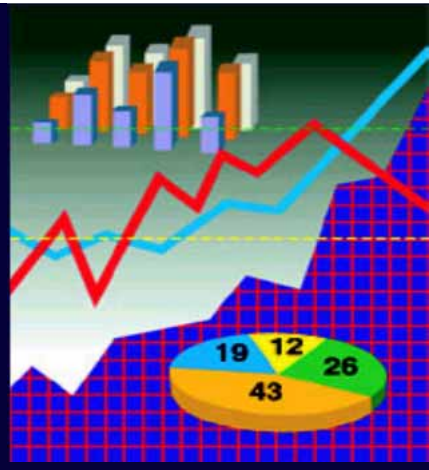
20141109




# Business Outlook

# Global Electronics Industry

## (with emphasis on Europe)

Custer Consulting Group
www.custerconsulting.com
November 2014

CITY PRICES

London Herald

LATE EDITION

No.4591 SATURDAY 11th NOVEMBER 1989 35p

# BERLIN WALL TUMBLES

## 'Beginning of the End' for Communism

### Germany Re-unified

By Our Own Staff
in Berlin, Bonn and London

The Berlin Wall was breached in the early hours of Thursday morning after 28 years of division and fear.

The 28-mile long wall, the ugly symbol of the divide between Communist Eastern Europe and democratic Western Europe, was finally ignored after a day of political confusion in the Communist bloc and East Germany's ruling Politburo.

When the news came through at midnight, thousands of Berlin who had been waiting by the wall gave a great roar of approval and began to surge towards the checkpoints building the worlds television cameras and news.

Hundreds of citizens from both sides climbed on the Berlin Wall and began to dance on it. Others started to chip away at the concrete with hammers, pickaxes and even their bare hands, creating new holes, enabling the flood of humanity to pass through from one side to the other.

Others danced on the Brandenburg Gate, the symbol of the Berlin Wall, while people, who had been separated from their families for years, were reunited with tearful embraces.

Many Berlins are no longer sure whether they are in the East or West.

Thousands of cars, the majority Trabants, the East German made, poured into West Berlin from East Germany. Border officials said no official limit was to be placed on visitors to the West, and visitors did not require visas.

The Berlin Wall was built in August 1961, dividing city and nation and separating families and friends. It became the symbol of the division of the Cold War. It was of greater force than any other barrier since the Great Wall of China was built to keep out invaders.



Celebrating East Berliners near where the Berlin Wall

### OTHER NEWS

**Mrs Thatcher Faces Opposition Storm**

Opening of Mrs Thatcher's leadership challenge will be conducted on the floor of the House of Commons amidst unprecedented security measures. Security sources fear a confrontation between Conservative MPs who support the leadership and those who want a change.

**£500,000 Windscreen**

A search by motor-mad Arab millionaire, who unfortunately smashed up three Rolls Royces in a week, has ended with the purchase of a £500,000 Bugatti. The super-rare car was found in Italy by Mr Abdul Rahman Al-Sayed, who was so delighted with his new purchase that he immediately had the windscreen replaced.

## Breaching the Wall

Yesterday's historic breaching of the Berlin Wall is largely symbolic of the demise of Communist Party control across Europe.

Talking over the last few years about what could replace the Iron Curtain, Western governments thought the most unlikely event would be the overthrow of Communist Party control in Eastern Europe without a bloody struggle, and the total collapse of the Soviet Union with hardly a shot fired.

The old communist Party Politburo members ruling East Germany were appointed by the Russian authorities in Eastern Europe. When democratic reforms of communist control first developed in Russia, many East Germans were expecting new freedoms to spill over into their own country. Instead, the East German people waited and demonstrated passionately, hoping the ruling party would change.

### Iron Curtain

The moment when a leading MP in the party was the part of the Soviet Union's Politburo, Mr Egon Krenz, succeeded as East German president in October, it was clear that the Communist Party was in trouble.

Mr Krenz, heading the delegation, took the old communist party line and said a full welcome for the move, but rejected the official government to complete democratization with the total overthrow of East German leaders. Krenz had once been seen as a reformer, but was subsequently seen as part of the old guard.

Mr Krenz's announcement on the closure of the border on October 9th, a few days after Honecker was replaced with the more moderate Egon Krenz.

Krenz immediately announced that there would be freedom of travel between East and West Germany, and promised free elections. But Krenz's announcement was greeted with scepticism by the people of East Germany, who demanded more than just promises.

Now, when millions of East Germans have travelled to the West, and when the Berlin Wall, the most famous symbol of repression, has finally been breached, the question is what will happen next.

