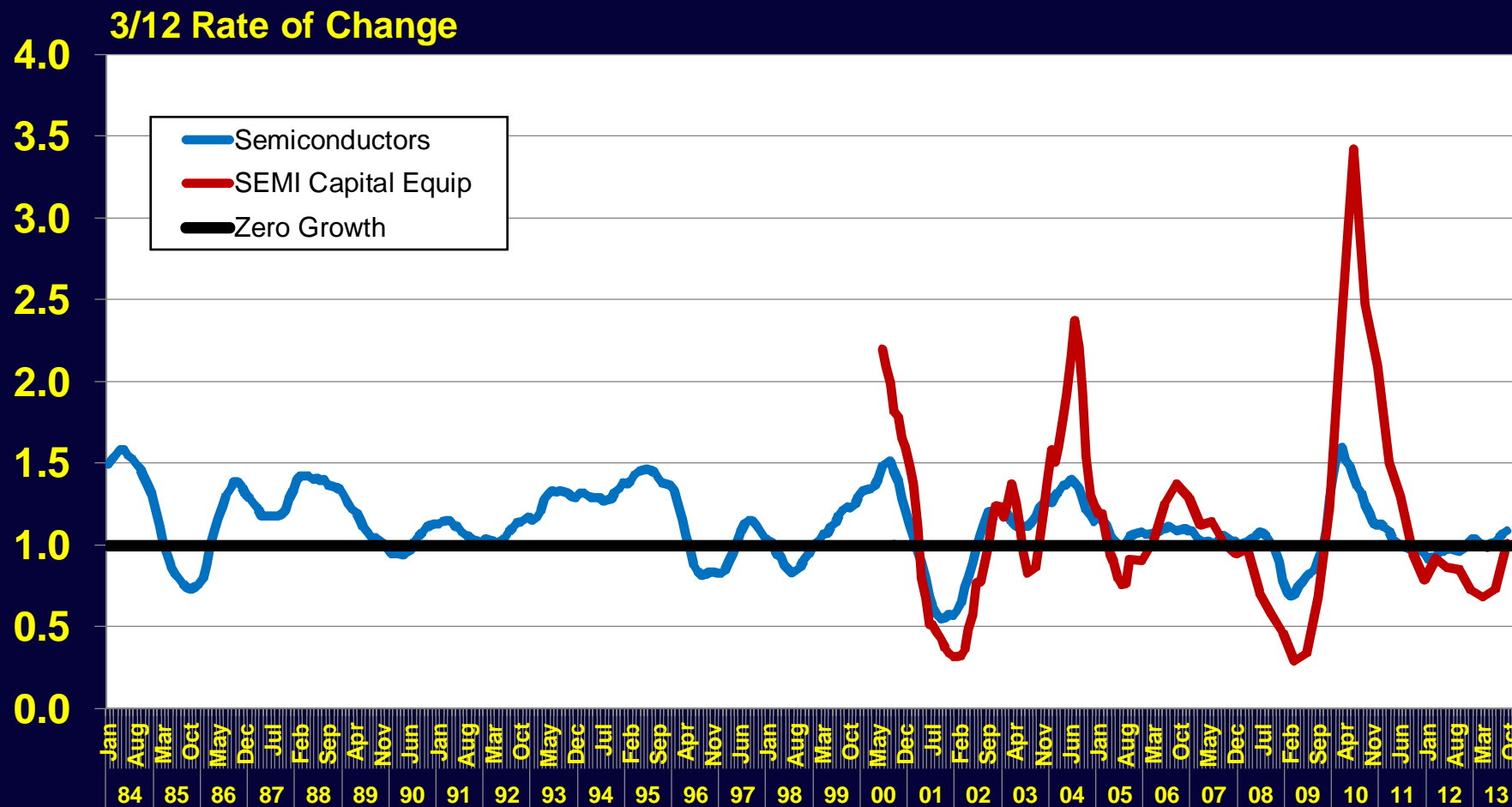
Applied Materials, ASM Intl, ASML, Advantest, KLA Tencor, Novellus, Hitachi Hi Tech, Lam Research, BTU, LTX-Credence, FEI, FSI, Intervac, Kulicke & Soffa, MKS Instruments, Rudolph, Teradyne, Ultratech Stepper, Varian semiconductor, Veeco

# Semiconductor Capital Equipment Shipments by Area

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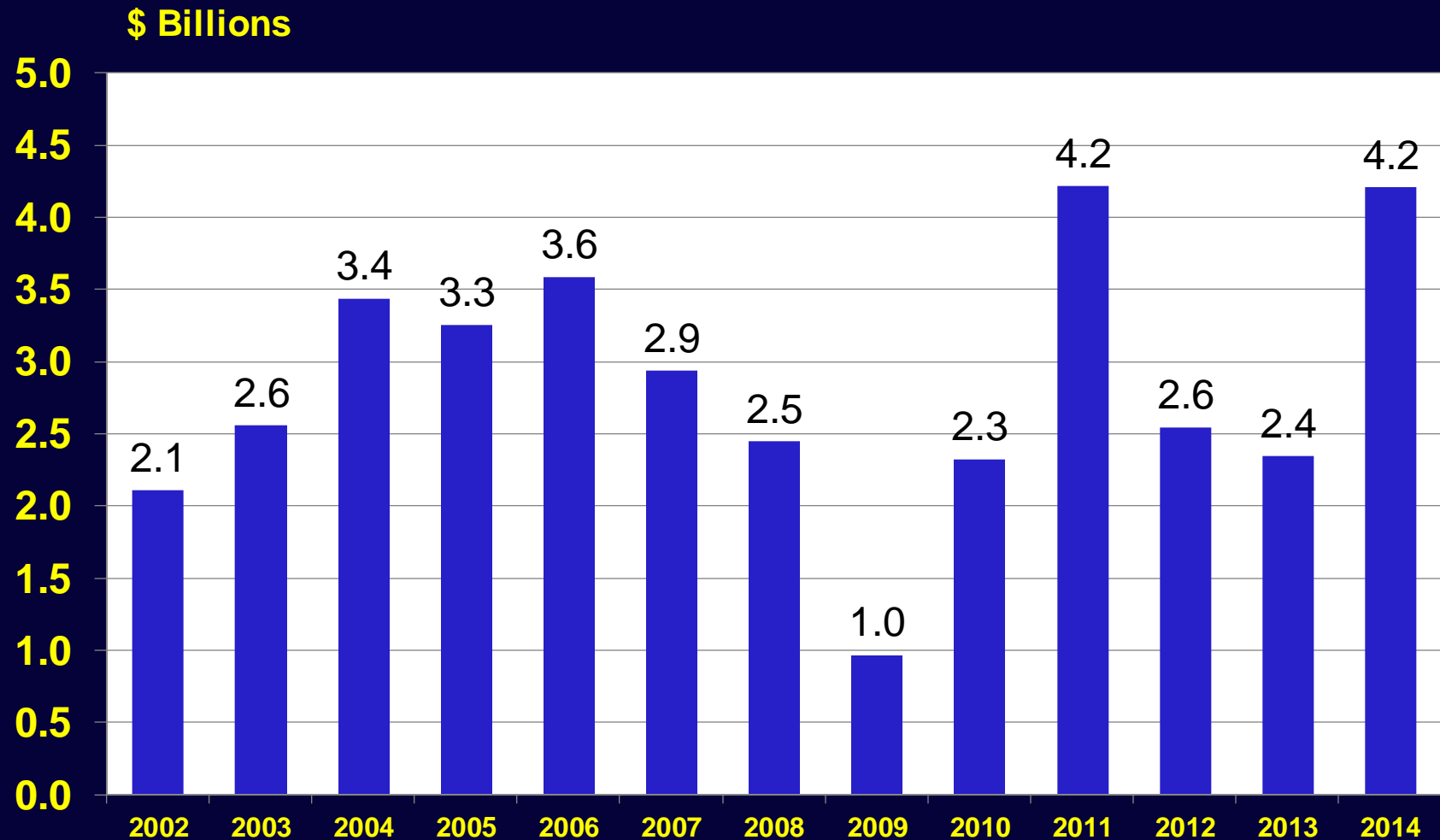
# Global Semiconductor & Semiconductor Capital Equipment 3-Month Shipment Growth Rates on \$ Basis



Sources: SIA; Semiconductor Equipment Association of Japan, [www.semi.org](http://www.semi.org), Custer Consulting Group SEMI equipment sector composite 2012 growth

20121208

# European Semiconductor Capital Equipment Market



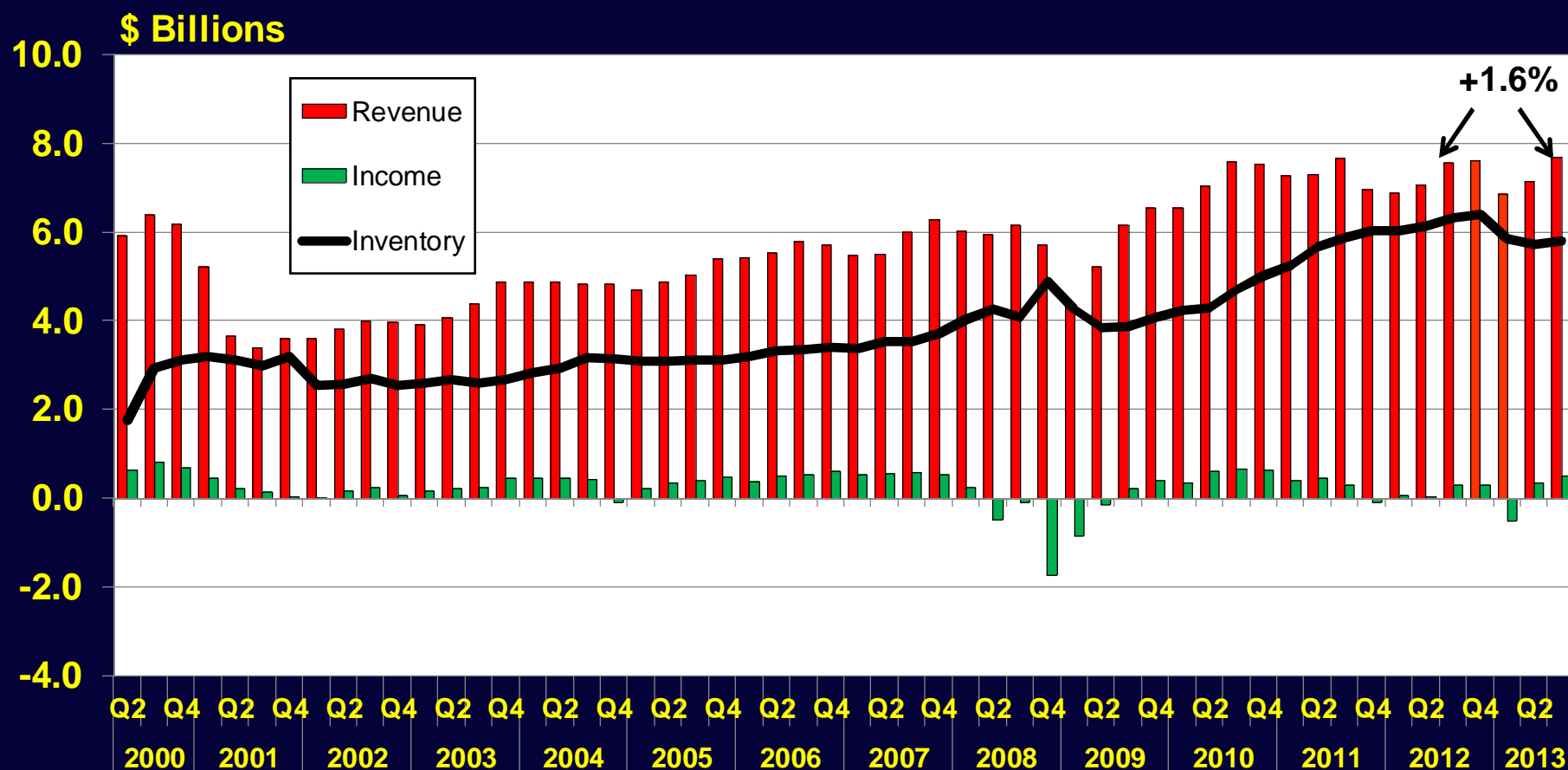
SEMI 7/13 (and prior reports)

# Passive Components

# Passive Components

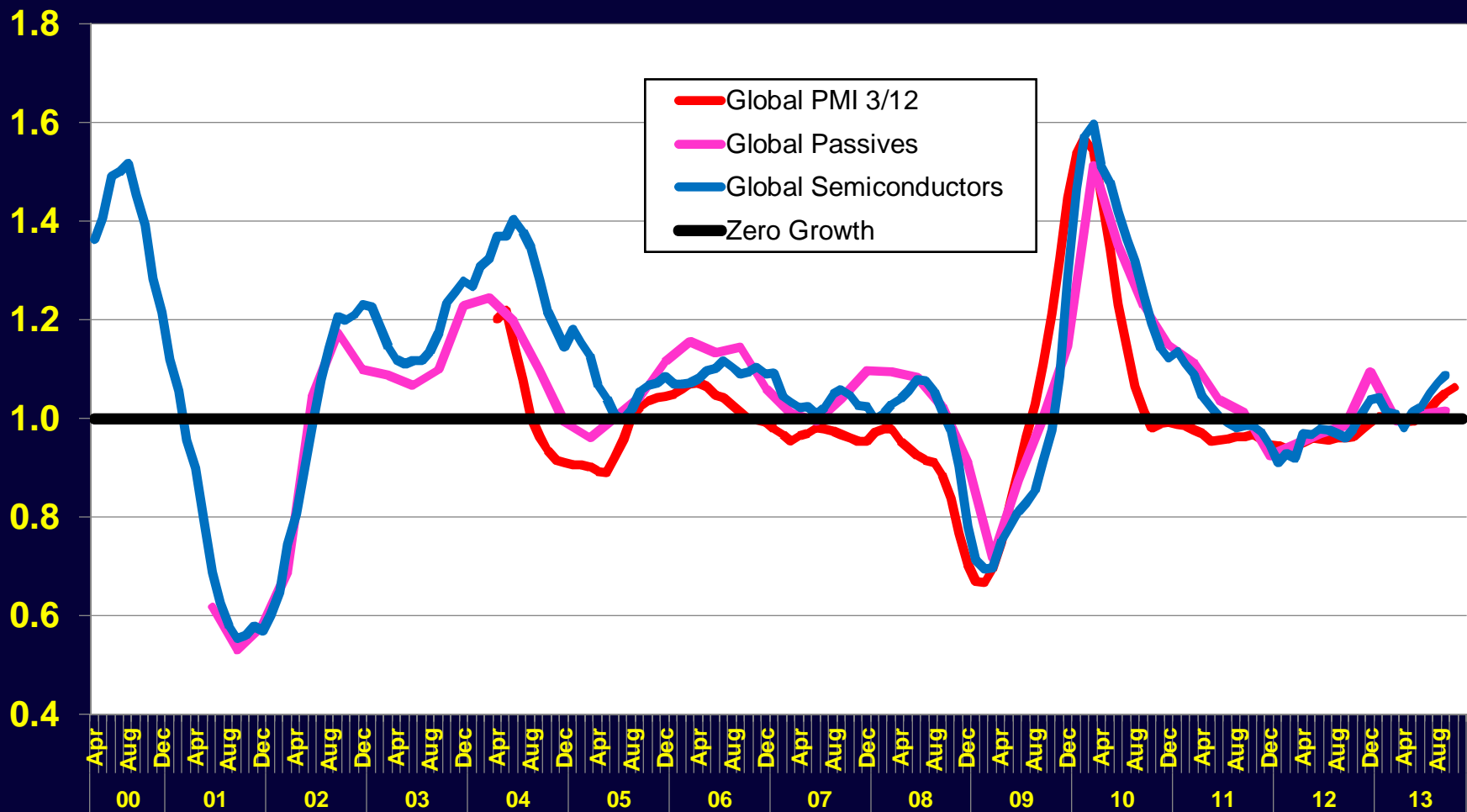
## Composite of 10 Companies

### Revenue, Net Income & Inventory



AVX, Bel Fuse, Diodes, Littlefuse, Murata, RF Micro, Rohm, Vishay, TDK, Yageo;  
Euros, Yen & NT\$ converted to US\$ at fluctuating exchange rates

# Global "Purchasing Managers" Index vs. Global Passive Component & Semiconductor Shipments



Global PMI=JPMorgan

Global Passive Components = Custer Consulting Group Industry Composite

Global semiconductors = SIA



# **Solar/Photovoltaic**

20131111

# Taiwan Solar/Photovoltaic Panel Companies Composite of 17 Manufacturers

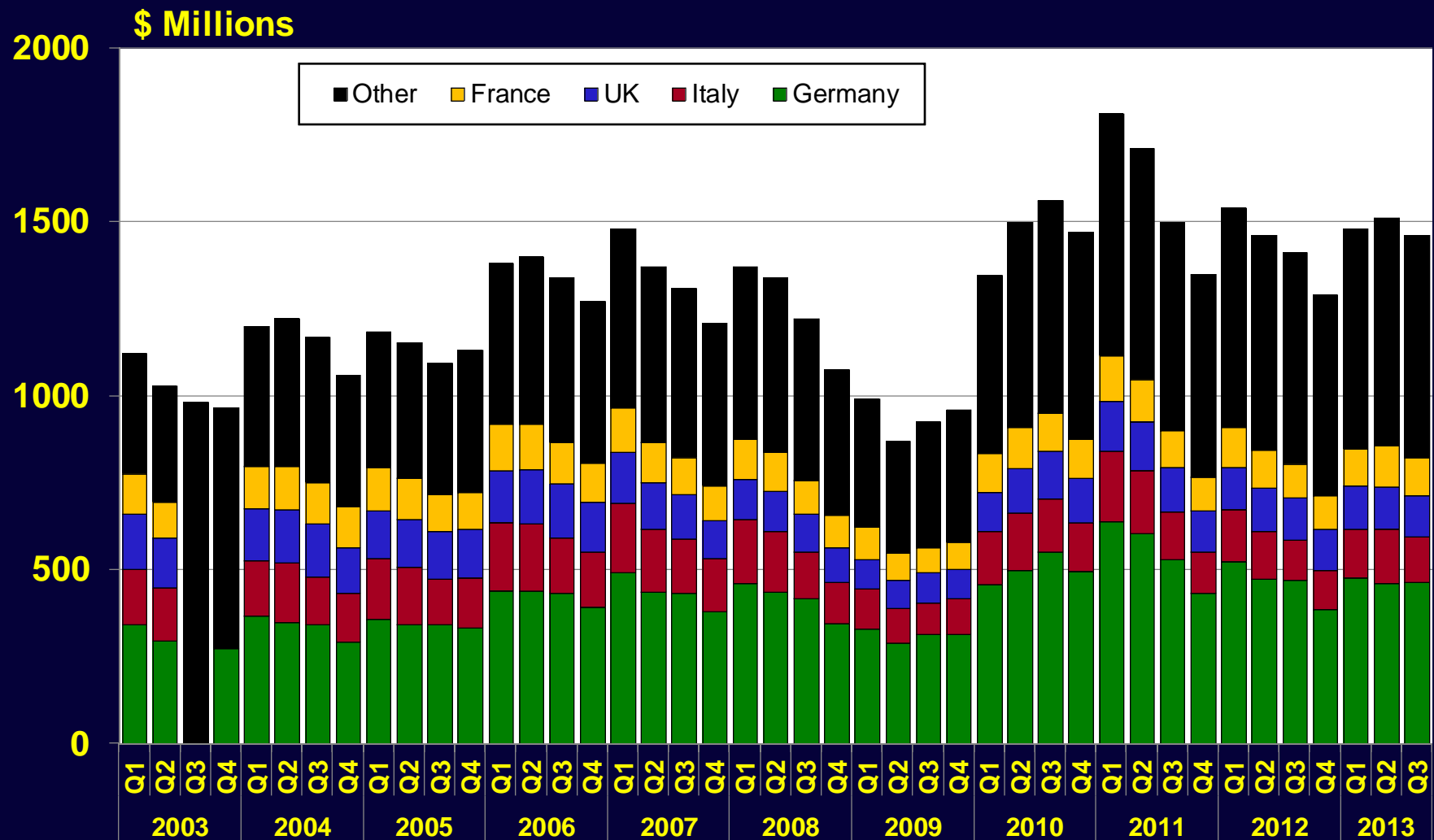


Big Sun Energy Technology, Daxon, DelSolar, e\_TON Solar Tec, Eversol, Gintech, Green Energy Technology (GET), Ligitek, Motech, Neo Solar Power, Phoenixtec Power Co (PPC), Precision Silicon, Sino-American Silicon Products, Sonartech, Sysgration, Tyntek, Wafer Works

# **Component Distributors**

20131114

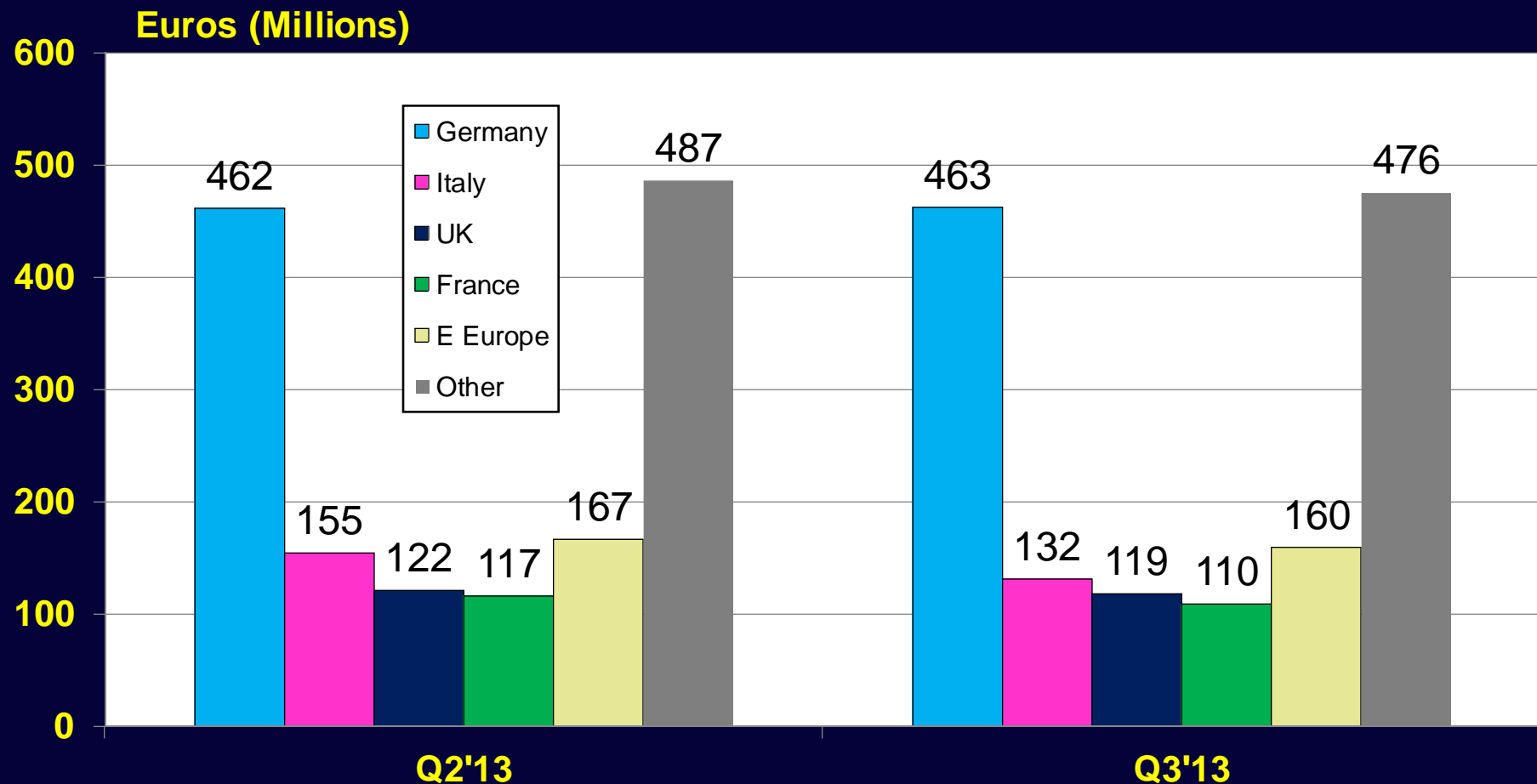
# DMASS - European Semiconductor Distribution Industry



20131114

# DMASS

## European Semiconductor Distribution Industry



DMASS 8/2013; <http://dmass.com/>

Georg Steinberger, chairman of DMASS, commented "An amazing recovery in the South, considering the macro-economic problems in France and especially Italy. Eastern Europe still has potential to grow internally and as a manufacturing stronghold for Western companies. The sluggish conditions in Central Europe and specifically Germany remain a concern, as it is not clear whether they indicate structural changes, like a loss of production to other regions. Although the German economy defies the signs of crisis Europe-wide, it is certainly very anti-cyclical."

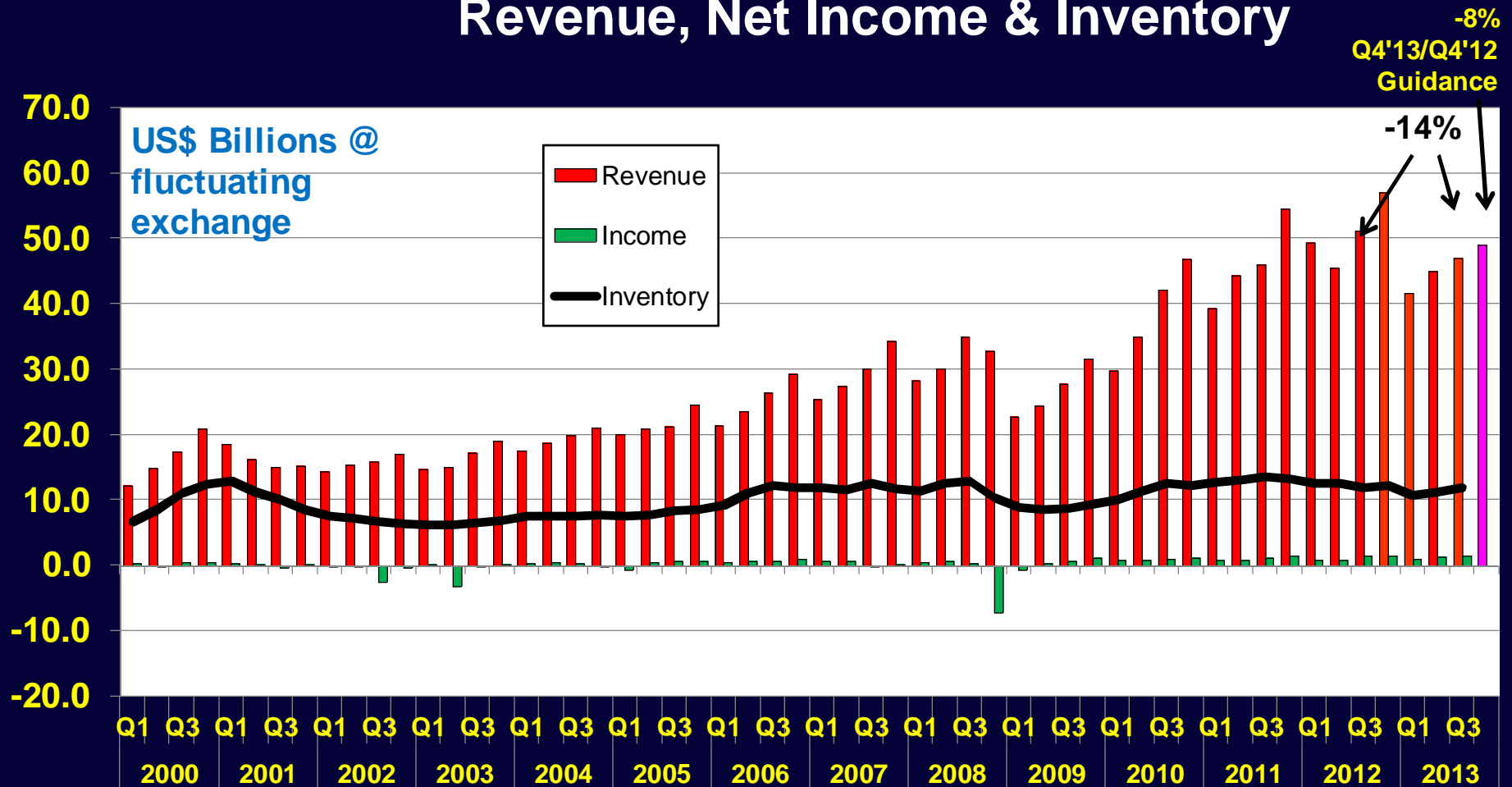
# **EMS & ODM Companies**

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# Large EMS Providers

## Composite of 9 Public Companies

### Revenue, Net Income & Inventory

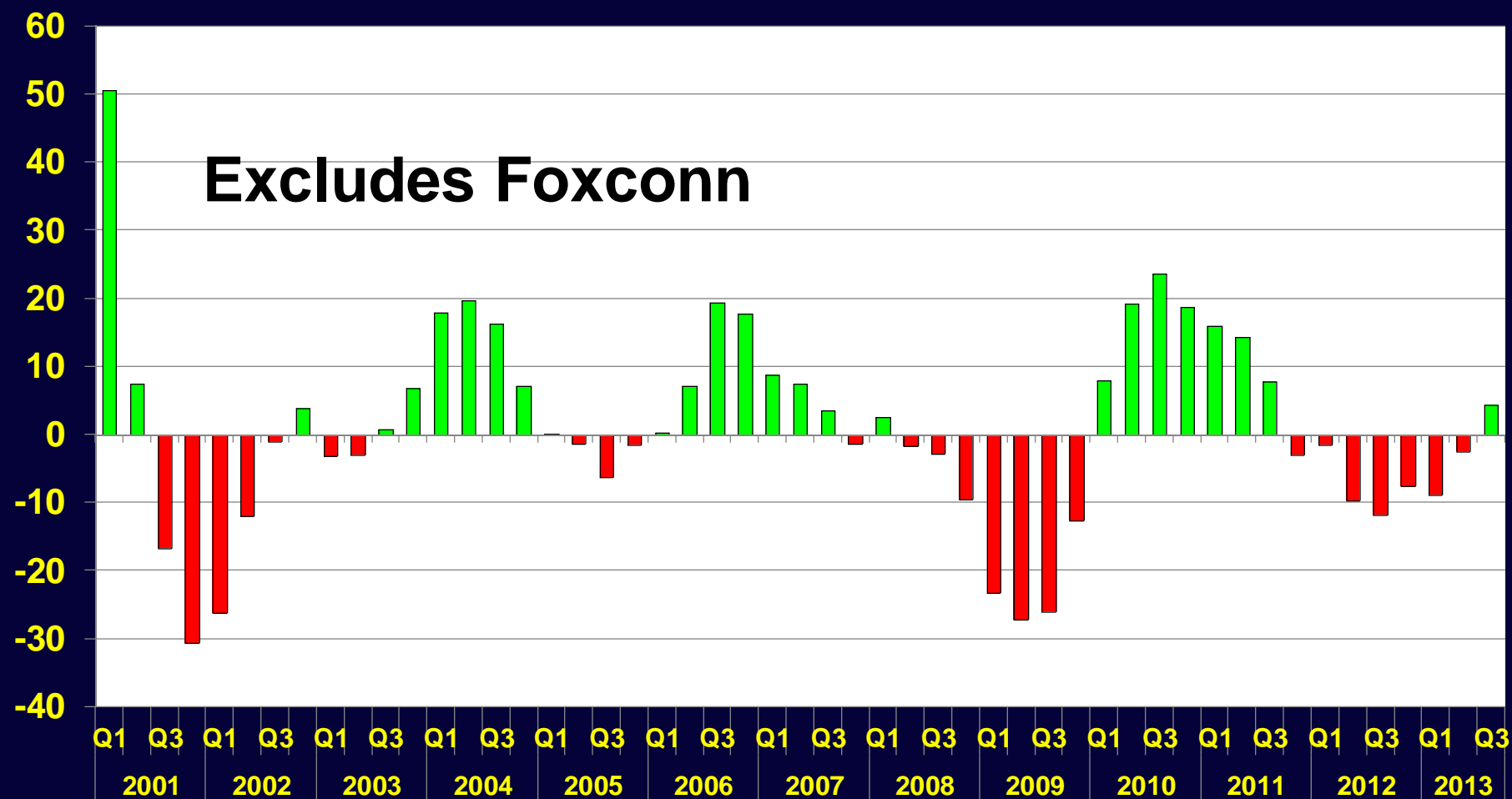


Benchmark+Pemstar, Celestica, Flextronics+Solectron, Foxconn, Jabil, Plexus, Sanmina-SCI, Sypris, Venture Mfg

# Large EMS Providers

## Composite of 8 Public Companies

### Quarterly Revenue Growth



Benchmark+Pemstar, Celestica, Flextronics+Solectron, Jabil, Plexus, Sanmina-SCI, Sypris, Venture Mfg



# Large Taiwan ODM Providers

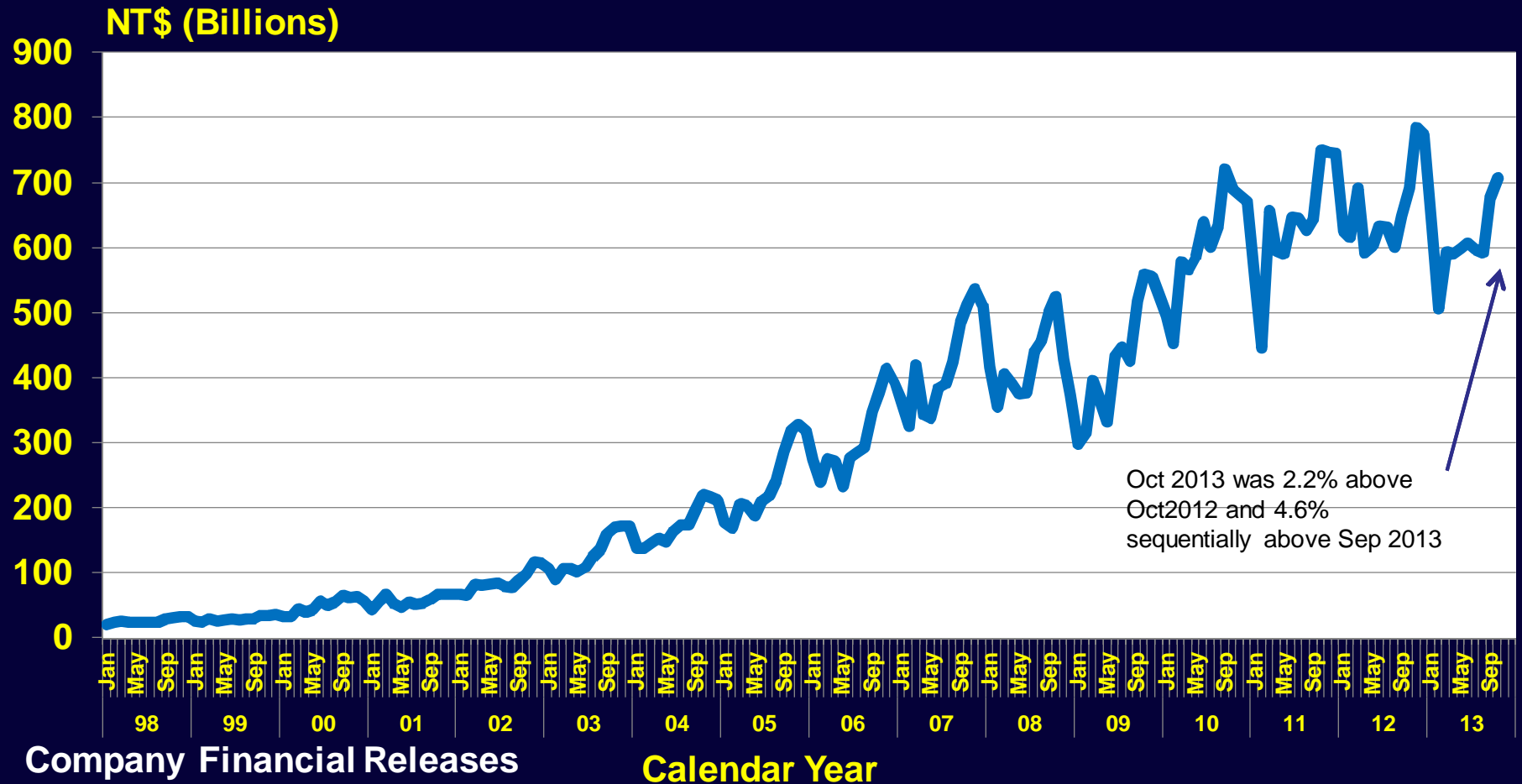
## 2012 vs. 2011 Sales (\$M)

	<u>2011</u>	<u>2012</u>	<u>2011/2010 Growth %</u>
Foxconn (Hon Hai)	93,837	108,937	16%
Quanta Computer	35,884	32,659	-9%
Compal Electronics	21,976	20,562	-6%
Wistron	19,827	20,260	2%
Chimei Innolux	16,424	15,955	-3%
Asustek Computer	10,749	12,693	18%
Inventec	11,451	10,843	-5%
Lite On Technology	3,201	2,597	-19%
Mitac International	1,138	962	-15%
Inventec Appliance	837	0	0%
<b>Total</b>	<b>215,324</b>	<b>225,468</b>	<b>+5%</b>

Source: Company data, NT\$ converted at constant avg 2012 exchange (29.554 NT\$ = 1US\$)  
 Unconsolidated company sales (to be updated soon to consolidated sales)

# Taiwan ODM Companies

## Composite Sales of 10 Large Manufacturers



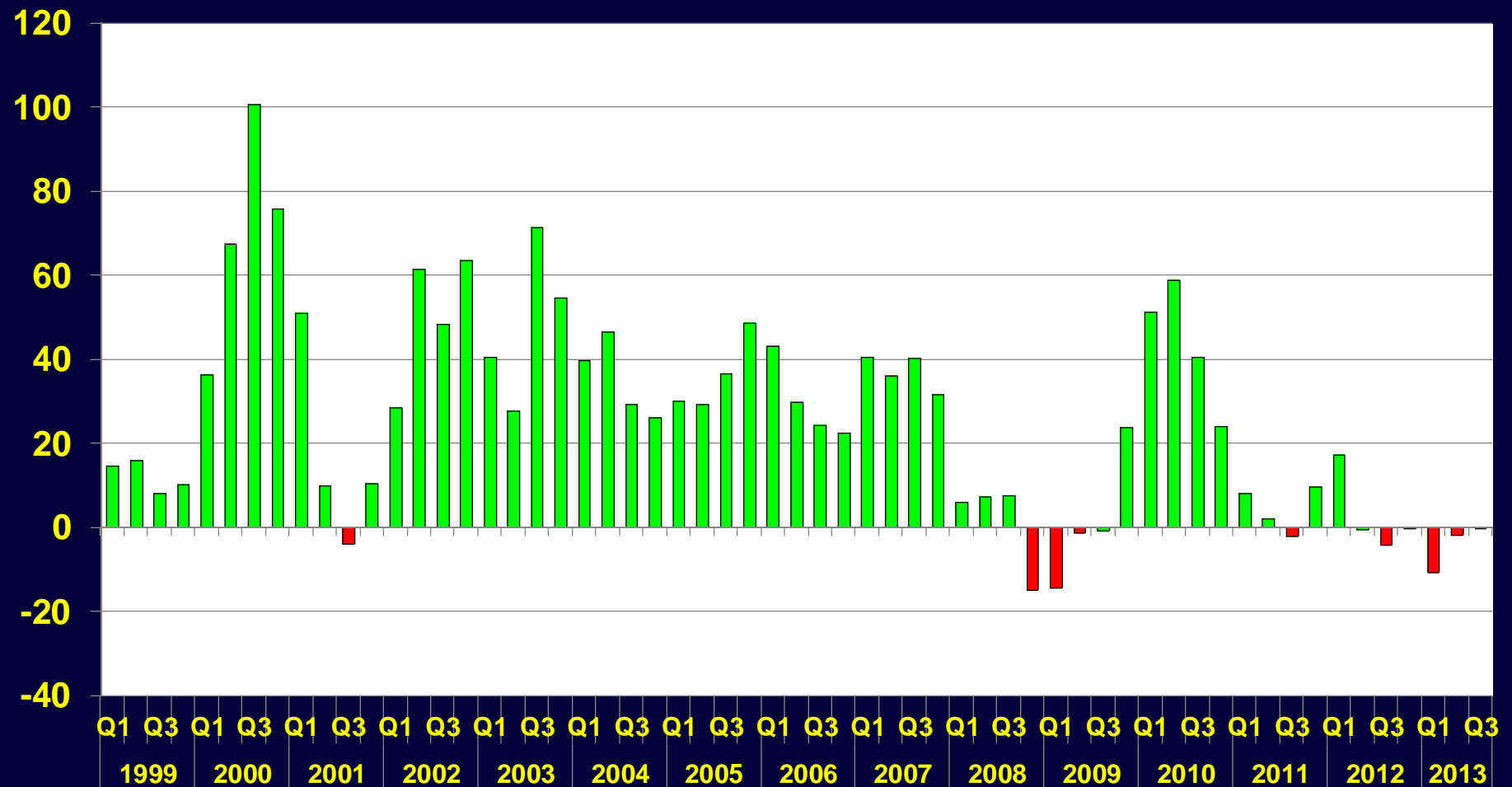
Asustek Computer, Chei Mei, Compal Electronics, Foxconn, Chimei Innolux, Inventec, Inventec Appliance, Lite On Technology, Mitac International, Quanta Computer, Wistron, Chei Mei Display replacing Chei Mei & Innolux Display 3/10 & later

20131010

# Large ODM Companies

## Composite of 10 Public Manufacturers

### Quarterly Revenue Growth



Asustek Computer, Compal Electronics, Foxconn, Chimei Innolux, Inventec, Inventec Appliance, Lite On Technology, Mitac International, Quanta Computer, Wistron