### After 'GCSE' and 'Heads' what about a career at Sea level?



# 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

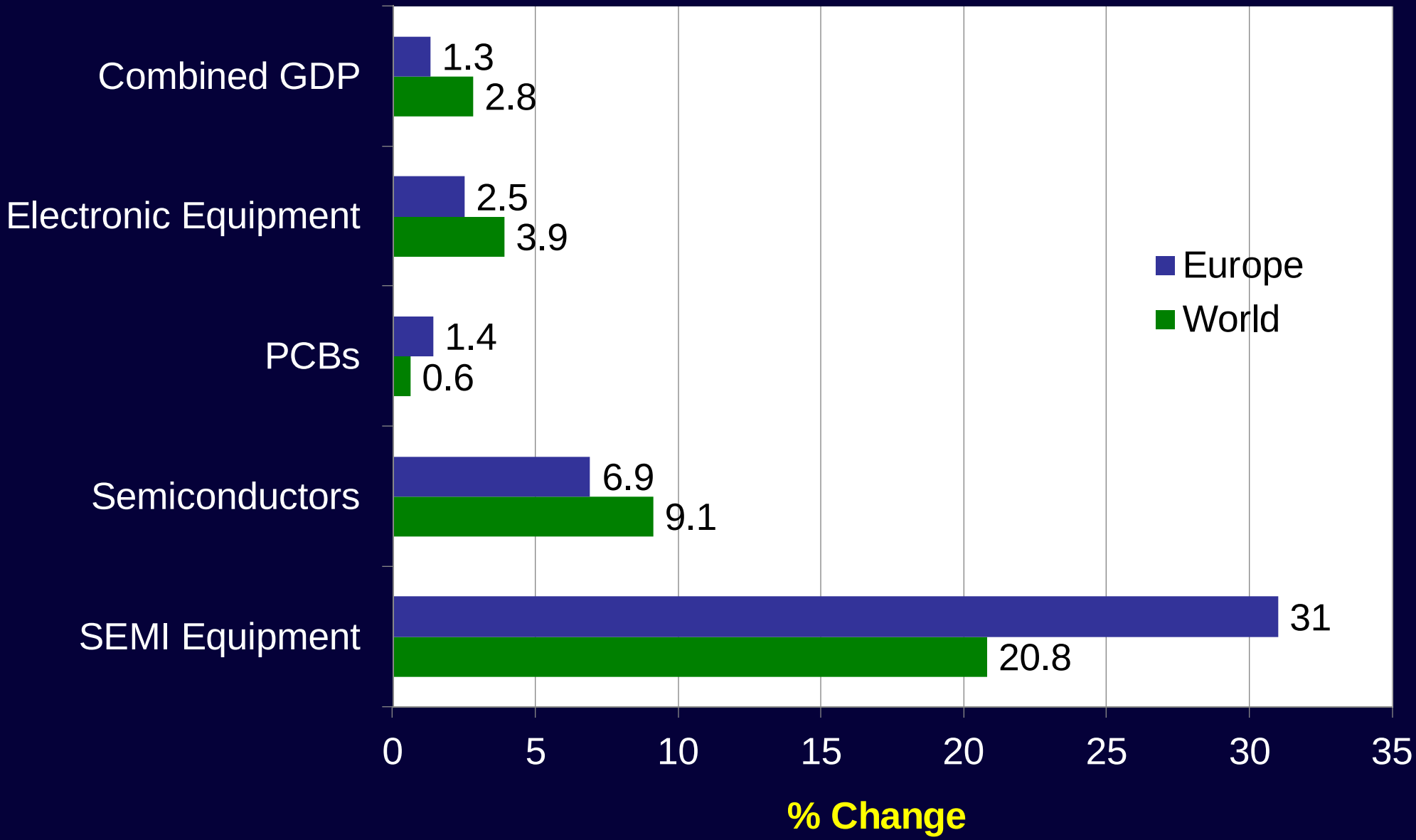
# Industry Dynamics



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# Electronic Supply Chain Growth

## 2014 vs. 2013



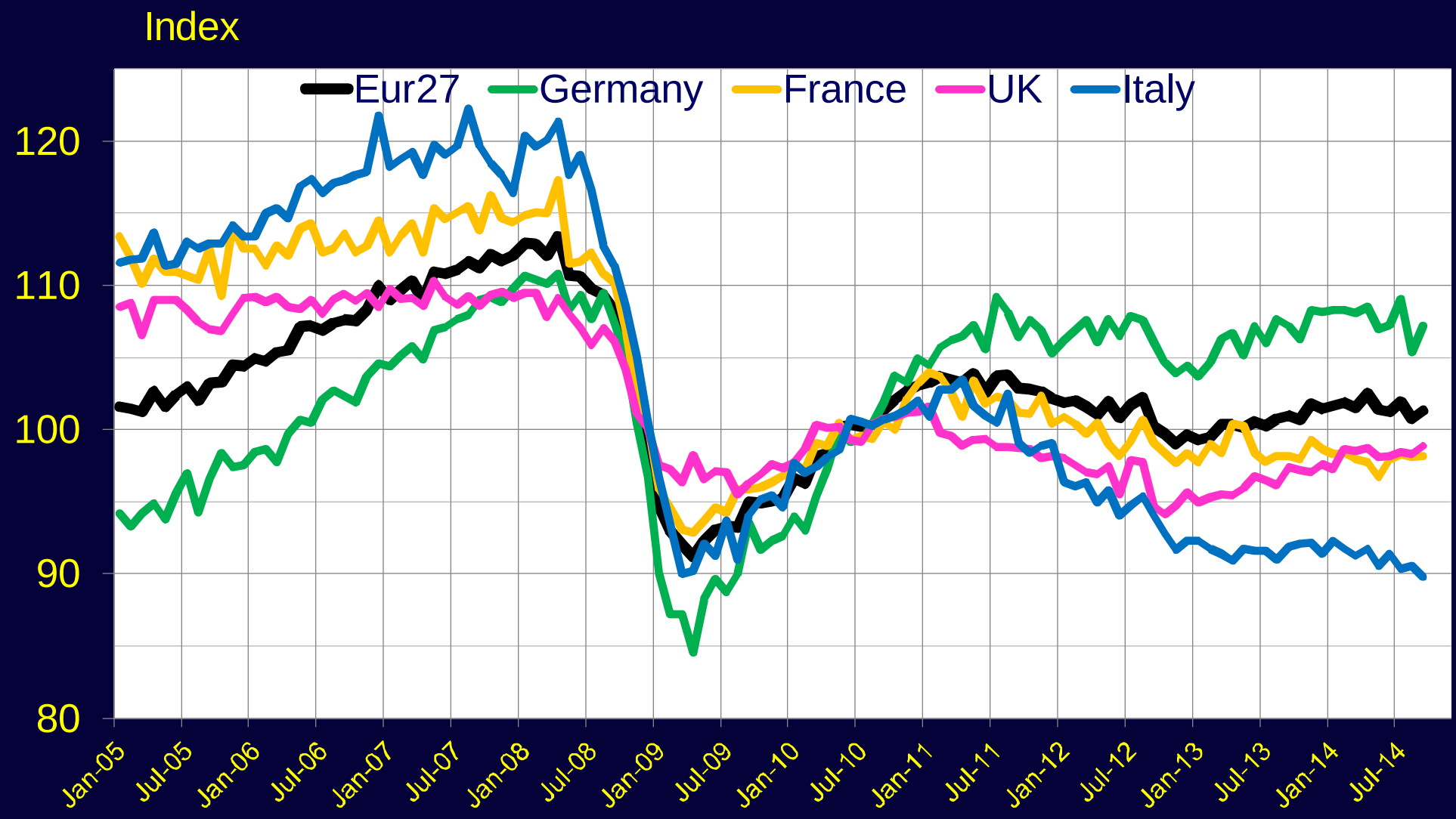
# Expect a Conservative Forecast for 2015