20131016

# European Loaded Electronic Board Production

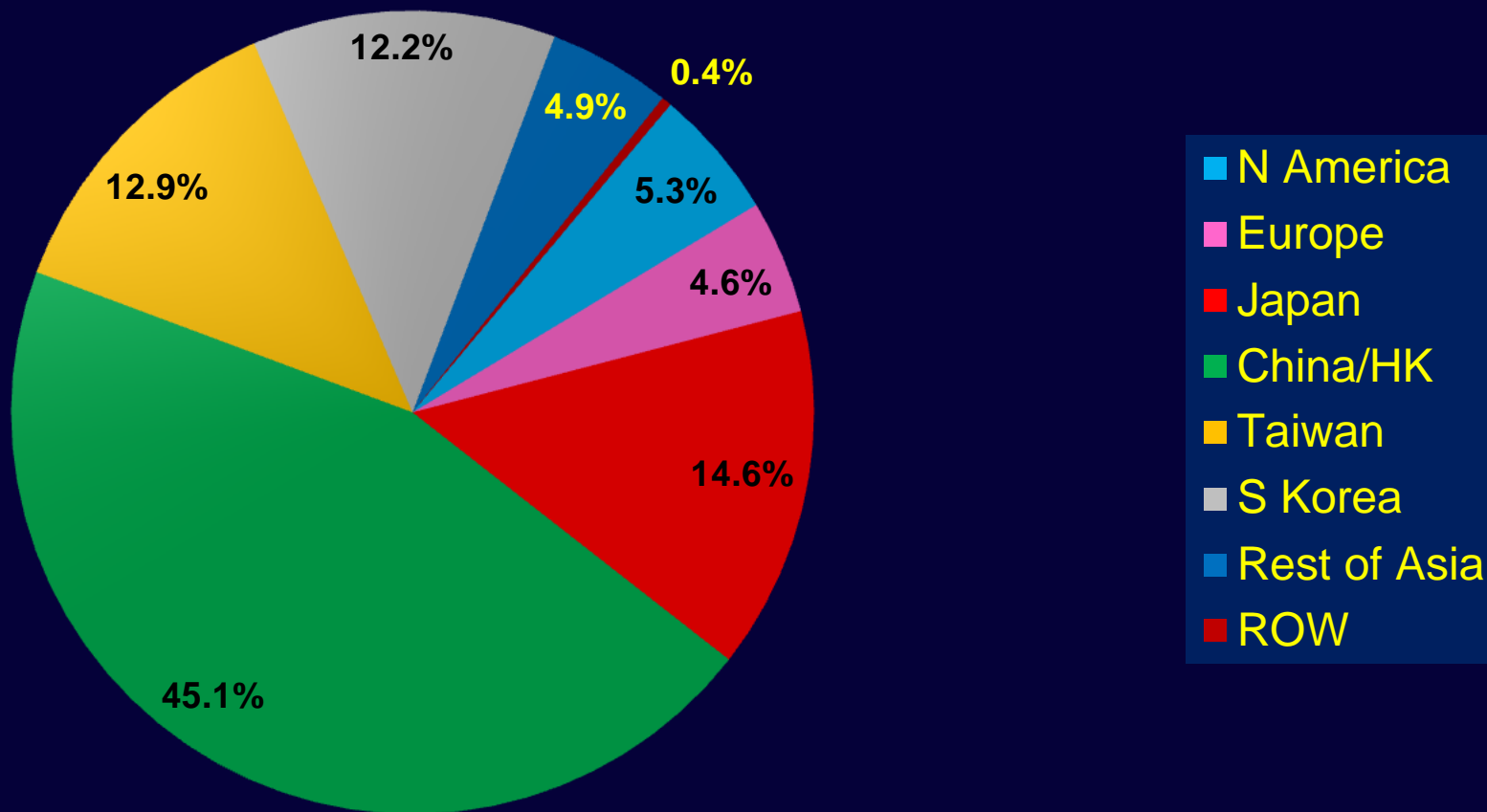


Eurostat, C2612

# **PCB Fabrication**

# 2012 World Rigid PCB Production by Geographical Area

(US\$ M @ Average 2012 Exchange)

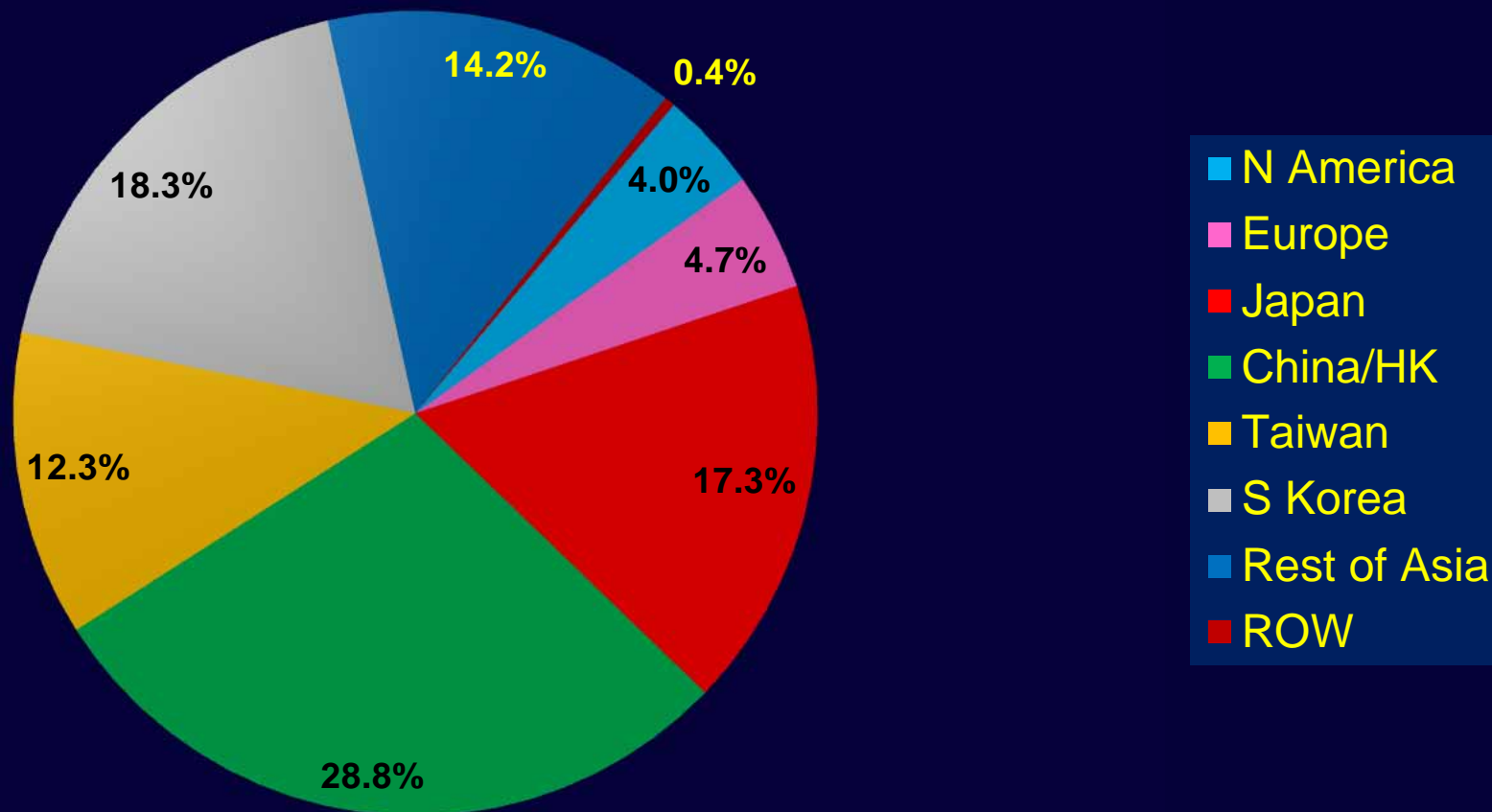


**Total: \$50.8 Billion**

20130831

# 2012 World Flex & Rigid Flex PCB Production by Geographical Area

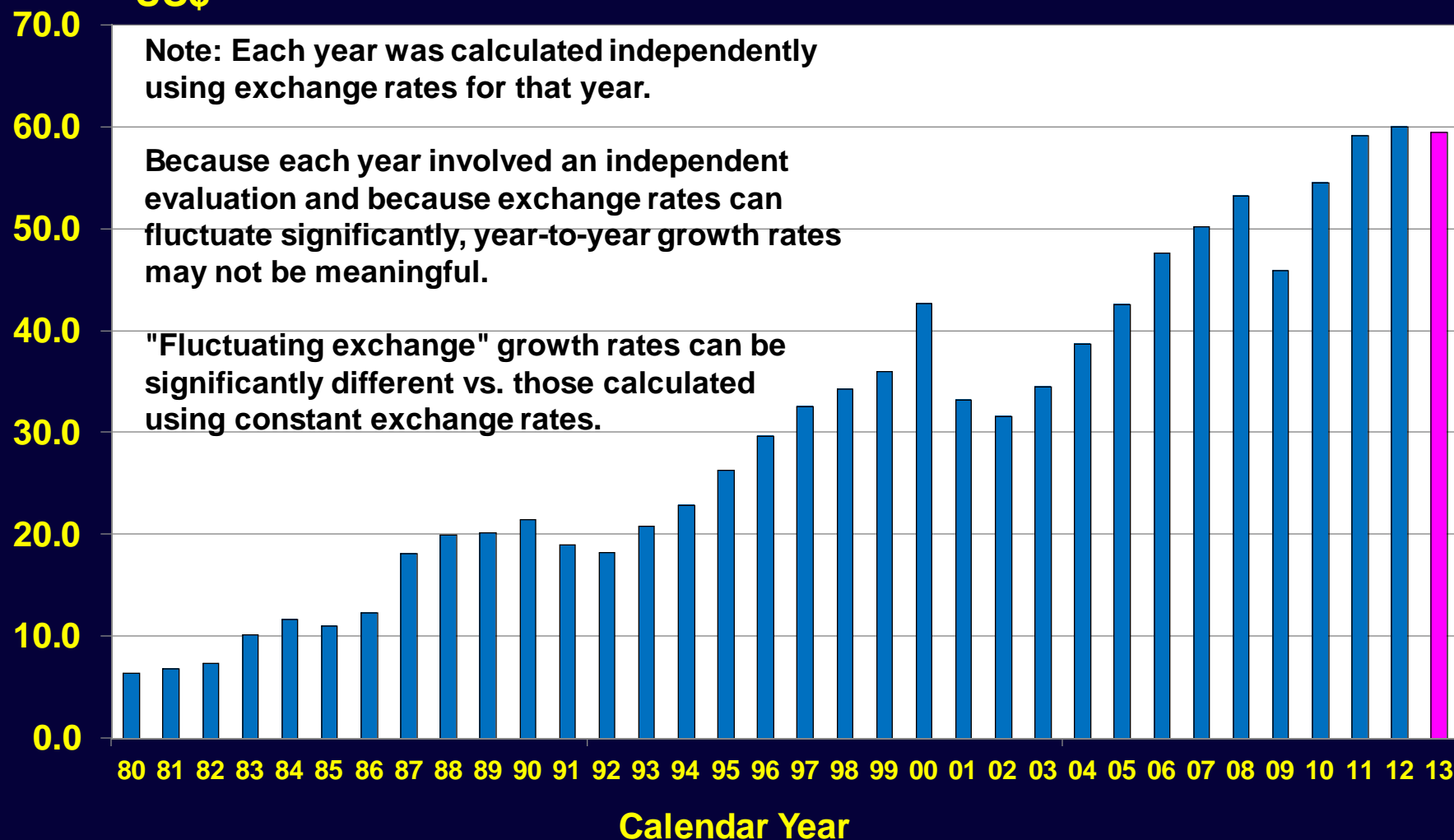
(US\$ M @ Average 2012 Exchange)



**Total: \$9.2 Billion**

# World PCB Production 1980-2012

US\$



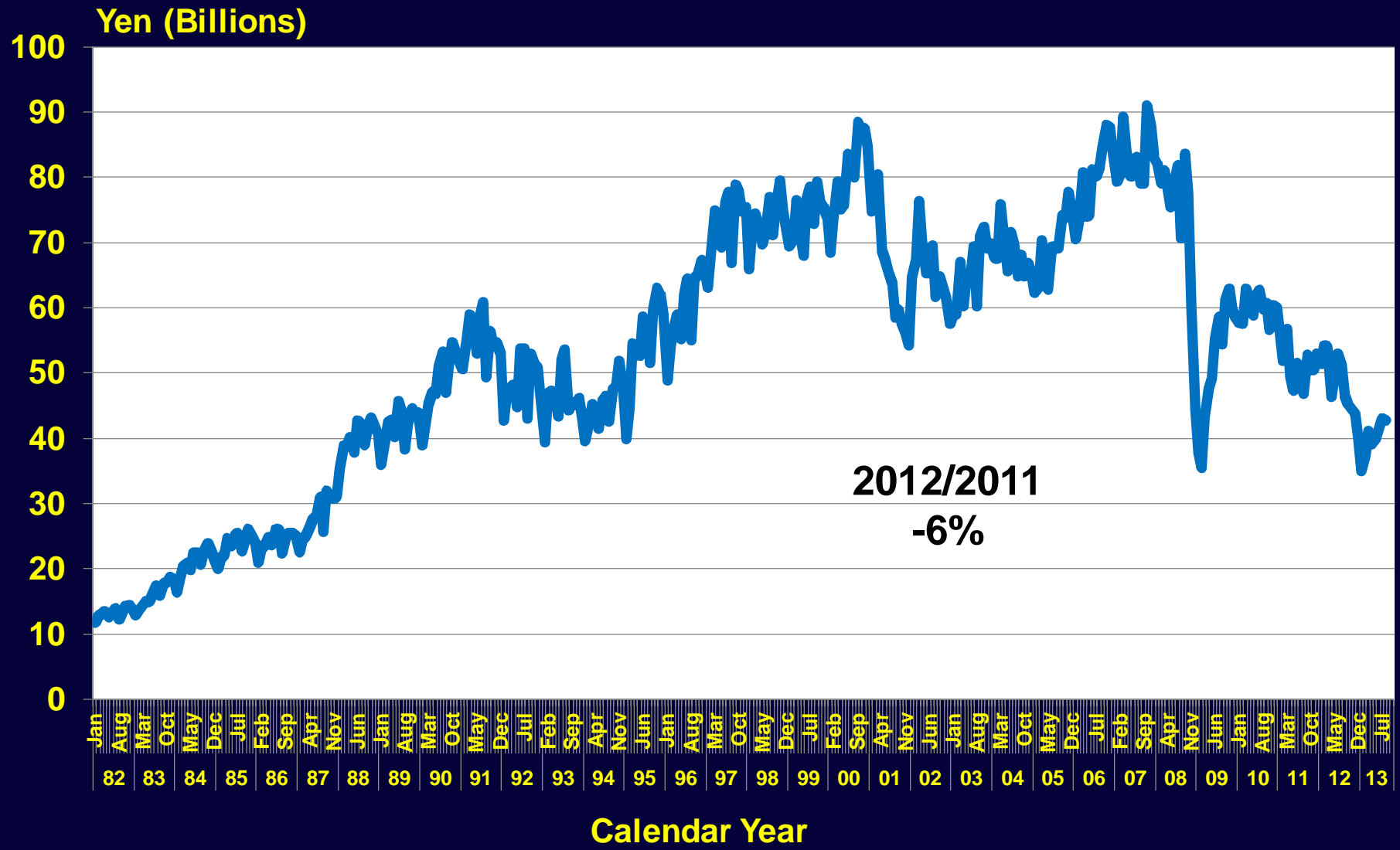


# World's Top PCB Companies - 2012

<u>Rank</u>	<u>Maker</u>	<u>Country</u>	<u>US\$M</u>
1	Nippon Mektron	Japan	2,888
2	Unmicron	Taiwan	2,383
3	SEMCO	Korea	2,002
4	Young Poong Group	Korea	2,000
5	Ibiden	Japan	1,924
6	Zhen Ding	Taiwan	1,512
7	Tripod	Taiwan	1,396
8	TTM Technologies	USA	1,310
9	Sumitomo Denko PC	Japan	1,219
10	Daeduck Group	Korea	1,147
11	HannStar Board (GBM)	Taiwan	1,112
12	Viasystems Group Inc	USA	1,080
13	Nanya PCB	Taiwan	1,007
14	Kingboard PCB Group	HK/China	935
15	CMK Corp	Japan	908
16	Shinko Electric	Japan	869
17	Mflex	USA	819
18	Kinsus (+Plotek)	Taiwan	788
19	Compeq	Taiwan	783
20	Meiko Electronics	Japan	759
21	TPT (Taiwan Techvest)	Taiwan	722
22	AT&S	Austria	698
23	Multek	USA	650
24	WUS Group	Taiwan	644
25	LG Innotek	Korea	600

20131026

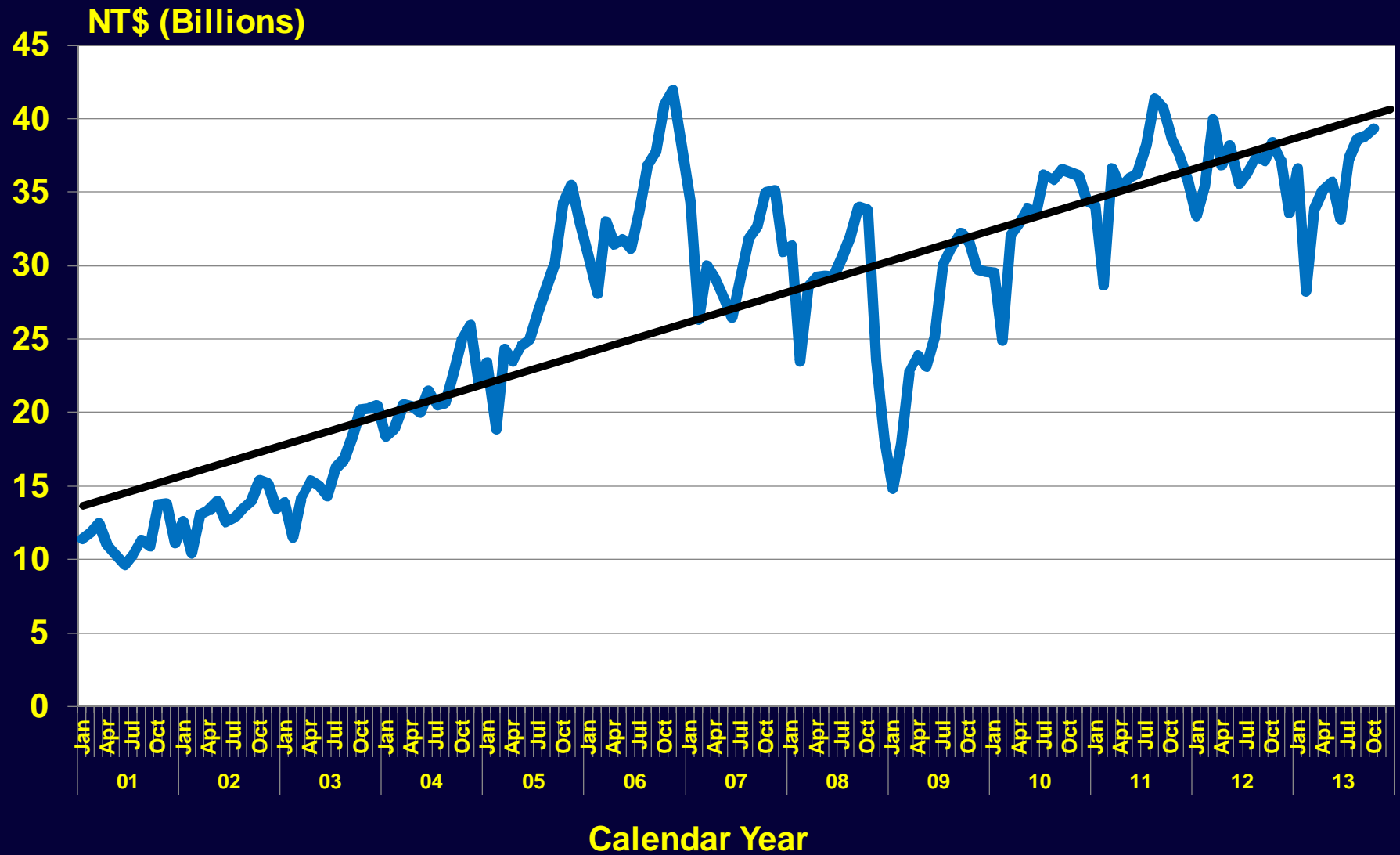
# Japan PCB Shipments



20131109

# Taiwan Rigid & Flex PCB Shipments

## Broad Composite of 46 Taiwan-listed Manufacturers



Company Financial Releases

20130921

## S. Korean Rigid & Flex PCB Shipments Composite of 11 Korea-listed Manufacturers

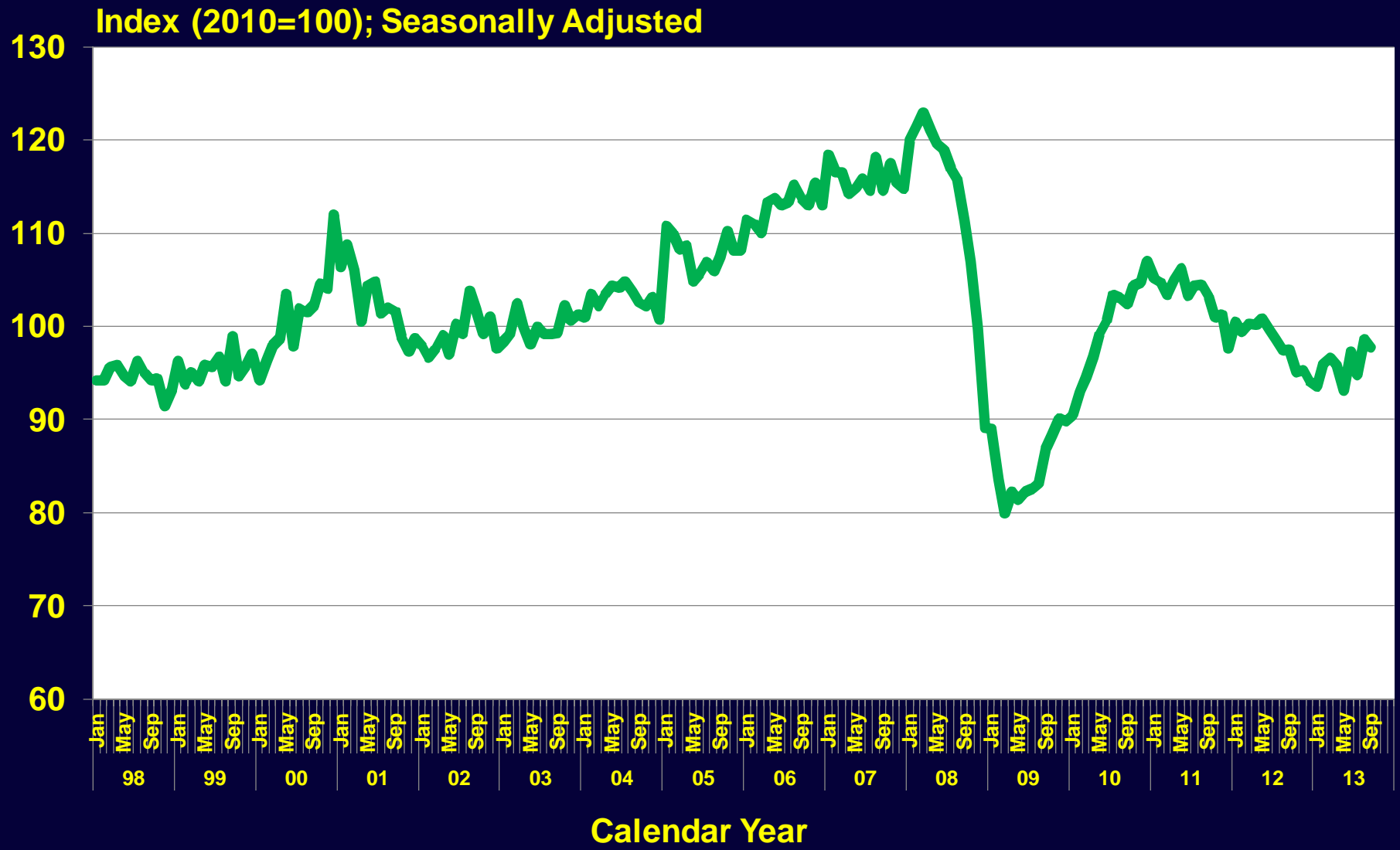


Calendar Year

Samsung EM, Samsung Techwin, Young Poong Grp, Daeduck Grp, LG Innotek, Simm Tech, Isu-Petasy, Flexcom, DAP, BH, Korea Circuit