# Economy
# &
# Leading Indicators

20141112

# Industrial Production - Europe

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

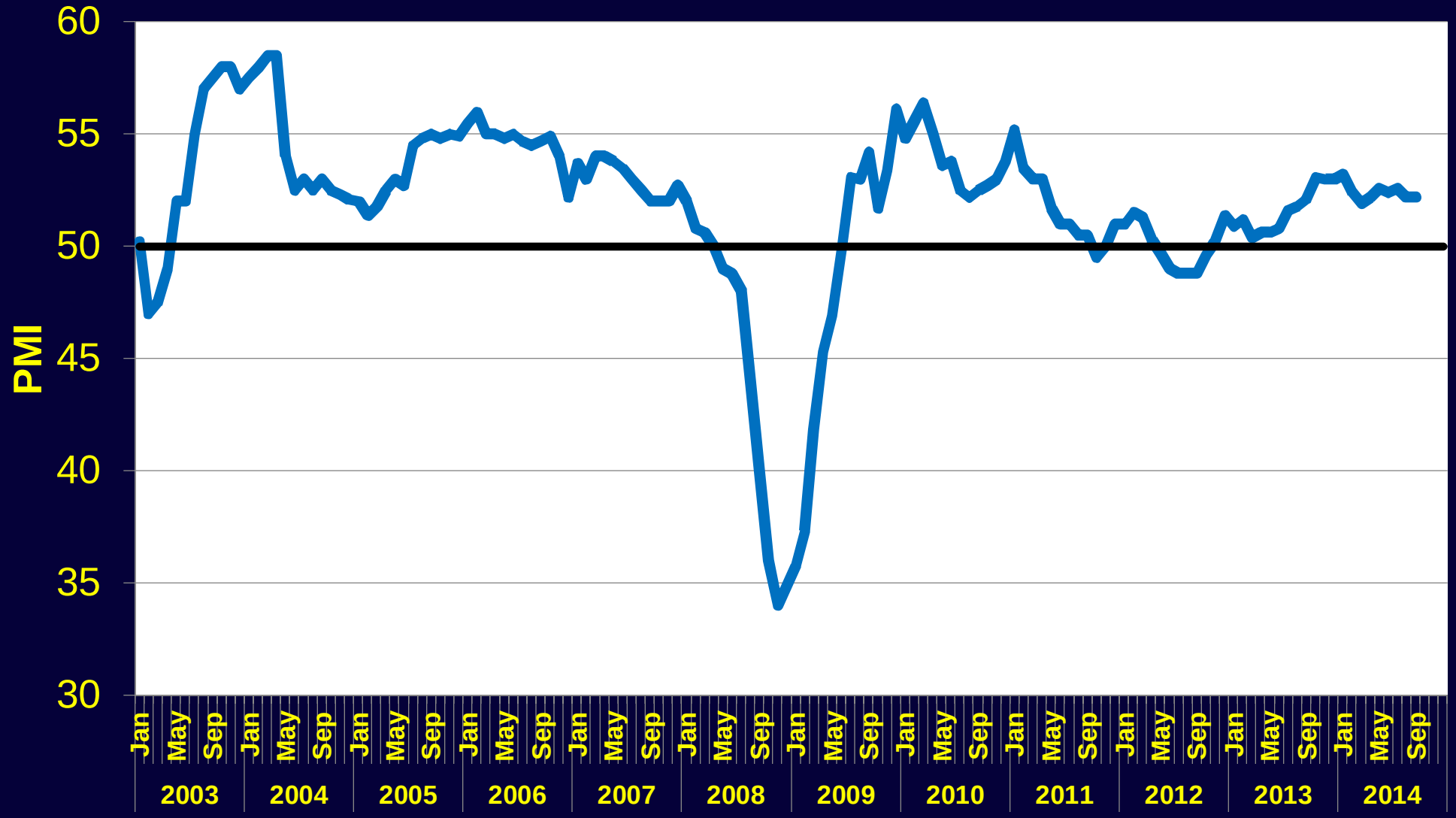



Eurostat

20141103

# Global "Purchasing Managers" Index

## Diffusion Index, >50 = Growth

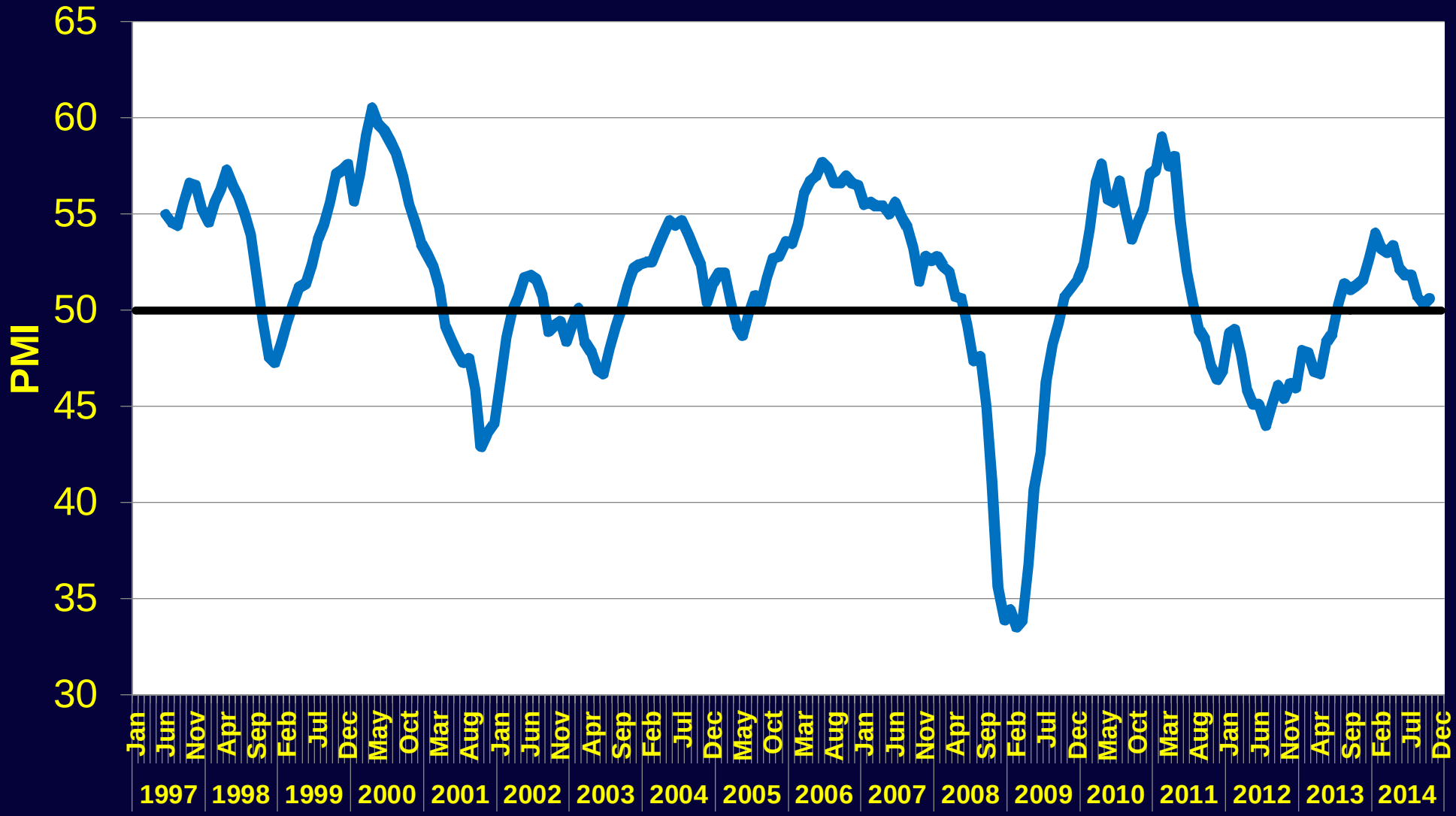



Markit Economics

20141103

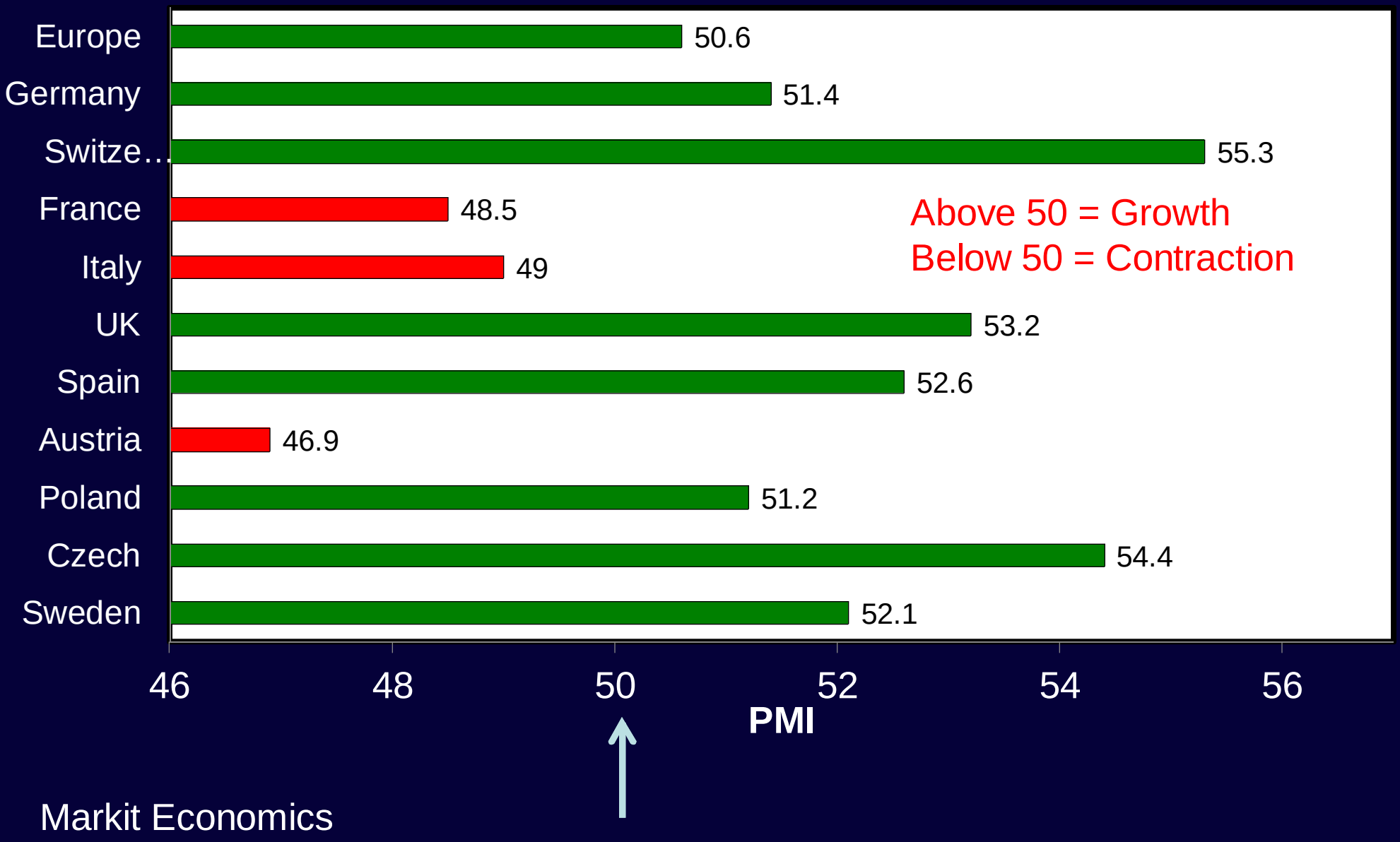
# Eurozone "Purchasing Managers" Index

## Diffusion Index, >50 = Growth




Markit Economics

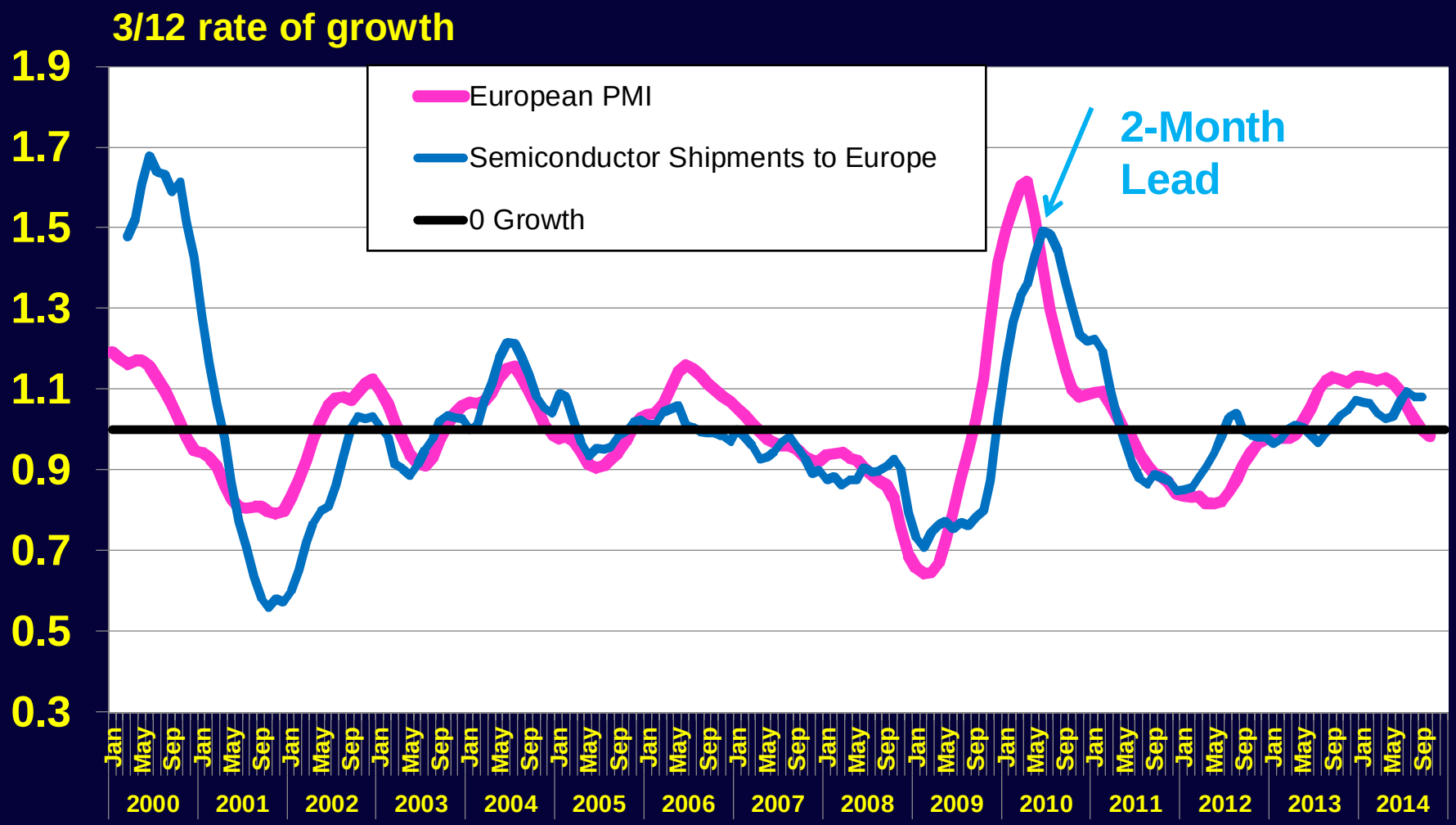
# European Purchasing Managers' Indices
# October 2014




Markit Economics

20141110

# European PMI Leading Indicator vs. Semiconductor Shipments to Europe




Sources: Markit Economics & SIA

# 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

# Methods to Measure Electronic Industry Growth

**Sector composites based upon financial reports of similar companies**
**- Typically quarterly, semiannually or monthly**