20131113

# European Electronic Wiring Devices

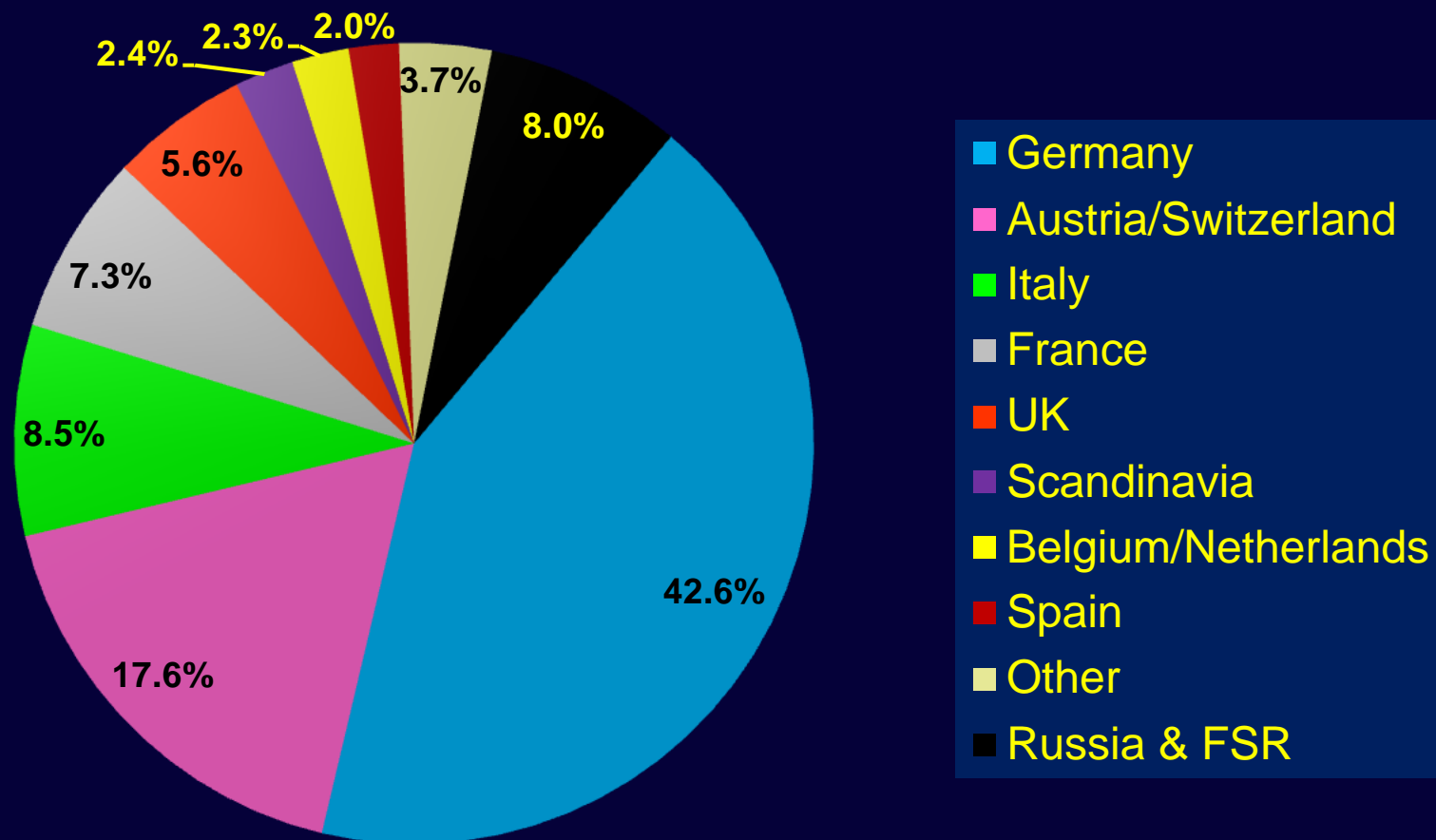


Eurostat

20131111

# 2013 European Rigid & Flex PCB Production

## Euros



**Total: Eur 1,878 Million**

M Gasch 11/13 + Custer estimate for Russia & FSR

# European PCB Production



20130127

# European PCB Market Comments

Depending which sector the European PCB manufacturers are supplying, they will either enjoy modest growth or suffer a decline. Industrial electronics, instrumentation and controls combine to make more than 40% of the European PCB revenues and their low lot sizes don't attract Asian manufacturers to compete.

The automotive segment is the second largest customer for PCBs but the bulk of the requirement is sourced in Asia. The remaining business in Europe is limited to NIP or EOL. For the European PCB shops it is decisive in which countries they find their customers.

The market demand for small to medium sized cars manufactured in UK, Italy, Spain or France is low; hence domestic suppliers will have a hard time. Better off are suppliers to premium car manufacturers.

Photovoltaic industry is no longer a major customer for European manufacturers and other segments were not able to replace this shortfall.

**Michael Gasch, Data4PCB 11/2013**



20130127

# European PCB Market Comments

German speaking countries (Austria, Switzerland, Germany) account for 2/3 of European PCB production. In 2012 four German speaking companies including PPC and six more in 2013 including Multek ended production. Lost revenues were about 21 and 78 million EUR respectively .

France gets 50% its PCB revenues from the defense and aeronautic/space industries. In UK these industries absorb over 1/3 of domestic PCB production. Reduced government budgets caused about 8% lower revenues for 2013 in France and a much higher reduction in UK Southern Europe:

Italy: Sales down perhaps 10% due to financial crisis and three plant closings.

Scandinavia should be about the same as 2012 . Aspocomp (the only large manufacturer) reduced its budget slightly.

Spain: One company closed, sales expected to be about 15% lower.

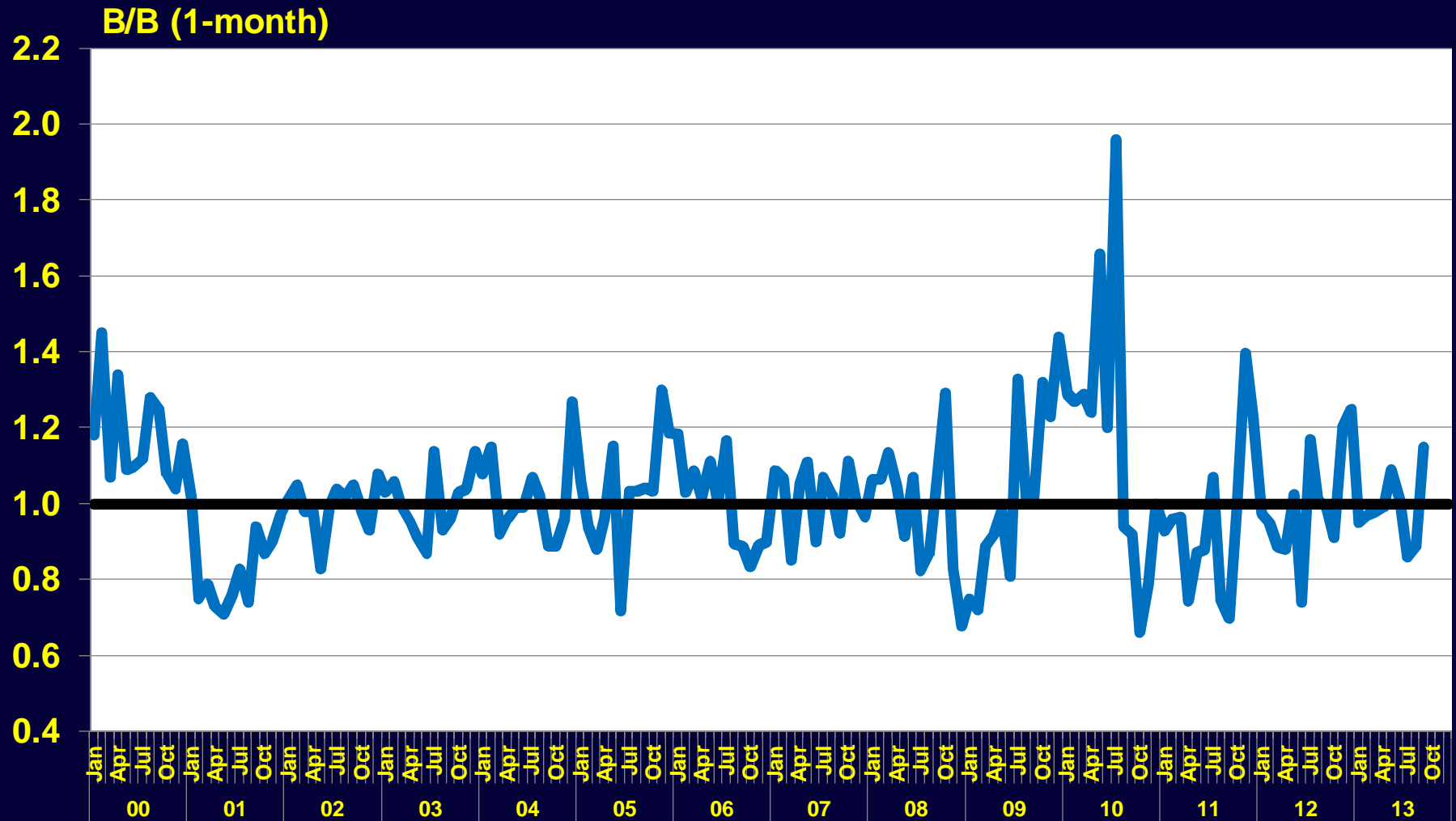
Central Europe: All manufacturers there report more or less a positive development, but facilities are small and usually are supplying their domestic markets only. Insofar business will be at least stable.

**Michael Gasch, Data4PCB 11/2013**

20131111

# PCB Book/Bill - VdL/ZVEI

## Primarily German PCB Makers



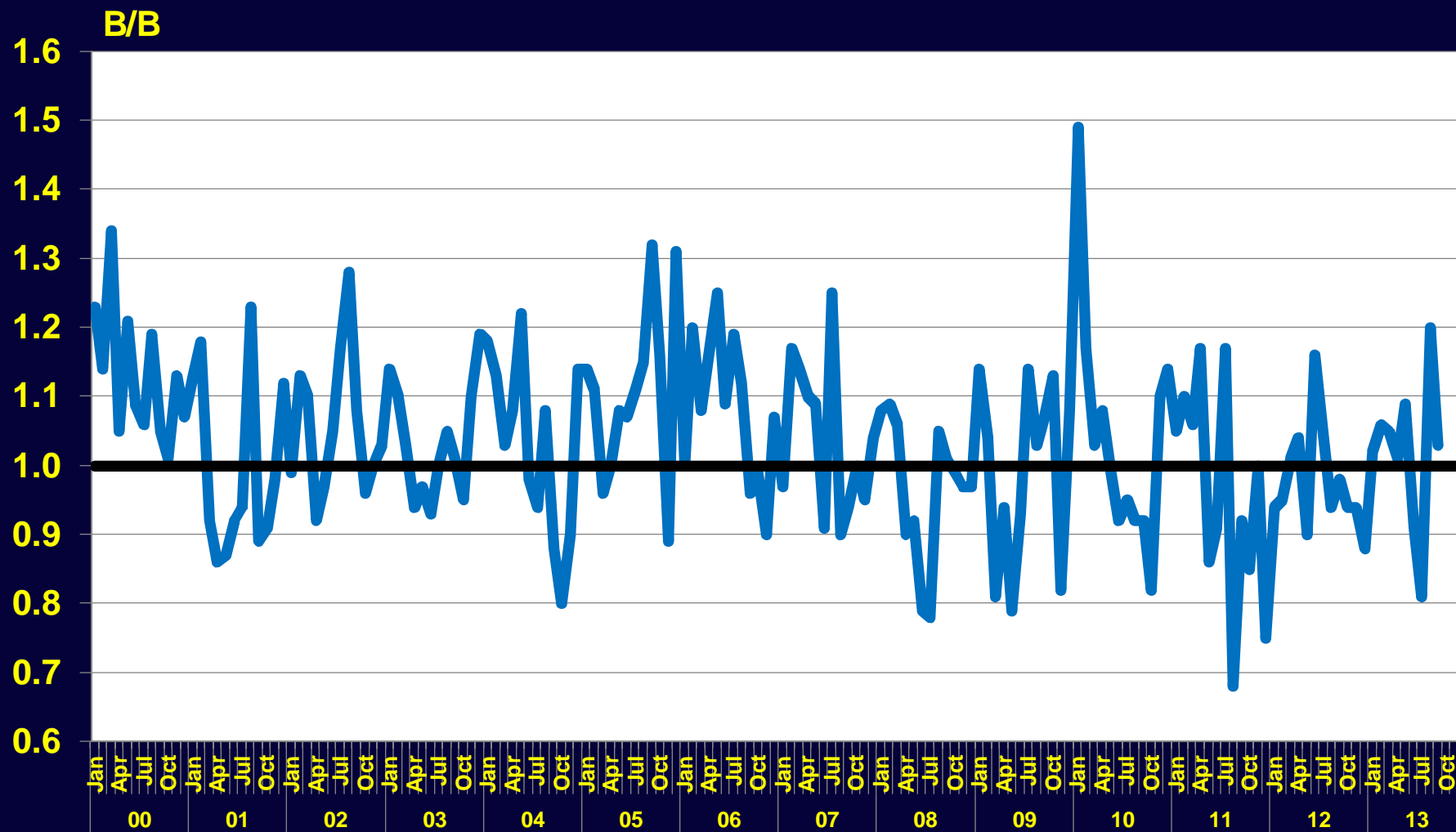
VdL/ZVEI

[www.zvei.de/fileadmin/user\\_upload/Presse/](http://www.zvei.de/fileadmin/user_upload/Presse/)