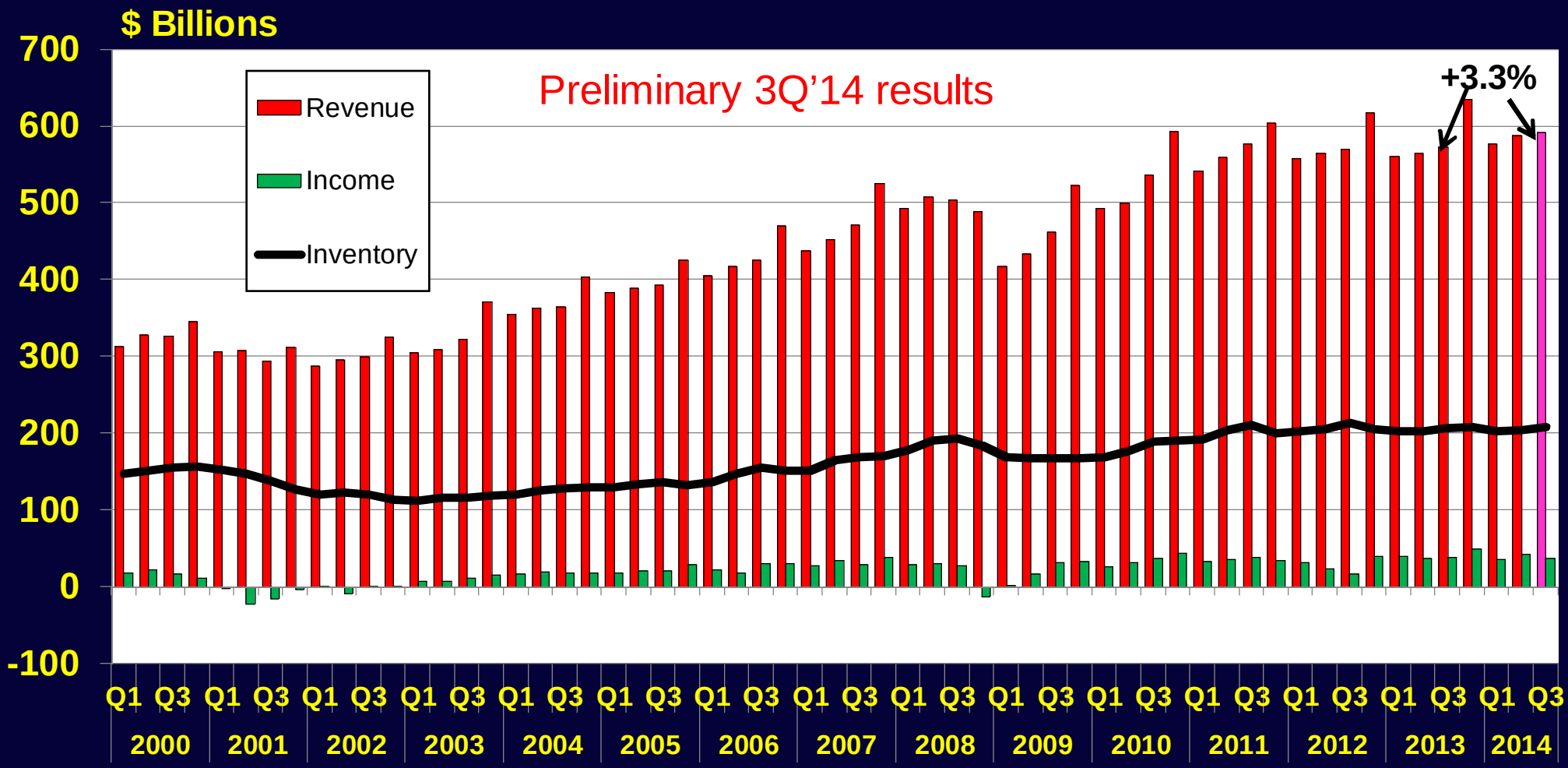
**Government and trade organization statistics**
- **Typically monthly**

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

# Sector Analyses based on Company Financial Reports

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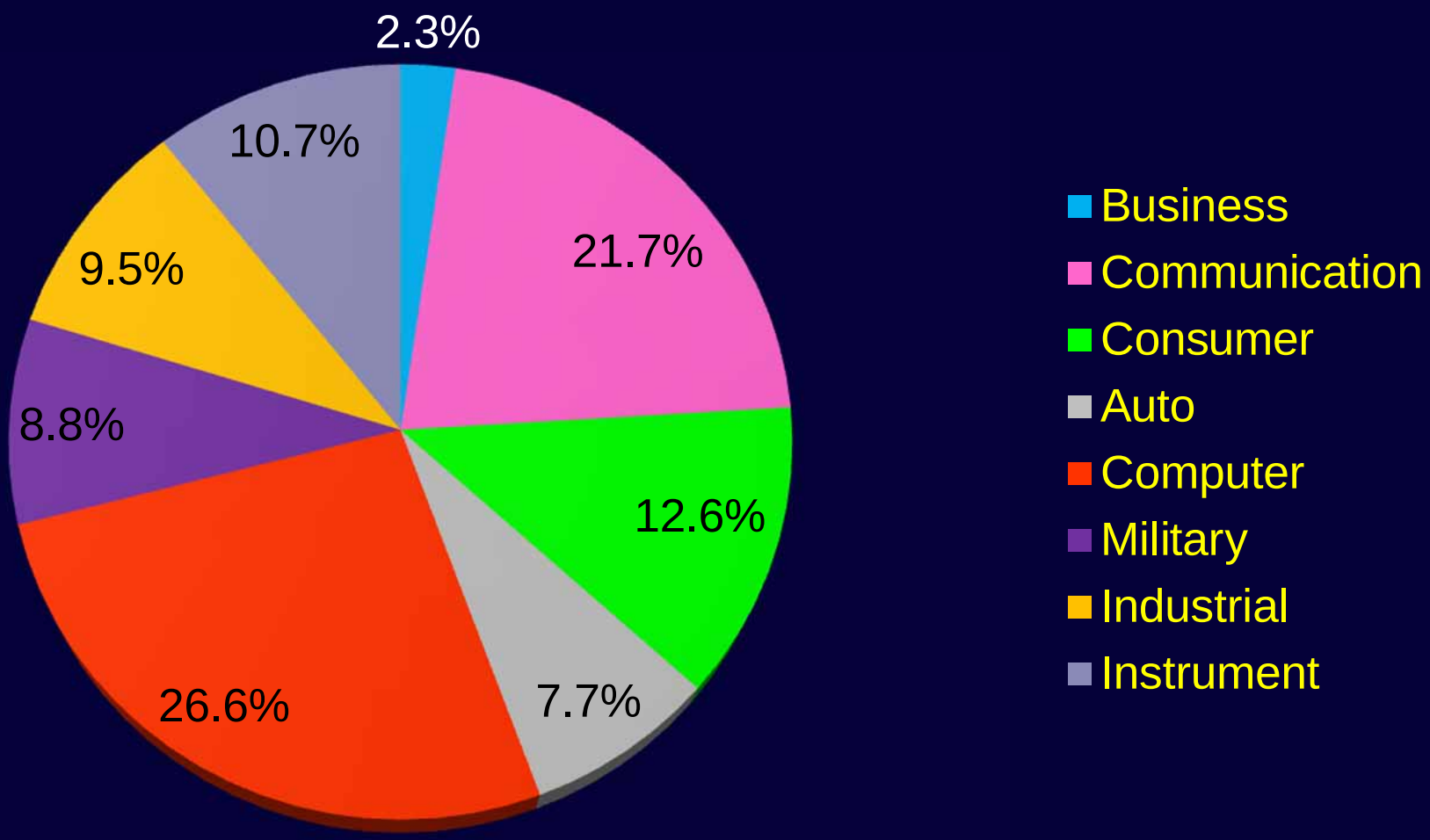
# Electronic Equipment Suppliers
# Composite of 160 Public Companies
## Revenue, Net Income & Inventory




Computer 13, Internet 9, Storage 10, Communication 20, SEMI 30, Medical 23, Instruments 11, Military 6, Business & Office 3, Consumer 13, Automotive 11

# World Electronic Equipment Production by Type @2013 Exchange Rates

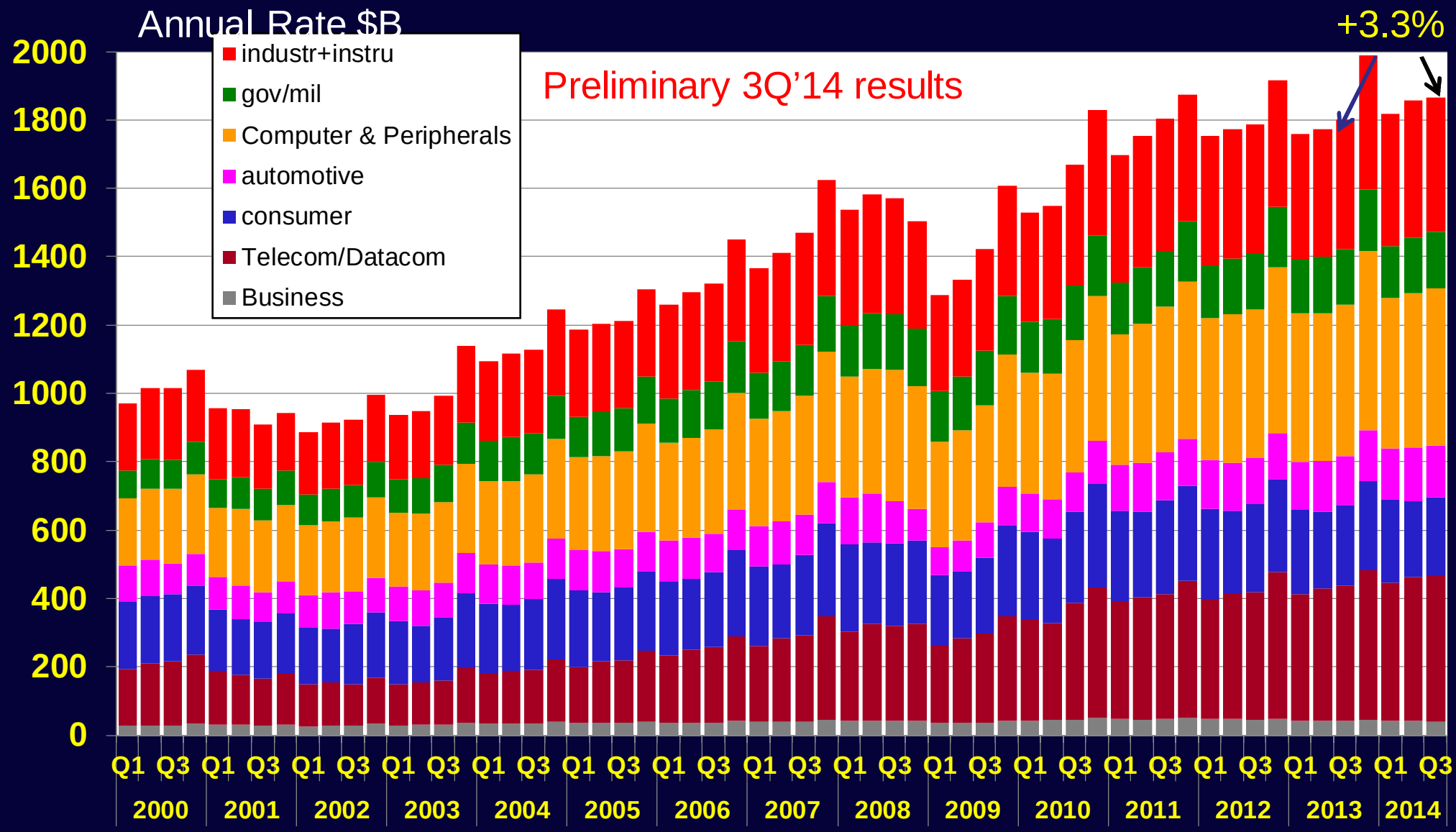
20141009




**2013 TOTAL: $2,025 Billion**

# World Electronic Equipment Production By Type

20141108



# Regional Data from Government, Industry & Trade Organization Statistics

Europe
Japan
Taiwan/China
S Korea
USA

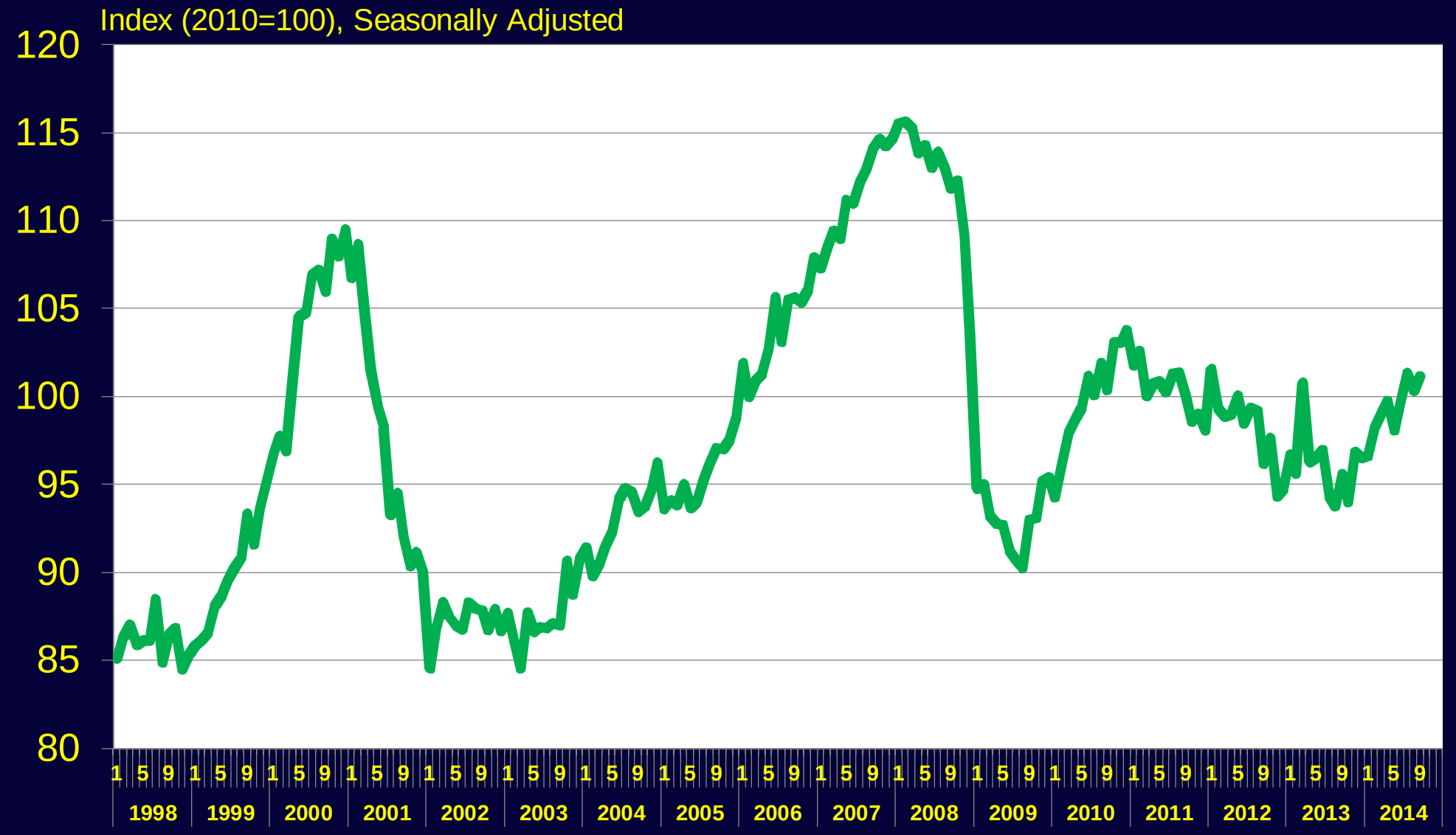
# Eurostat Data (NACE Rev 2)
# Electronic Equipment Production by Country