20131111

# PCB Book/Bill - ACSIEL

## French PCB Makers

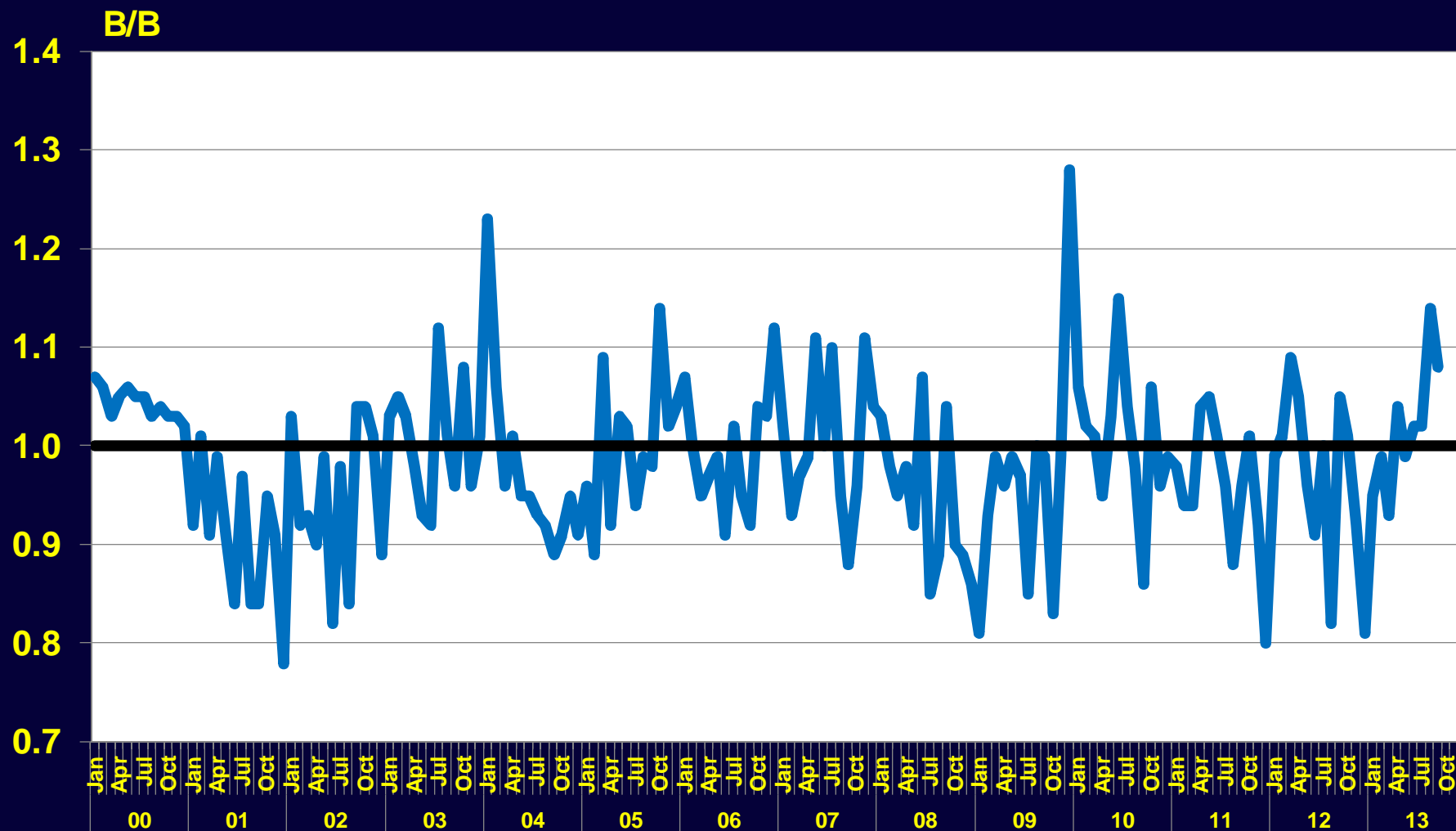


French producers, Industry Sources

20130819

# PCB Book/Bill - UK

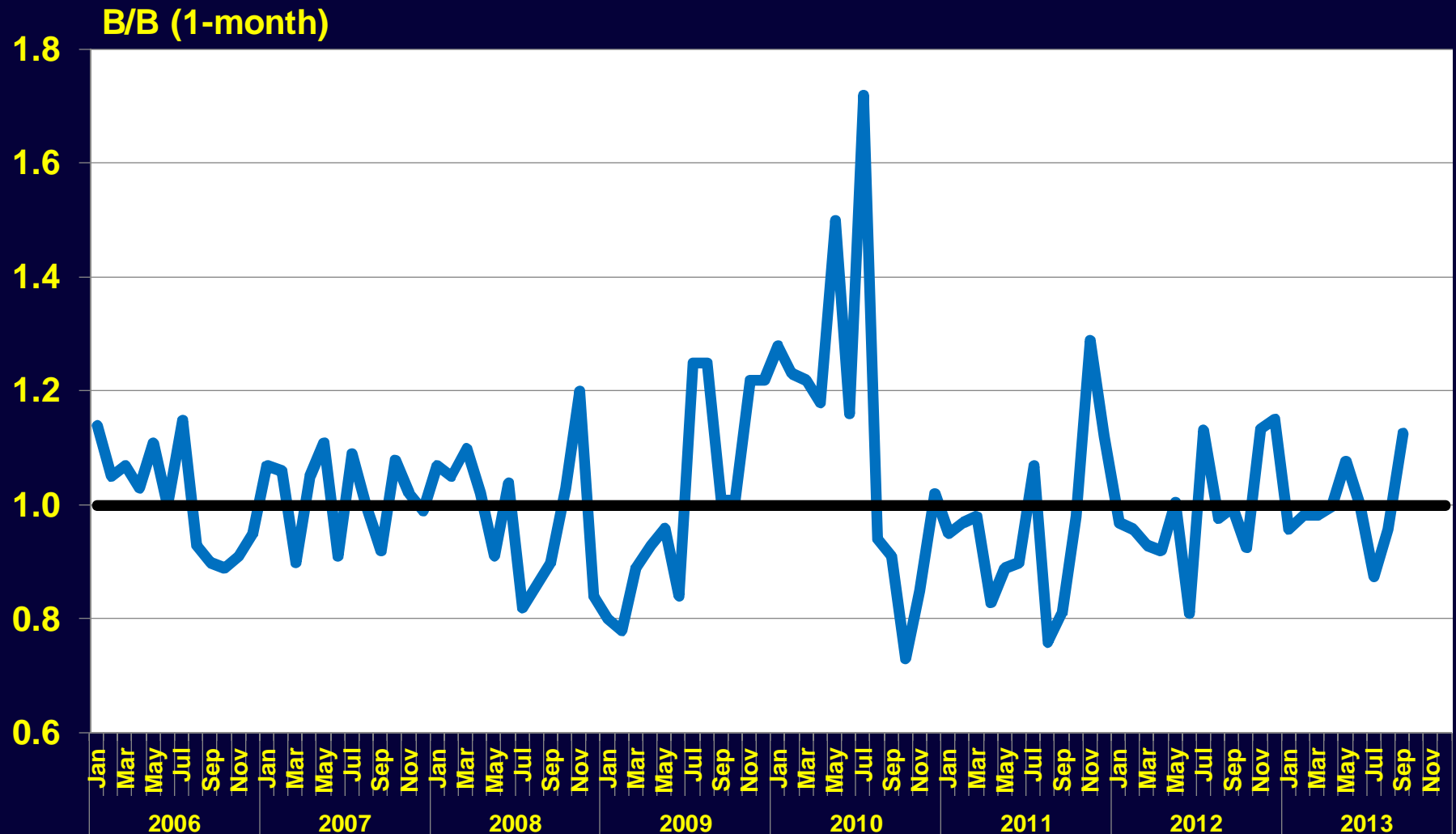
## UK PCB Makers



Industry Sources

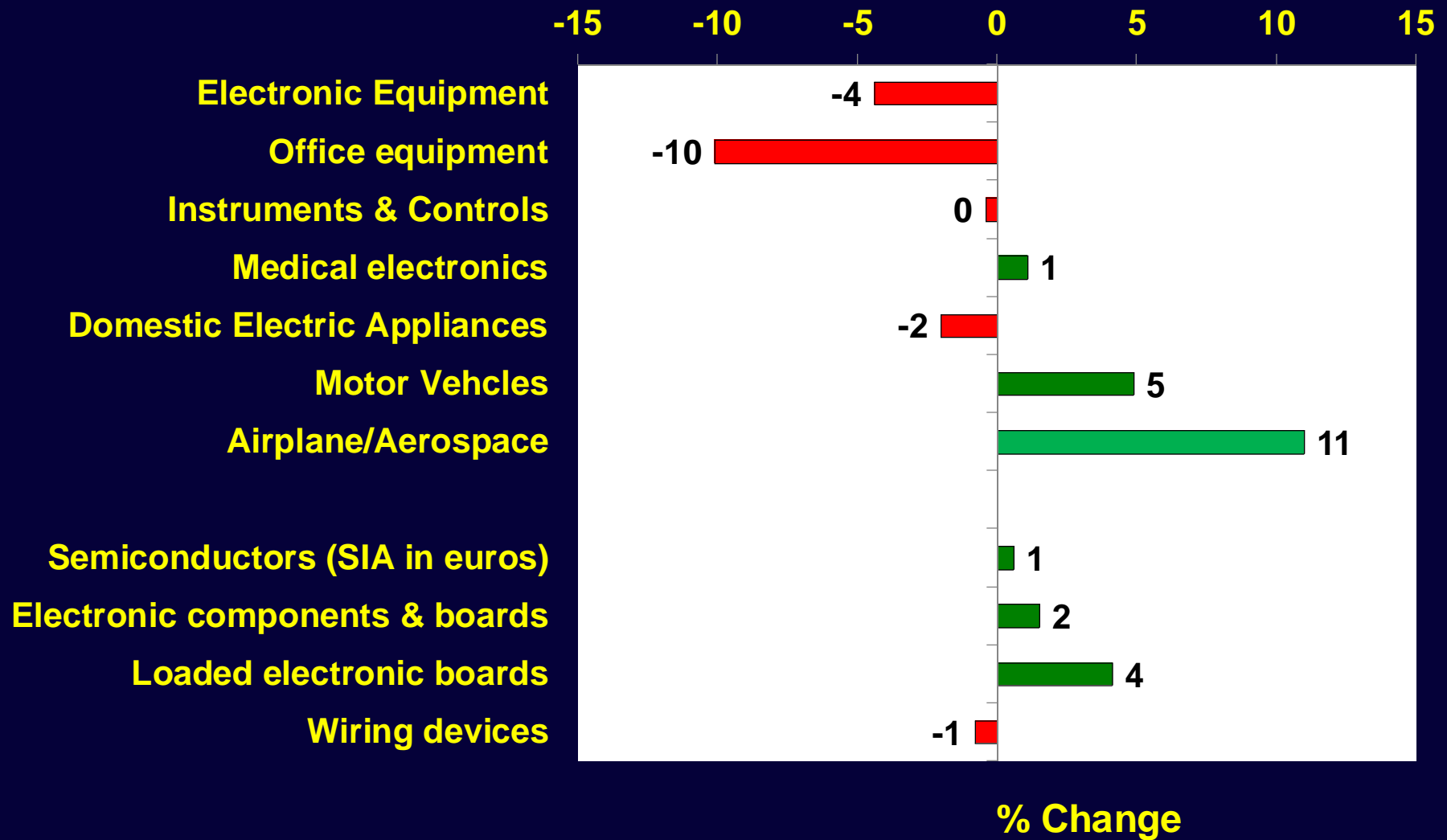
# PCB Book/Bill – Europe

Estimated from individual country data



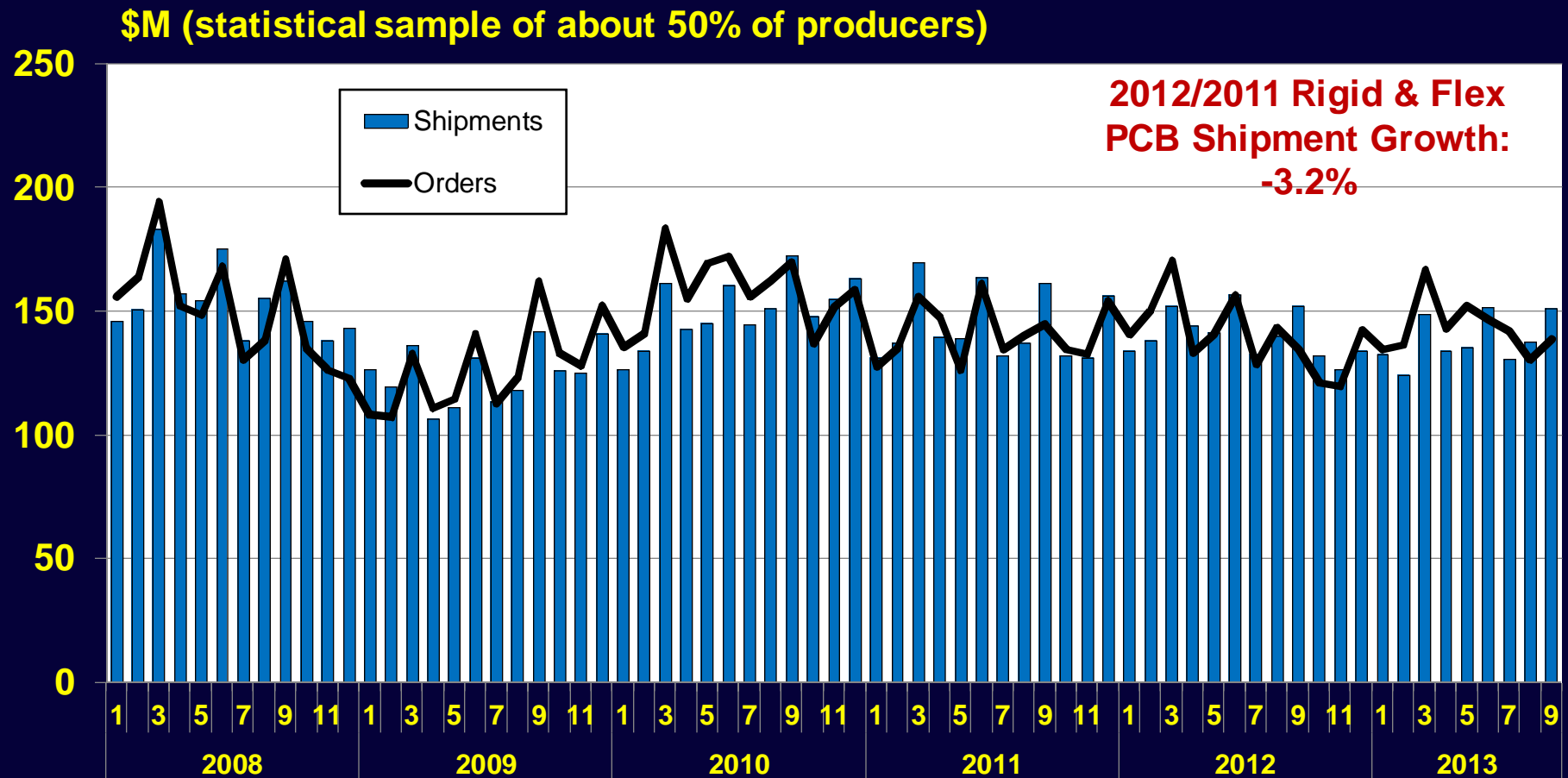
Weighted Average of Germany, Austria, Switzerland, France & UK using ZVEI, Gixel/ACSIEL & Intellect B/B and IPC world market country sales as weighting

# European Electronic Supply Chain Growth 3Q'13 vs. 3Q'12



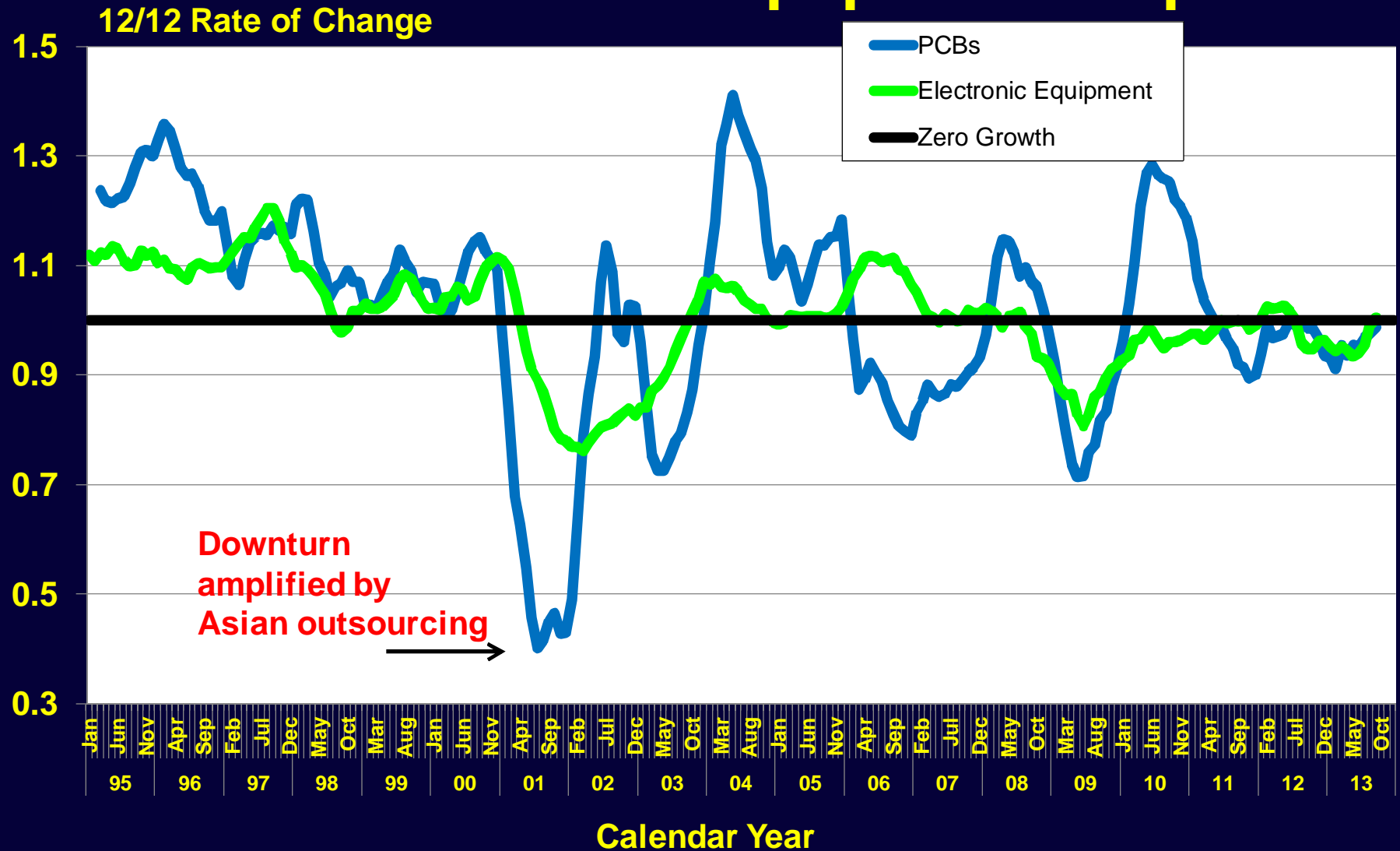
Euro denominated growth rates; Eurostat, SIA & Custer Consulting Group

# N American Rigid & Flexible PCB Shipments & Orders



Note: IPC survey captures "market" not domestic production. About 15% of the above represents imported boards resold by N American PCB producers in survey.

# N American Rigid & Flex PCB vs. US Electronic Equipment Shipments



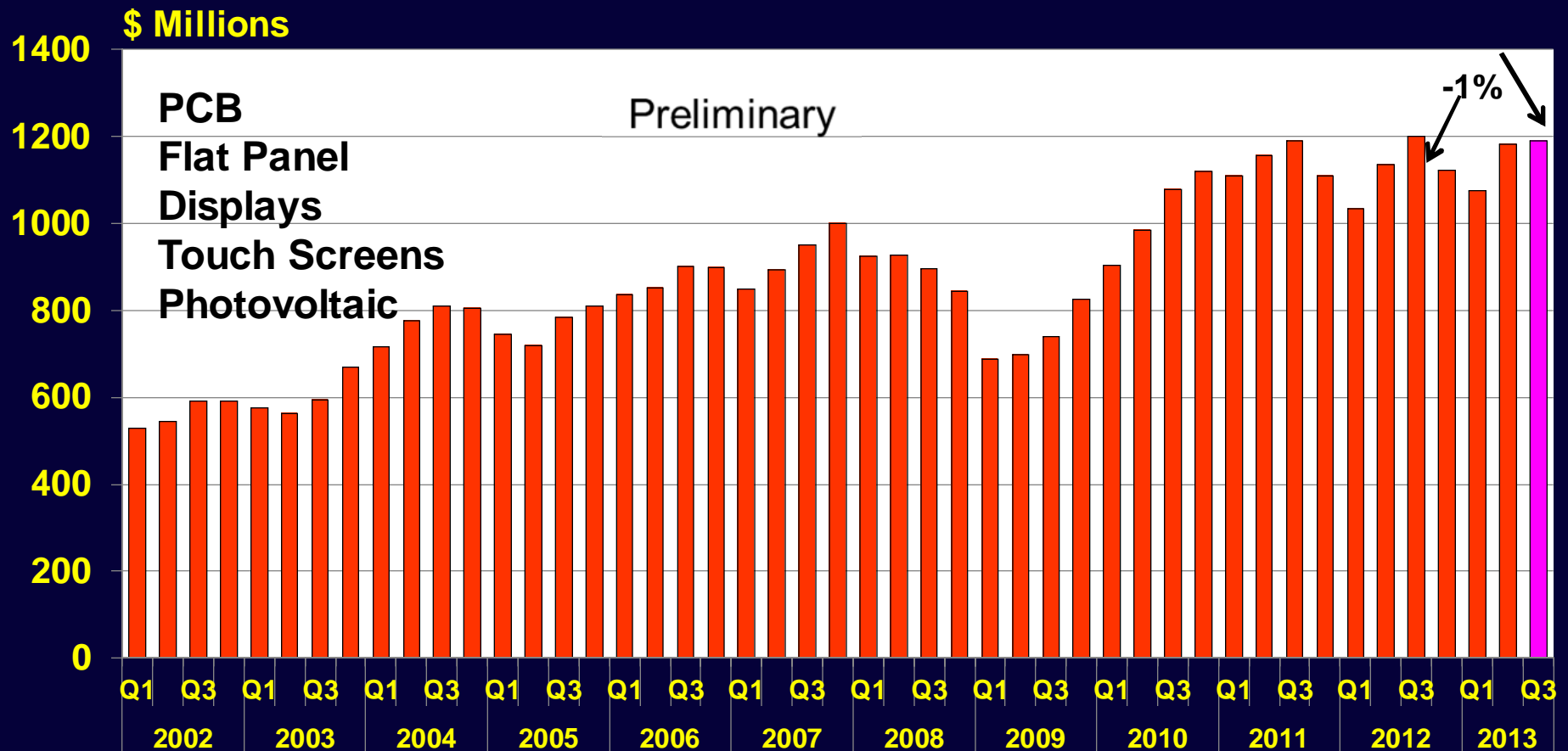
Data: IPC T/MRC & U.S. DOC



# **Process Equipment, Laminate & Materials Suppliers**

# Process Equipment Related Suppliers Composite of 9 Companies Revenue

20131108

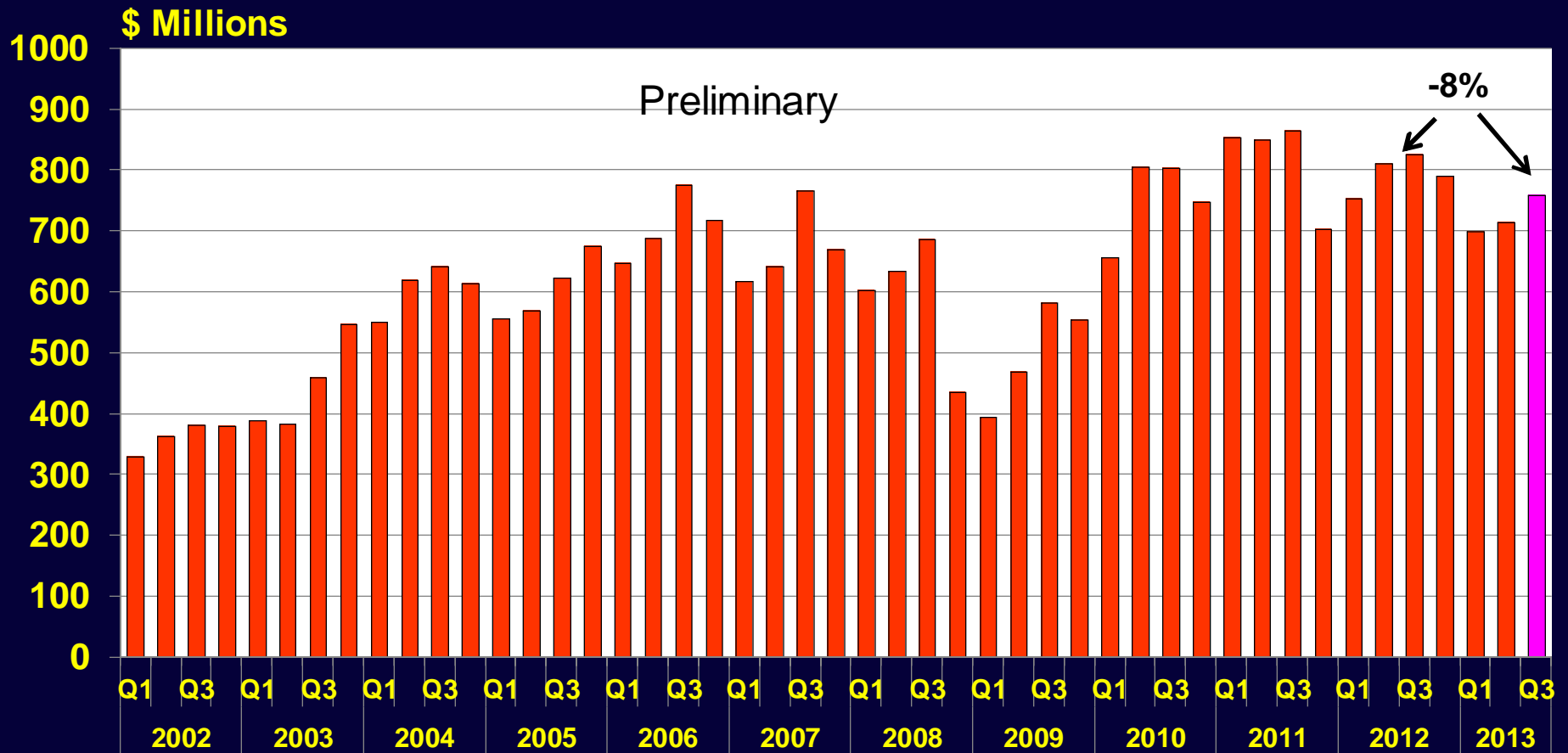


C-Sun, Tailing Technology, Camtek, ESI, GSI Group, Orbotech, Mentor Graphics, Nordson, Coherent

# Rigid & Flex Laminate Suppliers

## Composite of 13 Companies

### Revenue



Arisawa, Arlon Electronic Materials, Elite Materials, Hwa Woei, Iteq, Microcosm, Park Electrochemical, Rogers, Shinemore, Taiflex, Thinflex, Top Union, Uniplus