- **C26 computer, electronic & optical products**
- **C261 electronic components & boards**
- **C2611 electronic components**
- **C2612 loaded electronic boards**
- **C2733 wiring devices**
- **C264 consumer electronics**
- **C2651 instruments & appliances for measuring, testing and navigation**
- **C266 irradiation, electromedical & electrotherapeutic equipment**
- **C2751 electric domestic appliances**
- **C2823 office machinery & equipment (except computers & peripherals)**
- **C291 motor vehicles**
- **C303 air & spacecraft and related machinery**

Monthly indices where average month in CY2005=100

20141112

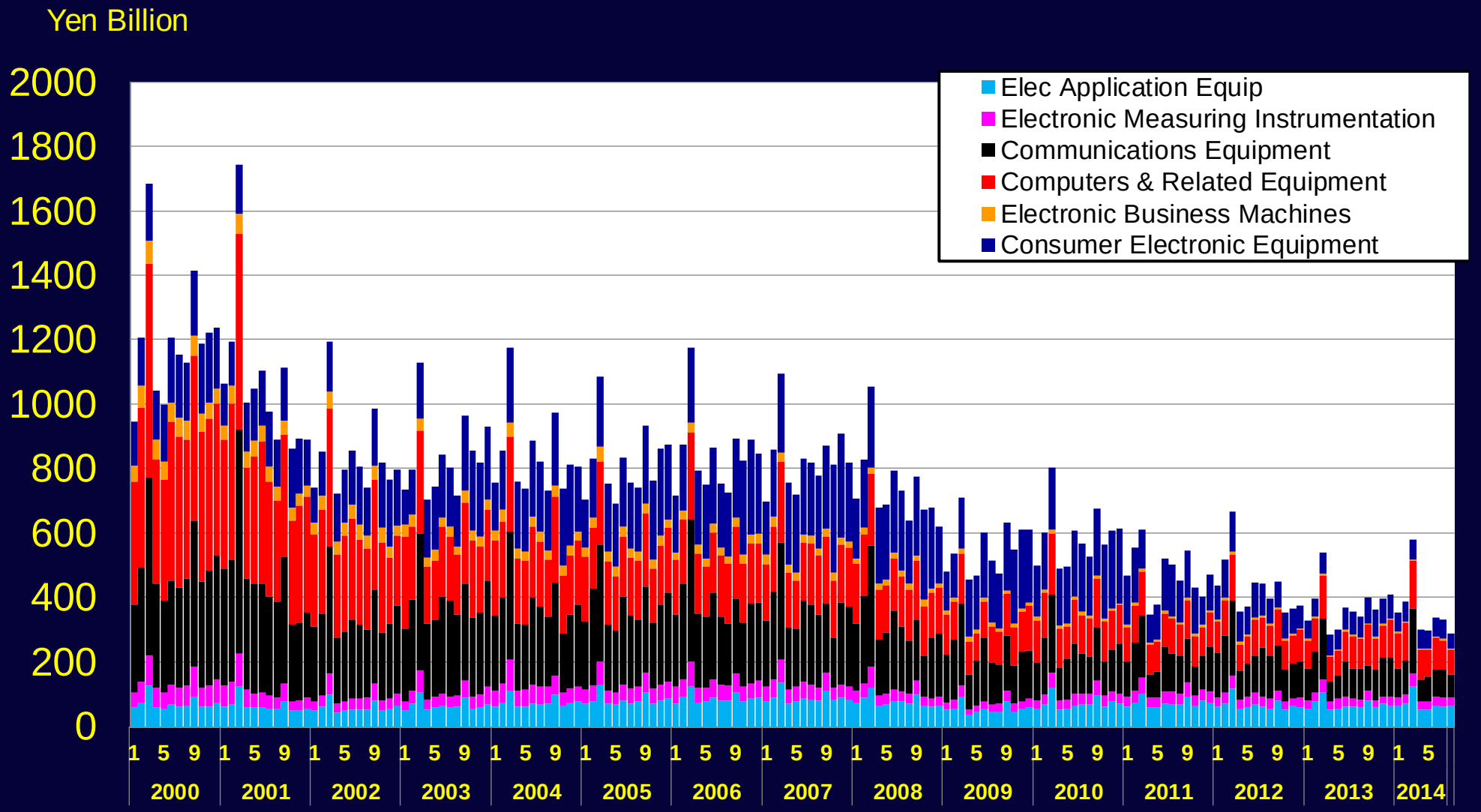
# European Computer, Electronic & Optical Products Production