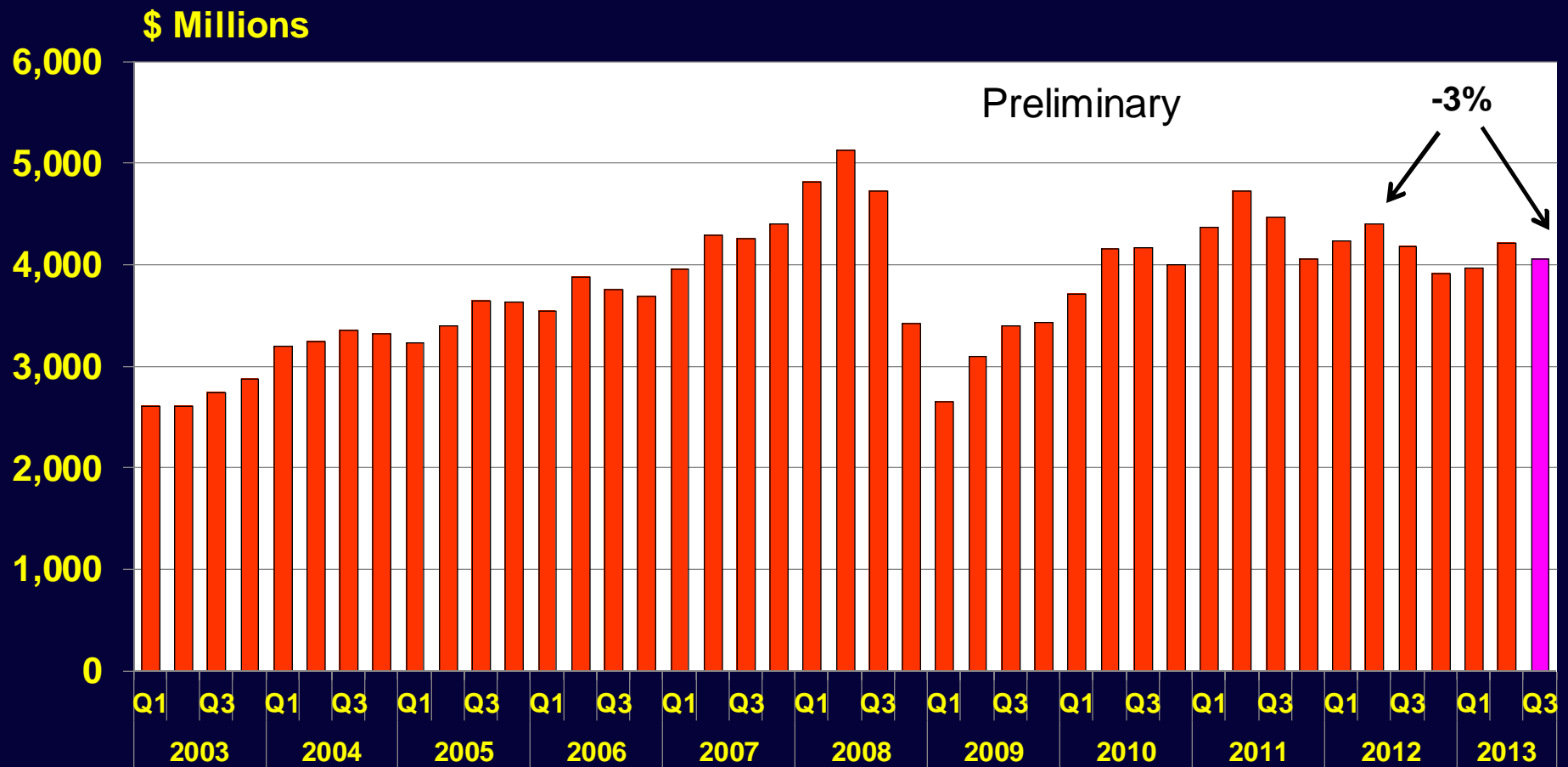
NT\$ converted at fluctuating exchange

# Material Suppliers (excluding laminate)

## Composite of 14 Companies

20131108

### Revenue



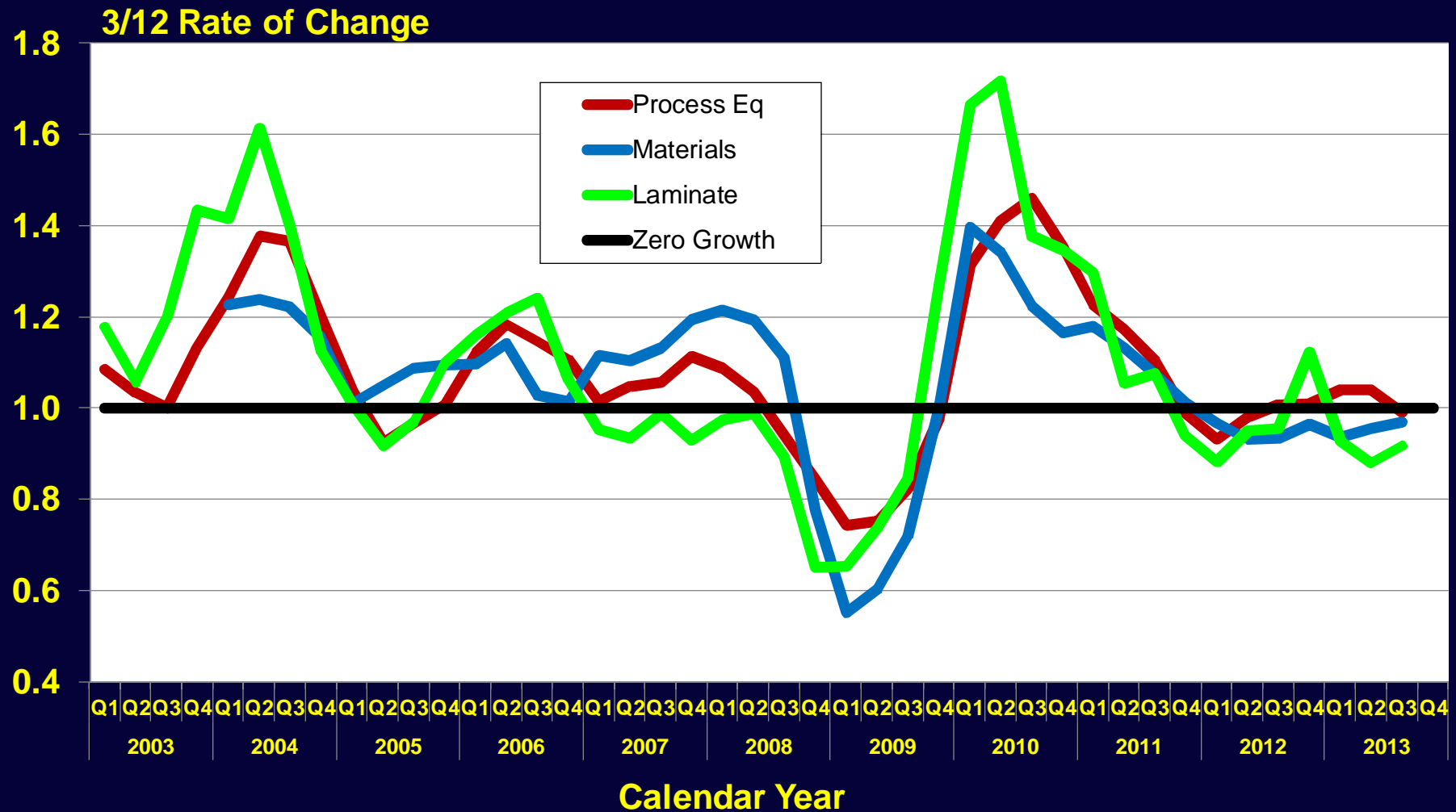
Momentive, OM Group, Taiwan Glass, Baotech, Glotech, Shenmao, Wahlee, Topoint, Cabot Micro, Chemtura, Cookson Elec, Eternal Chemical, Hexcel, Chang Wah

NT\$ & GBP converted to US\$ at fluctuating exchange

20131108

# Global Growth Rates

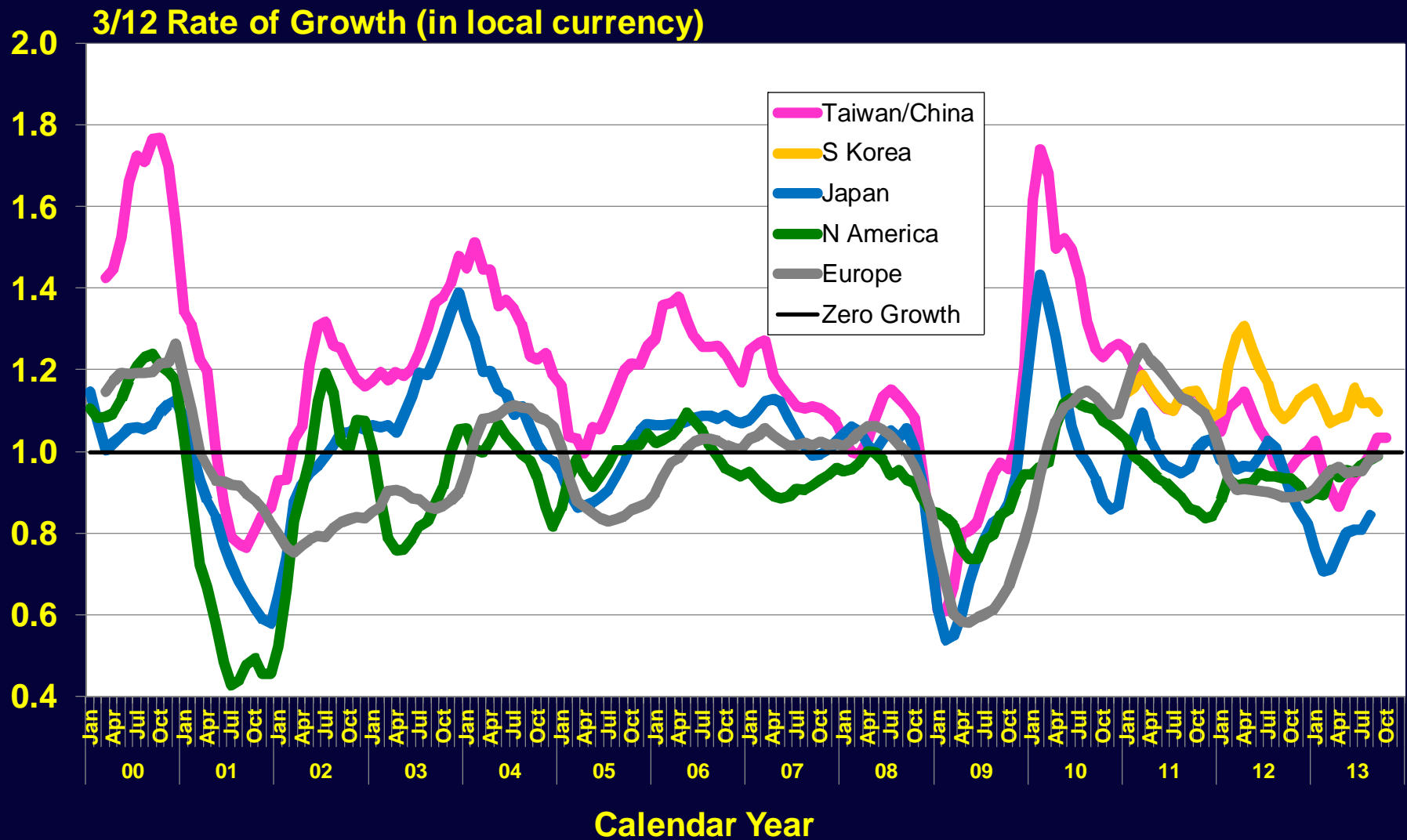
## Process Equipment, Materials & Laminate



Company Financials of 12 Laminate suppliers, 13 material suppliers & 8 Process Equipment Suppliers

# World PCB Model

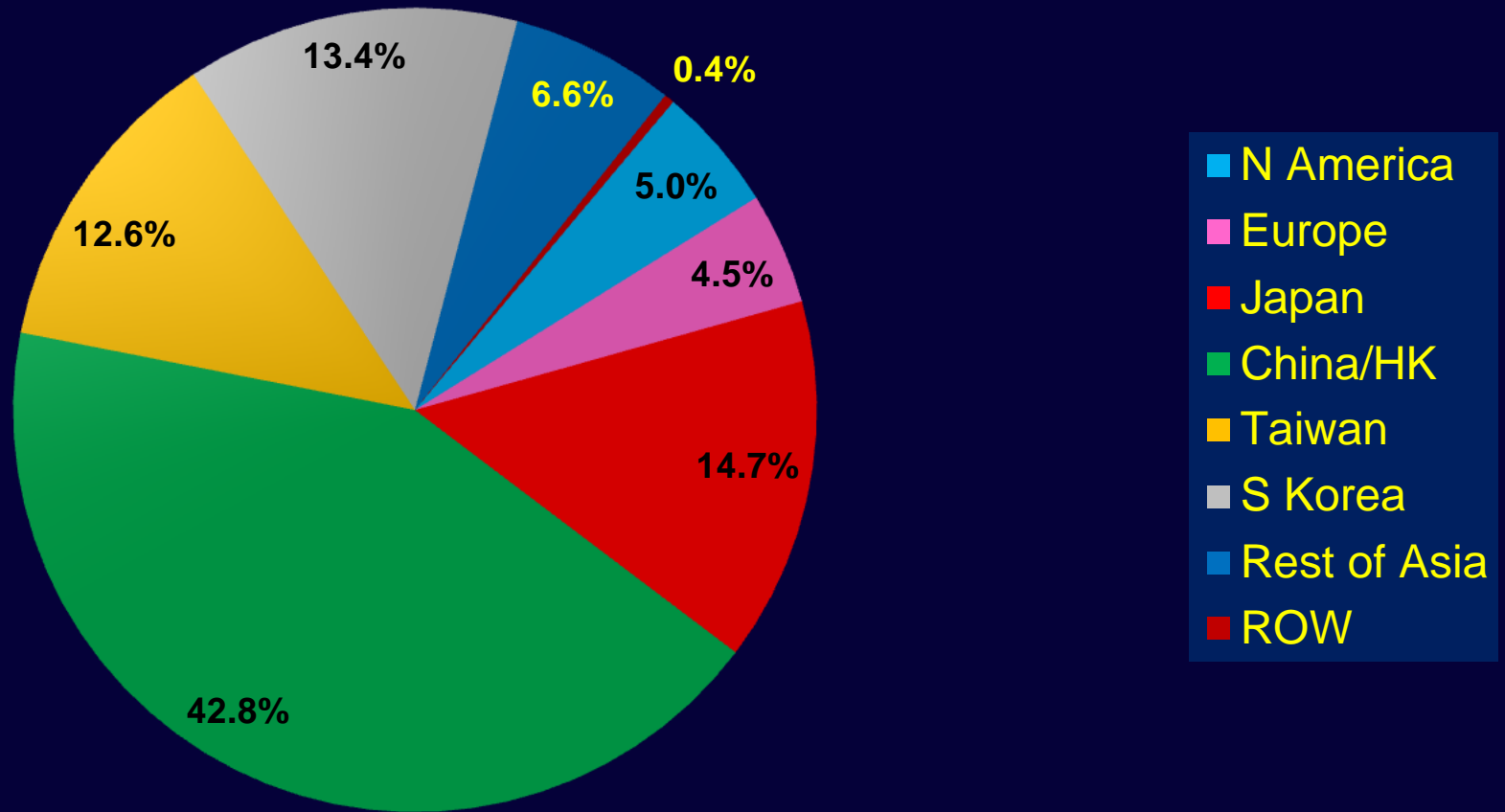
# Regional PCB Shipment Growth



Sources: IPC, JPCA, Taiwan/China composite; Eurostat "wiring devices" for Europe

# 2012 World PCB Production by Region

(US\$ M @ Average 2012 Exchange)



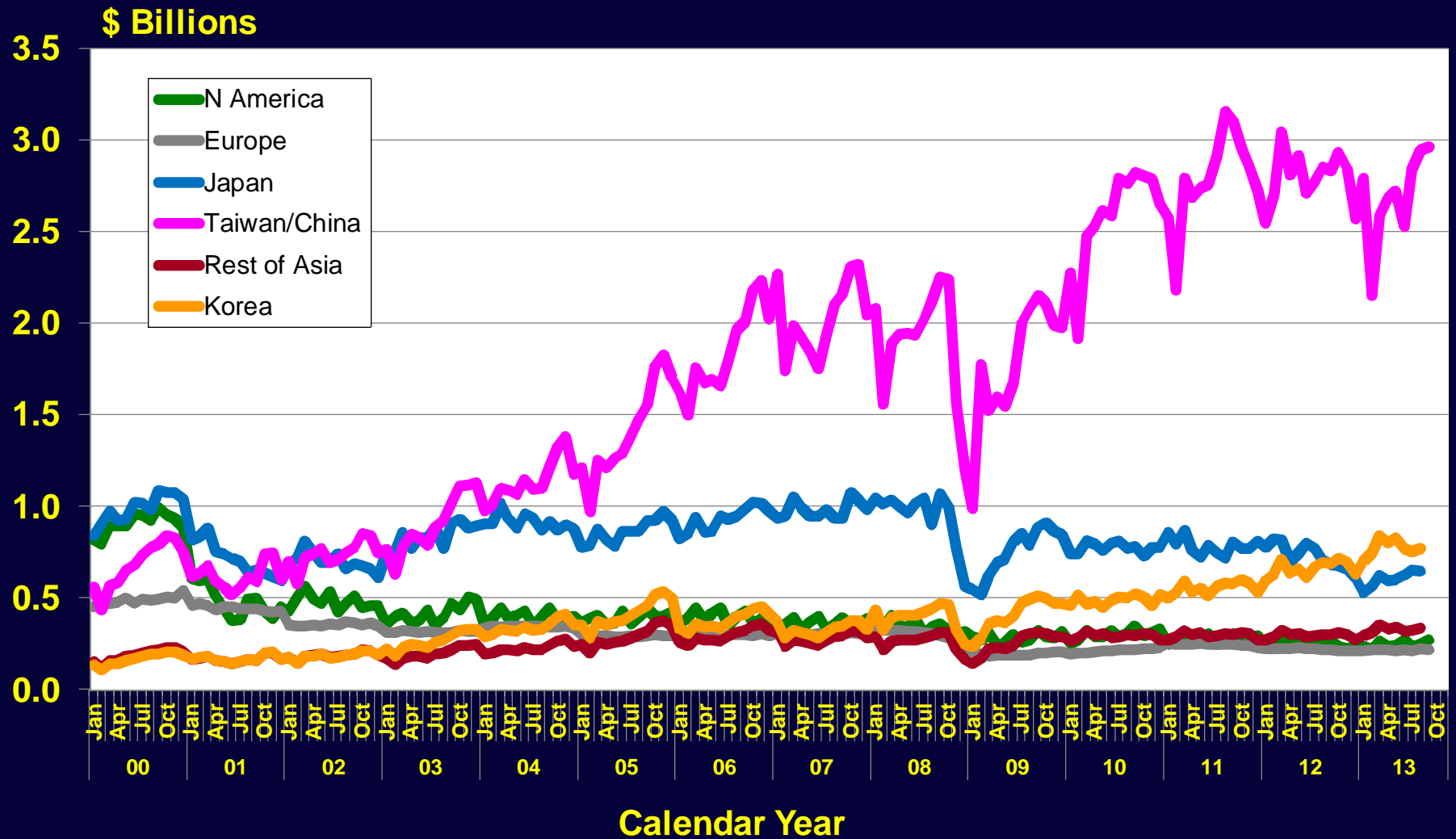
**Total: \$60.0 Billion**



20131113

# World PCB Monthly Shipments

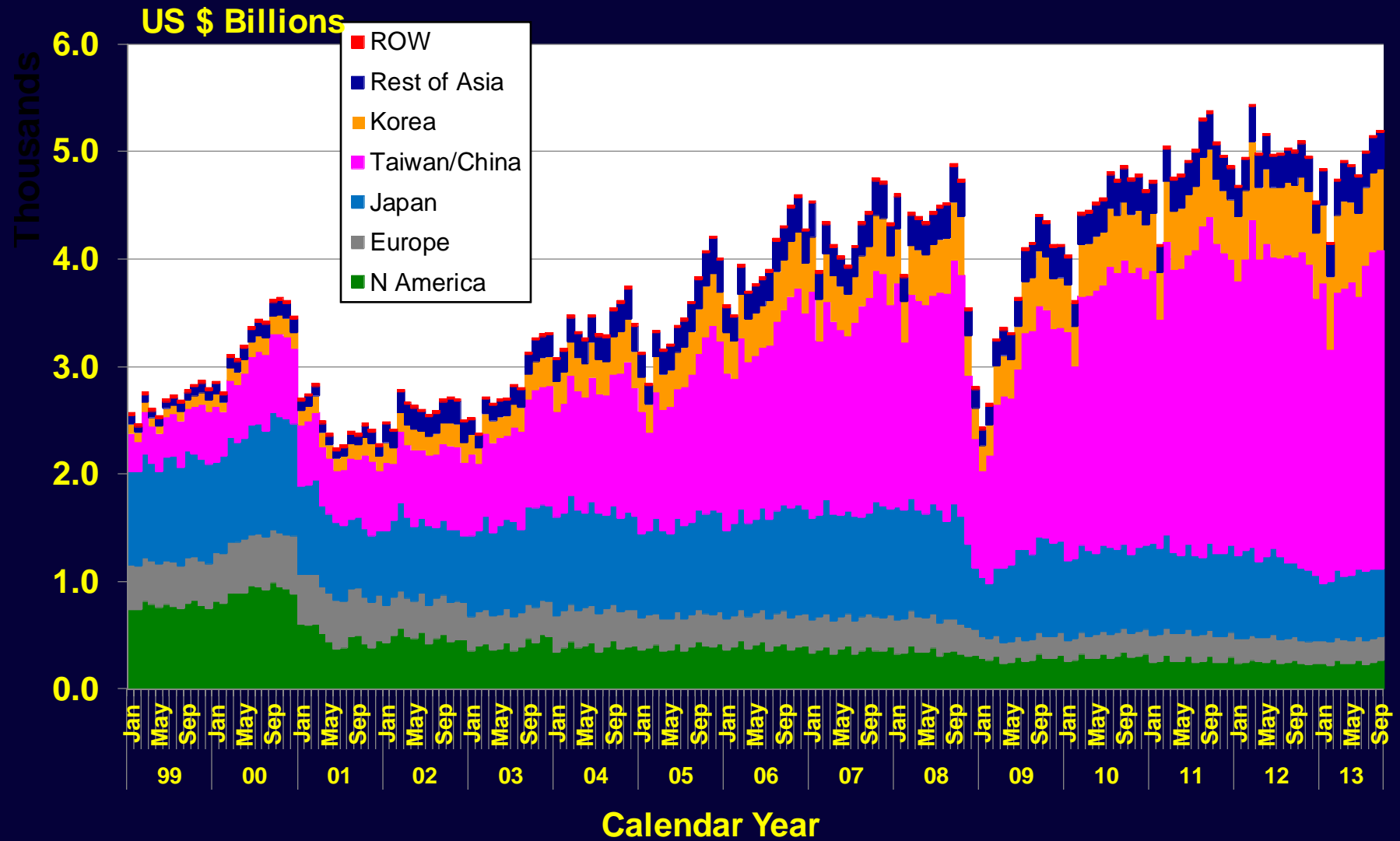
## Converted @ Fluctuating Exchange Rates



Source: Custer Consulting Group

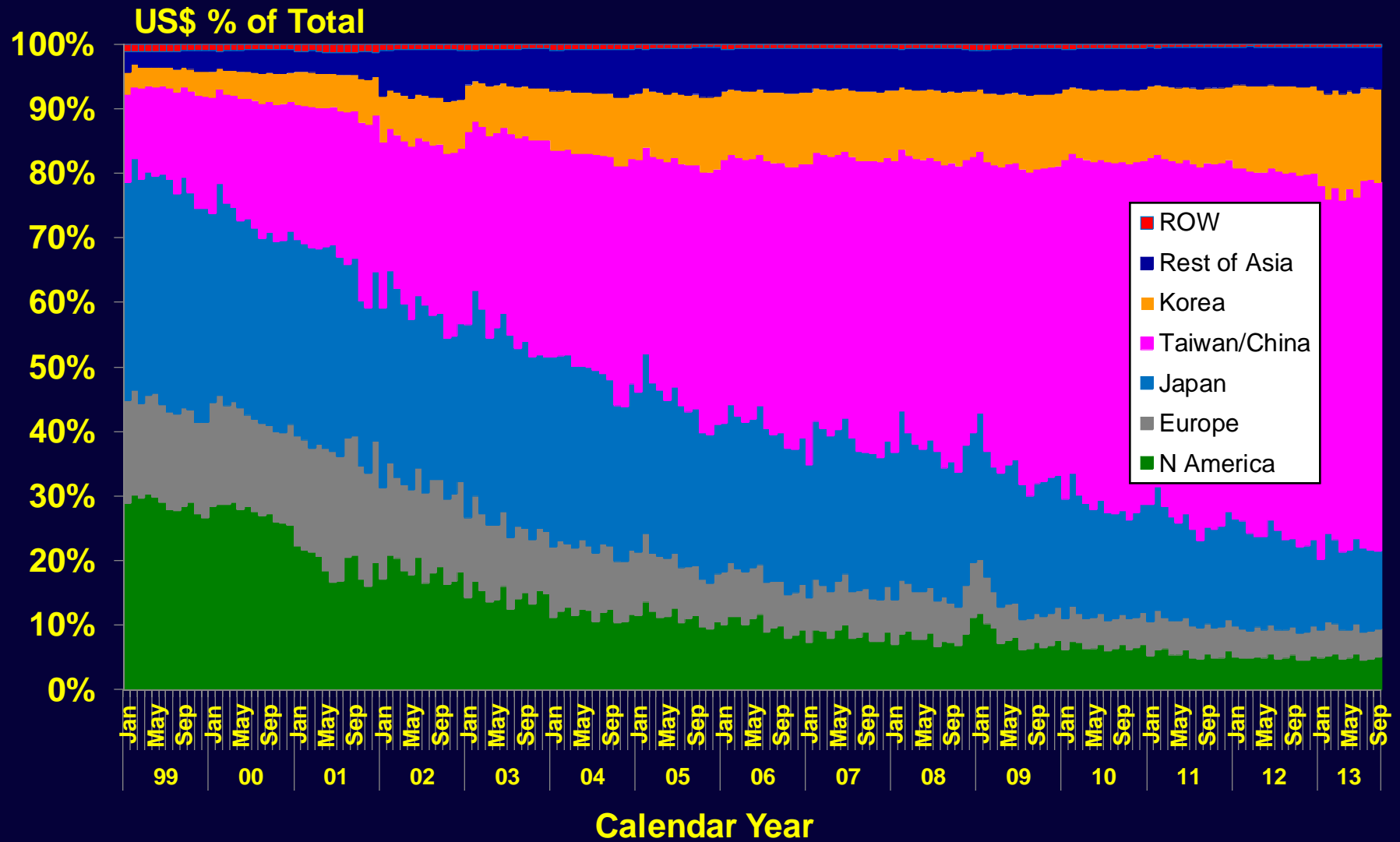
# World PCB Monthly Shipments

## Converted @ Fluctuating Exchange Rates



Source: Custer Consulting Group

# World PCB Monthly Shipments Converted @ Fluctuating Exchange Rates

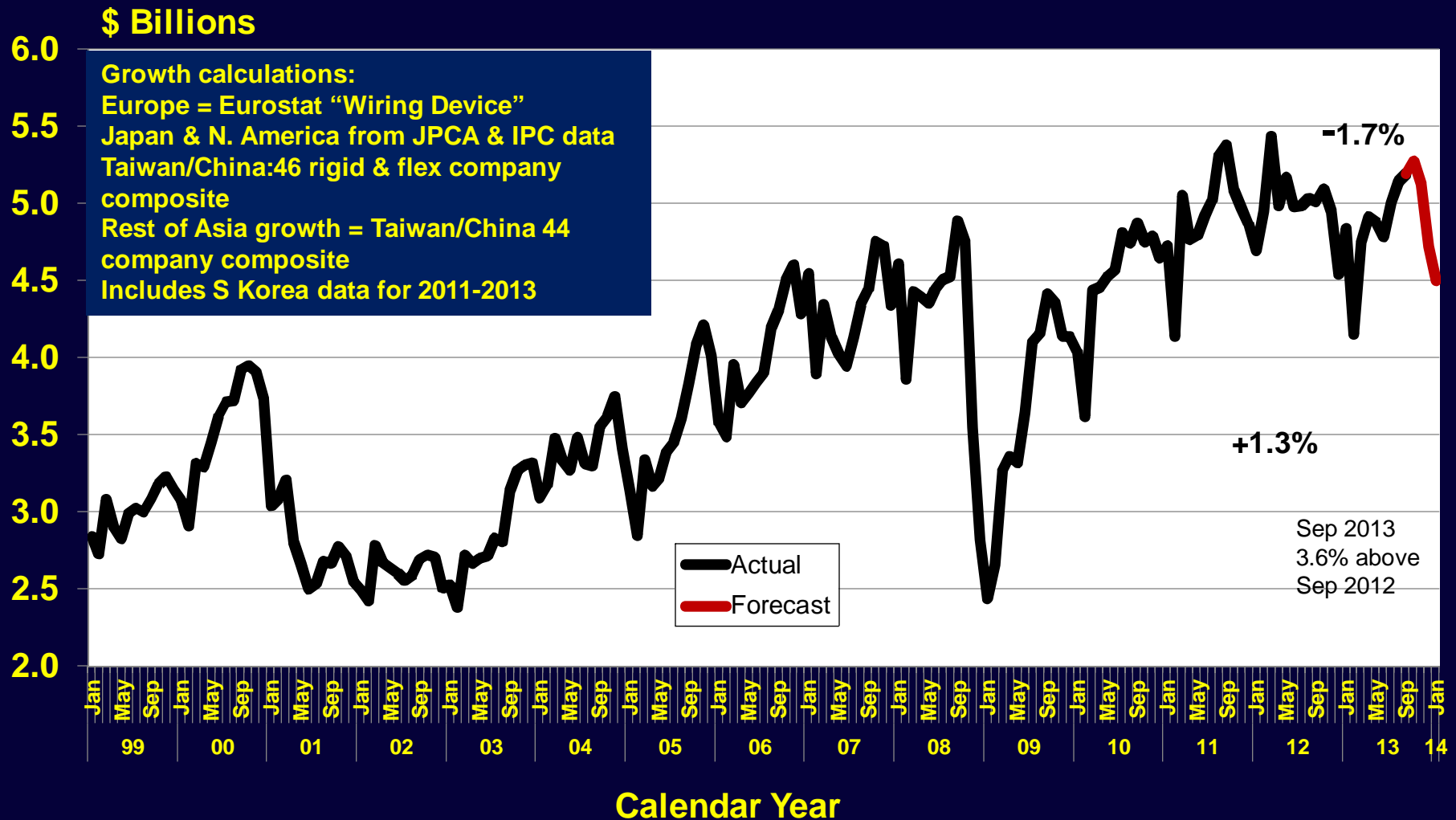


Source: Custer Consulting Group

20131106

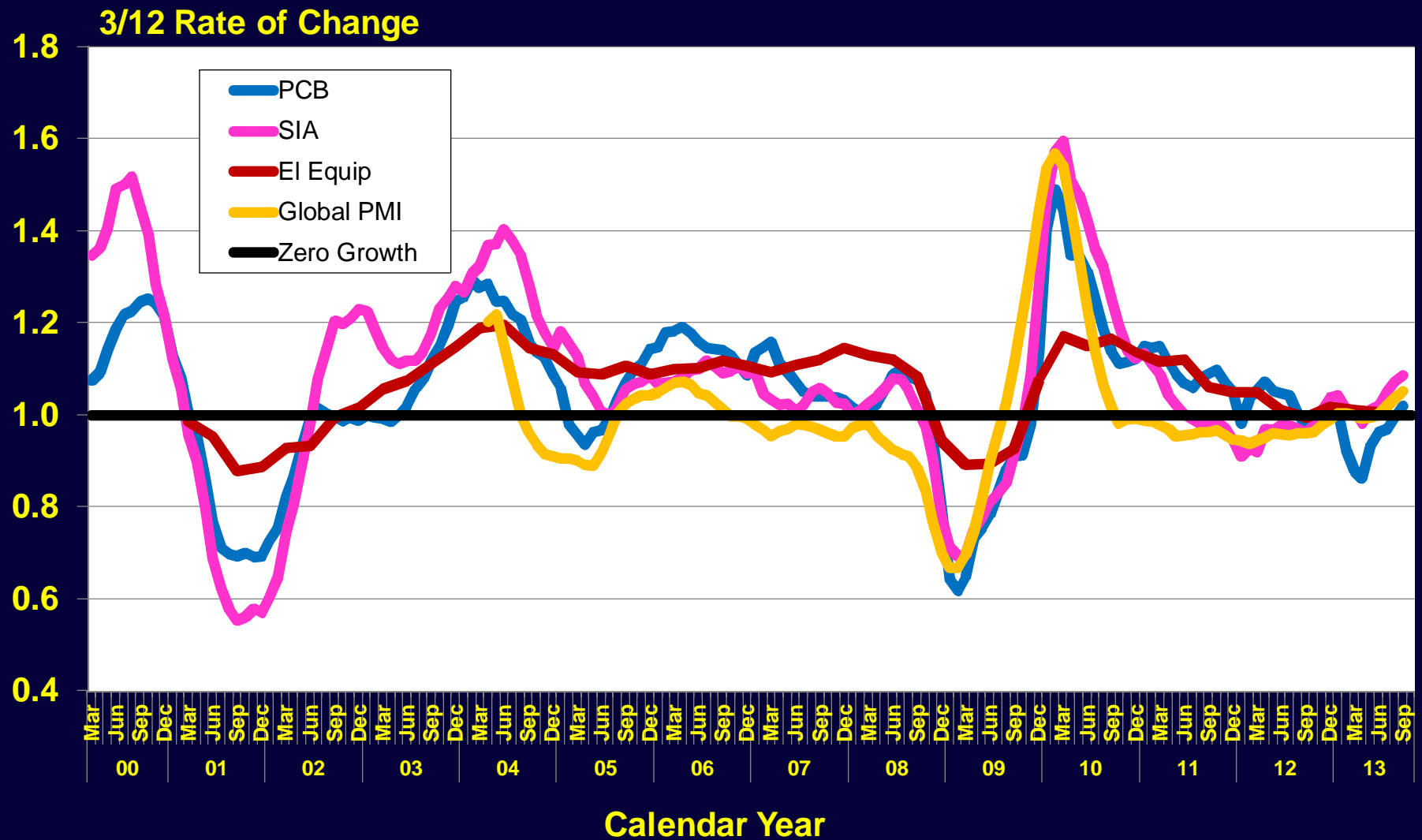
# World PCB Shipments (with forecast)

## Converted @ Fluctuating Exchange Rates



Source: Custer Consulting Group - 2010 base year expanded by monthly growth of N. American, European, Japanese & Taiwan/China monthly PCB shipments

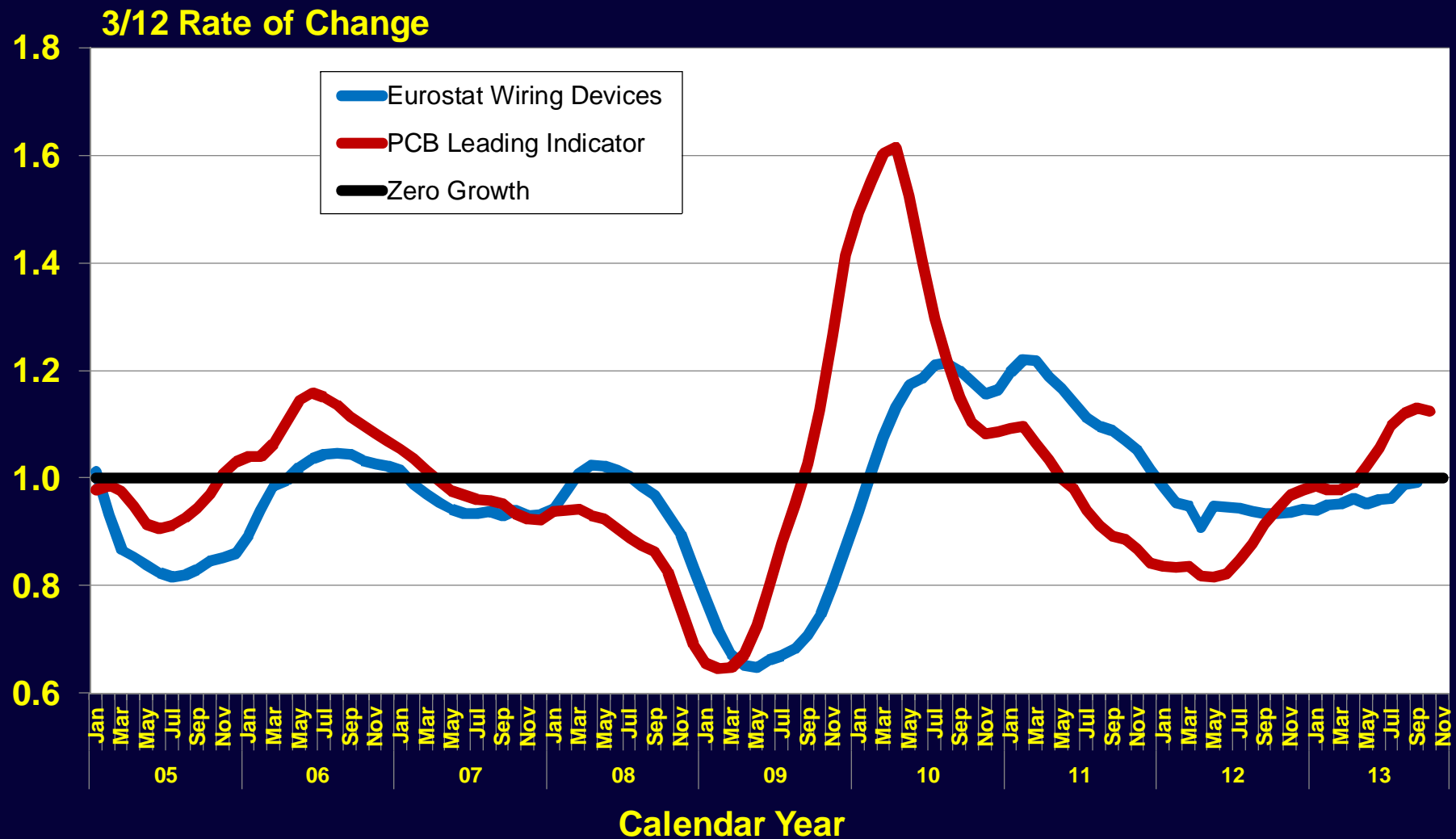
# Global PMI, Electronic Equipment, PCB & Semiconductor Shipments



Source: Custer Consulting Group

20131106

# Europe PMI Leading Indicator vs. Europe Wiring Devices

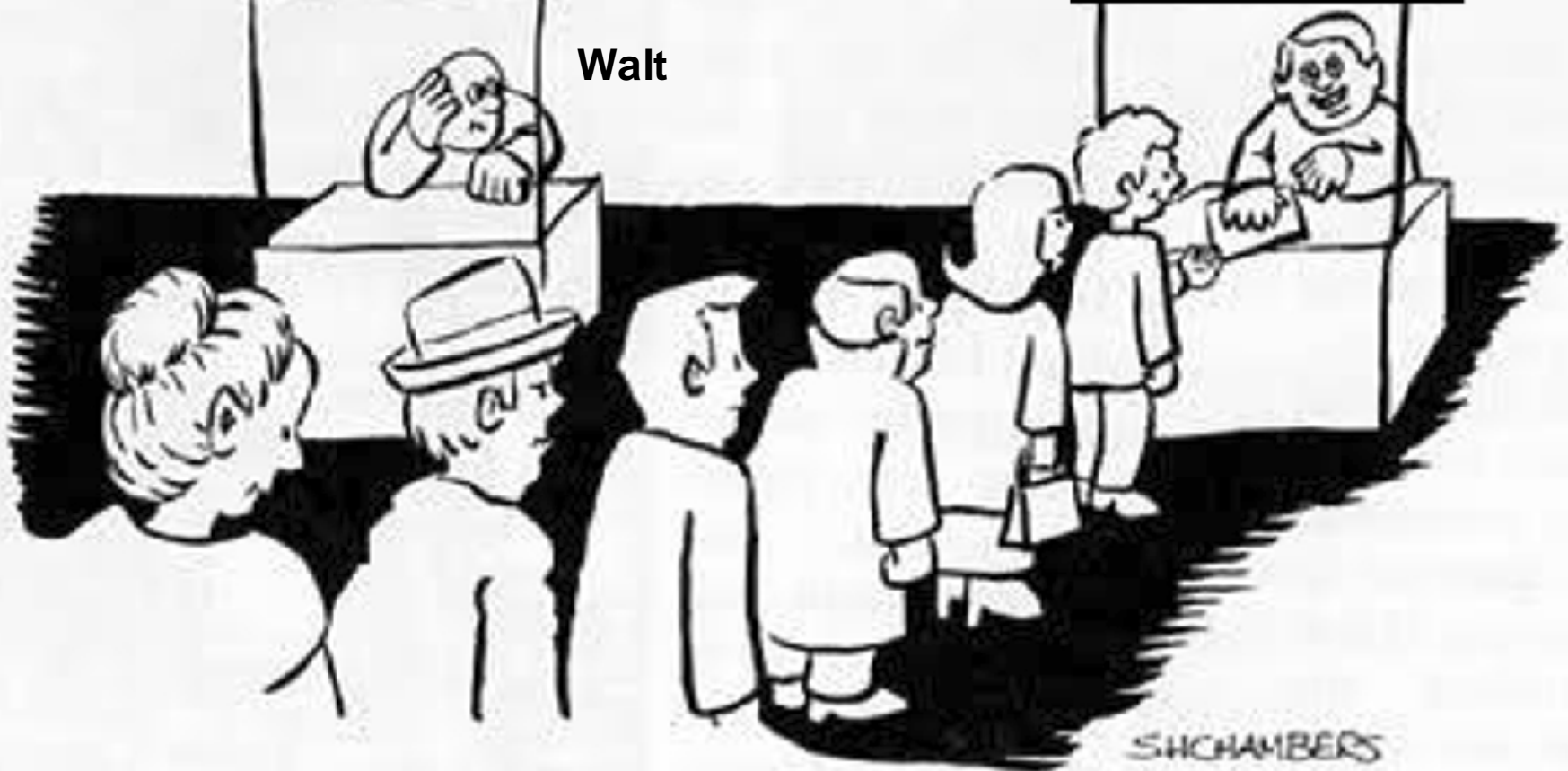


# Forecasts

Unpleasant  
Truth

Comforting  
Lies

Walt





# Europe Comments

**PMI Leading Indicator of 51.3 was 4<sup>th</sup> successive month of gains**

**Eurozone inflation down from 1.1% in September to 0.7% in October, below 2% European Bank target creating fears of GDP-stalling deflation**

**Banks are cutting back on small business loans to improve their financial stability. Therefore investment and hiring have suffered**

**12.2% European unemployment rate unlikely to fall quickly as labor laws discourage hiring while business conditions are still uncertain**

**European GDP growth unlikely to exceed 1.5% in next few years  
3Q'13 GDP Growth was minimal**

# GDP Growth

Constant \$ Growth Rates Converted @ Constant Exchange Rates

	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>
World	3.0	2.5	2.3	3.2	3.9
USA	1.8	2.8	1.6	2.6	3.4
EU	1.6	-0.4	-0.2	1.1	1.5
Japan	-0.5	2.0	1.8	2.2	1.6
Four Tigers	4.0	1.9	2.5	3.4	4.2
China	9.3	7.7	7.7	7.9	8.1

# Electronic Equipment Production Growth

20131112

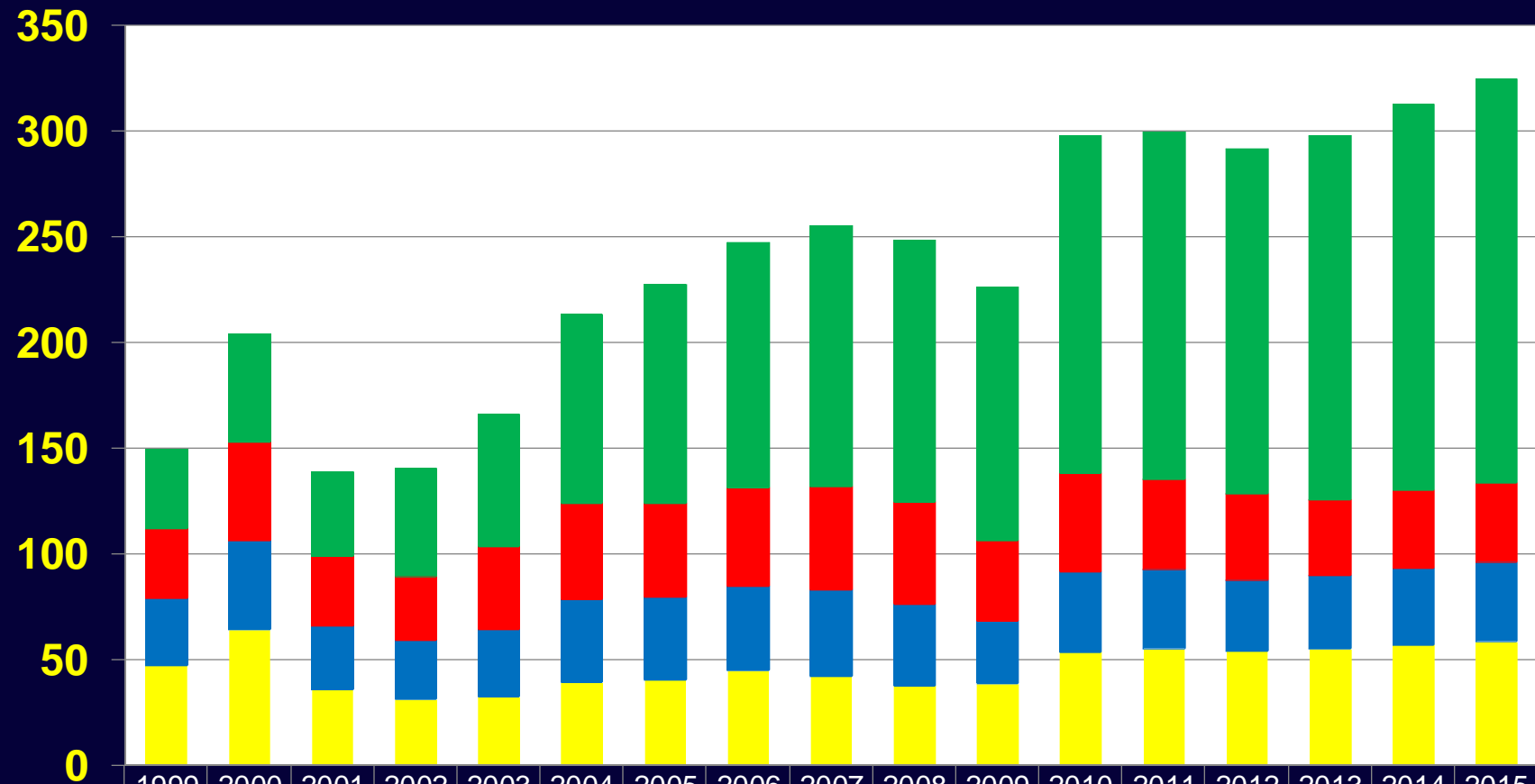
Constant \$ Growth Rates Converted @ Constant Exchange Rates

	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>
World	3.7	1.0	-1.9	4.5	6.4
USA	1.5	-0.9	-2.4	3.2	5.3
W. Europe	1.9	-3.4	-3.7	2.2	4.7
Japan	-13.7	-2.6	-10.3	1.6	4.2
Four Tigers	7.8	-1.2	1.3	4.4	5.4
China	10.2	2.6	-2.2	5.1	5.4

Henderson Ventures 11/2013  
[www.hendersonventures.com](http://www.hendersonventures.com)

20130604

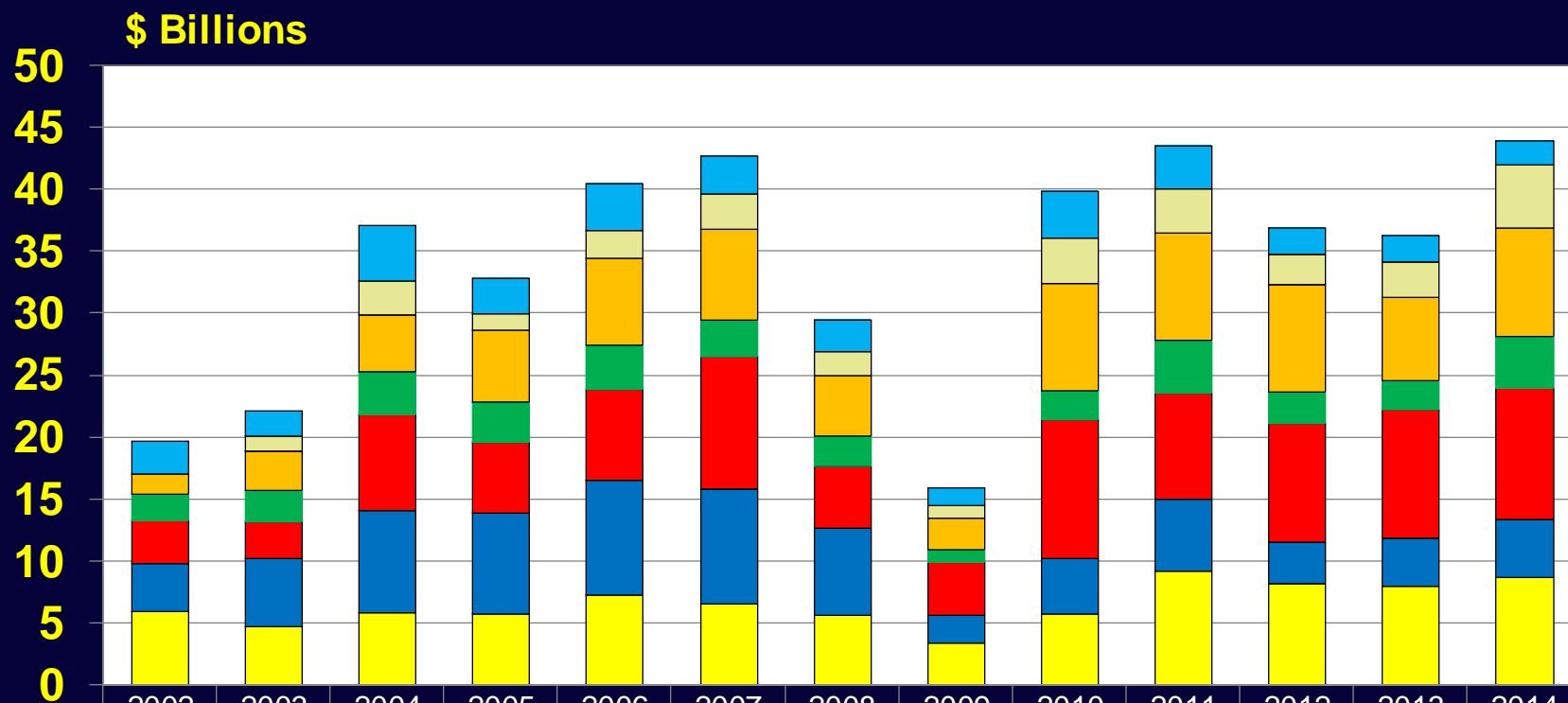
# Worldwide Semiconductor Market by Geography WSTS Forecast



WSTS 6/13

20121208

# Worldwide Semiconductor Capital Equipment Market by Geography (with forecast)

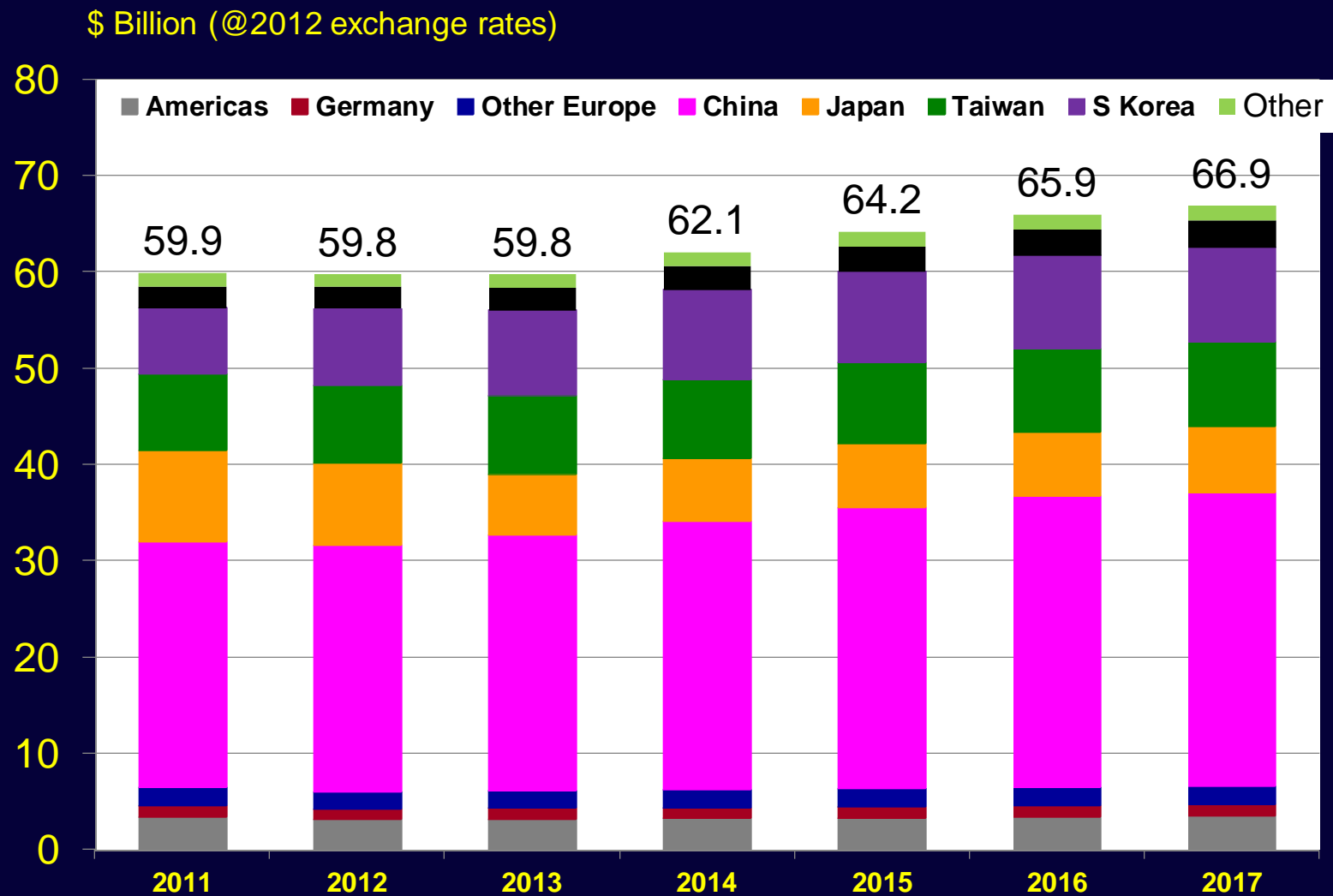


SEMI 7/13 (and prior reports)

20131111

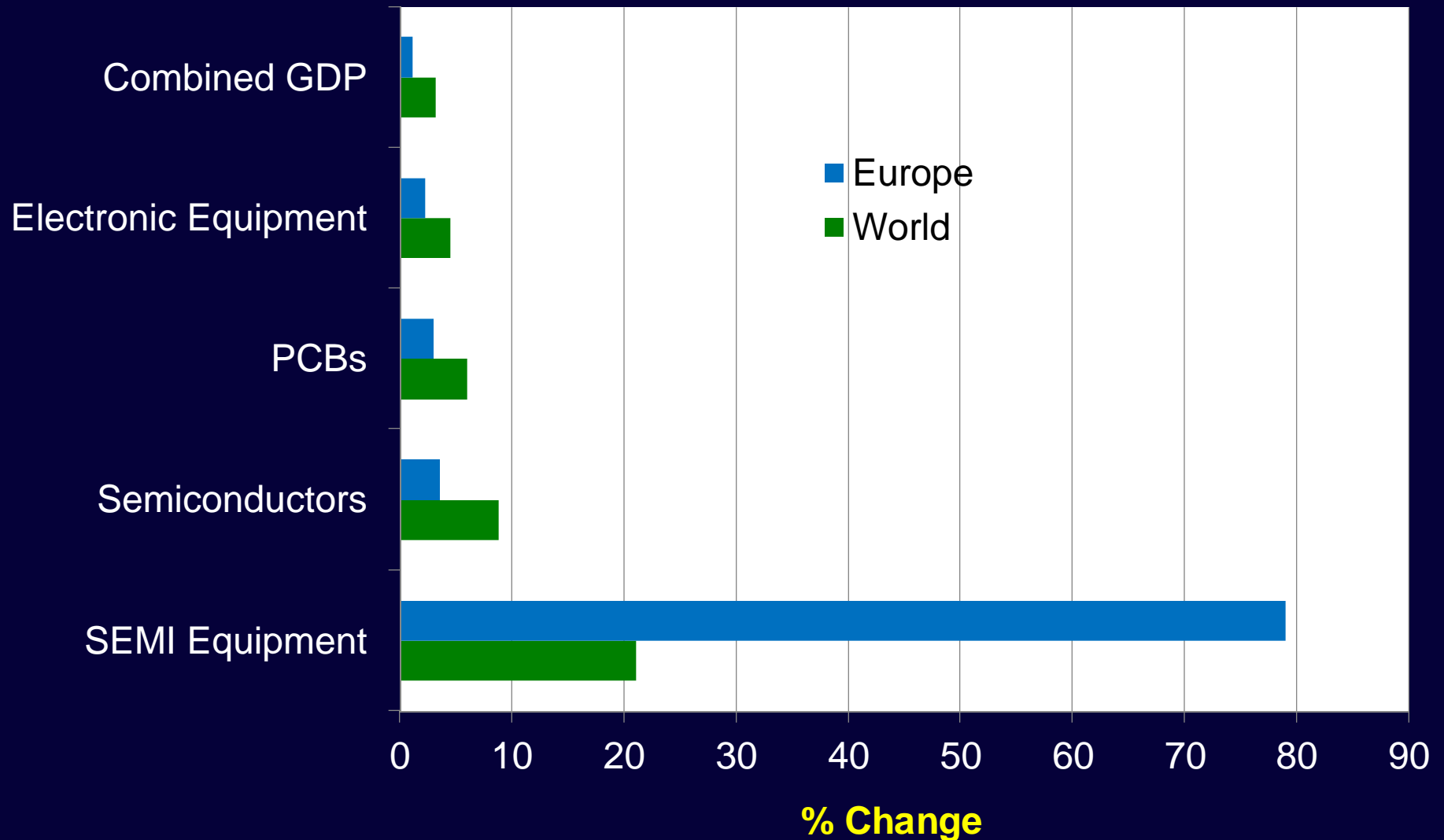
# World Rigid & Flex PCB Production

Converted @ 2012 Exchange Rates except Japan @ 100Y/US\$



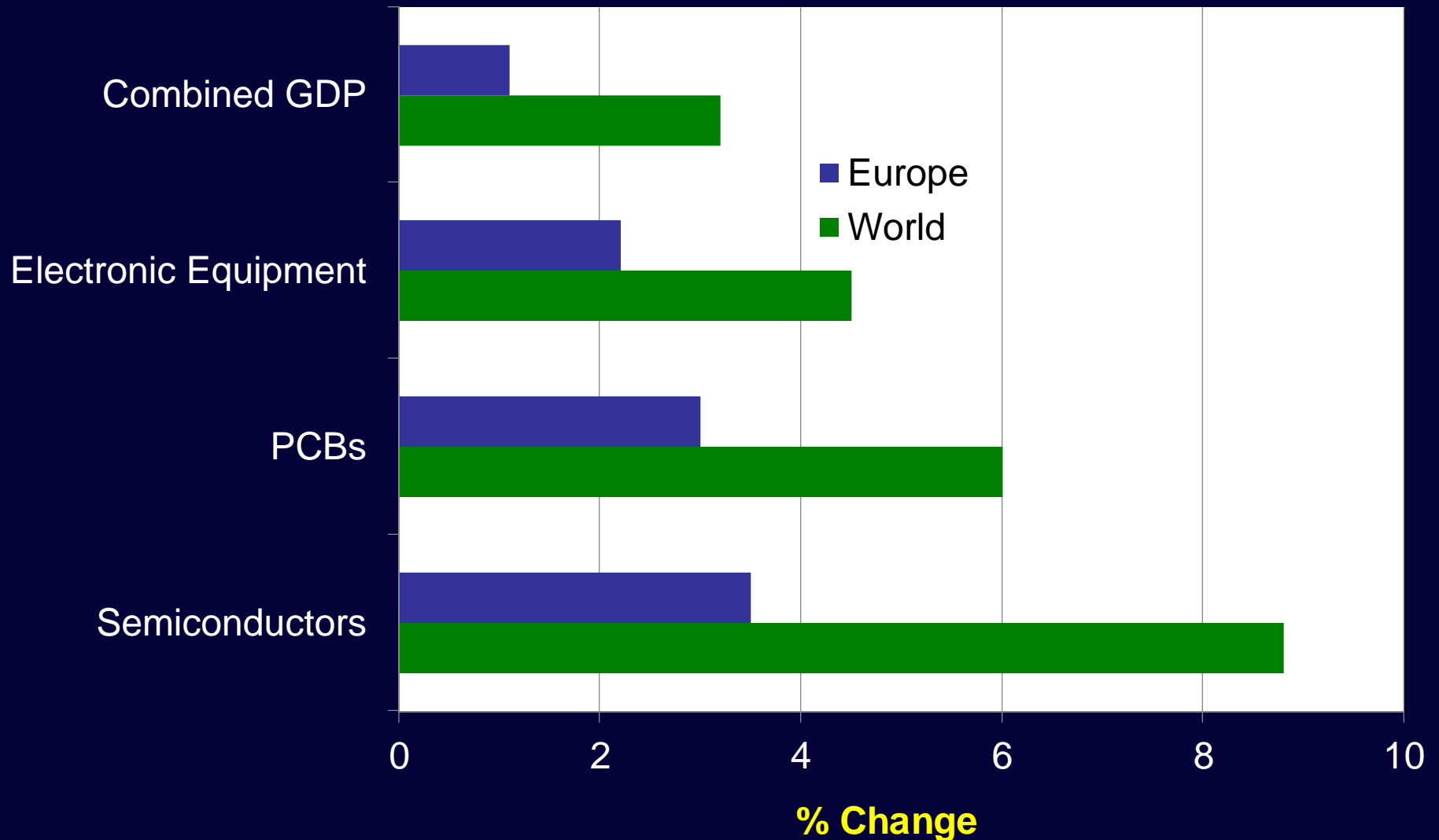
# Electronic Supply Chain Forecast

## 2014 vs. 2013



# Global Electronic Supply Chain Forecast

## 2014 vs. 2013





**Using This  
Information to  
Forecast Your  
Company's Sales**

# Data Sources

- **Trade Organizations**
  - SIA, SEMI, JEITA, IPC, JPCA, DMASS, ZVEI
- **Government Statistics**
  - US DOC, Eurostat
- **Published Market Research Studies**
- **Company Financial Reports & Consolidated Sector Data**
- **Leading Indicators**
  - Purchasing Managers Indices, Conference Board CLI
  - Consumer Confidence, Chip Foundry sales, etc.
- **Your Own Company's Sales**

# Forecasting Your Company Sales

- Organize monthly or quarterly sales in spreadsheet
- Obtain related industry time series for same time period
- Compare industry data and/or leading indicators to your sales using 3/12 growth rates
- Determine lead times vs. your data
- Forecast your sales based upon lead times
- Estimate your market share gains/losses by comparing your company growth to a related industry sector
- Custer Consulting Group can assist by providing:
  - Historical industry data
  - Help with analysis

# Custer Consulting Group Products

## Daily News Services (6 days/week)

- **Global electronics supply chain**
- **Solar/Photovoltaic supply chain**

## Business Outlook

- **Market charts & data**

Global market

OEMs

Components, EMS, ODM, materials & process equip

Solar/Photovoltaic

- **Weekly Market Comments with latest charts**