Eurostat, C26 category, EU 27 countries

20141026

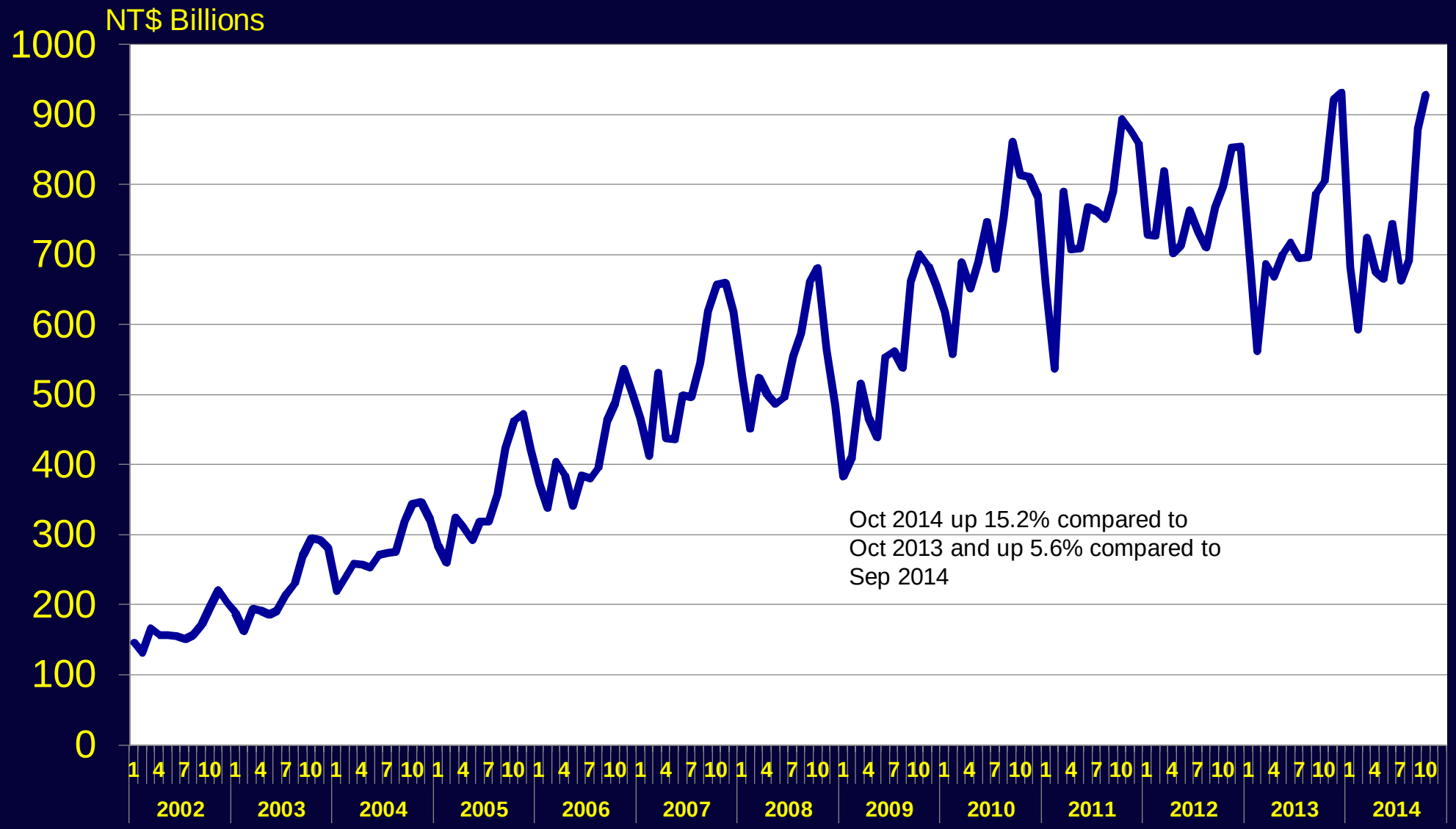
# Japan Electronic Equipment Production by Month 2000 to Present




JEITA www.jeita.or.jp/

20141110

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

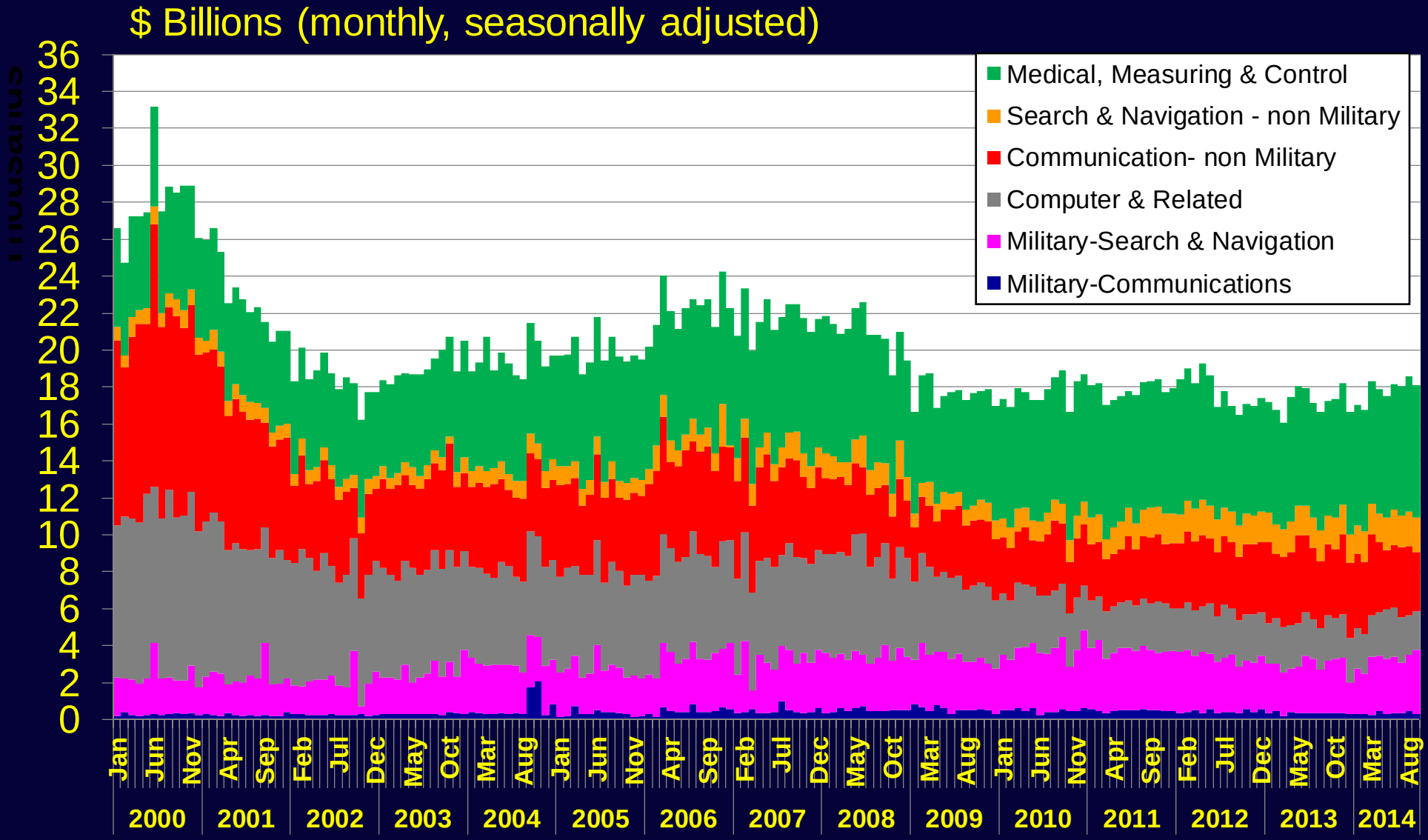



Taiwan listed companies, often with significant manufacturing in China

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# U.S. Electronic Equipment Orders

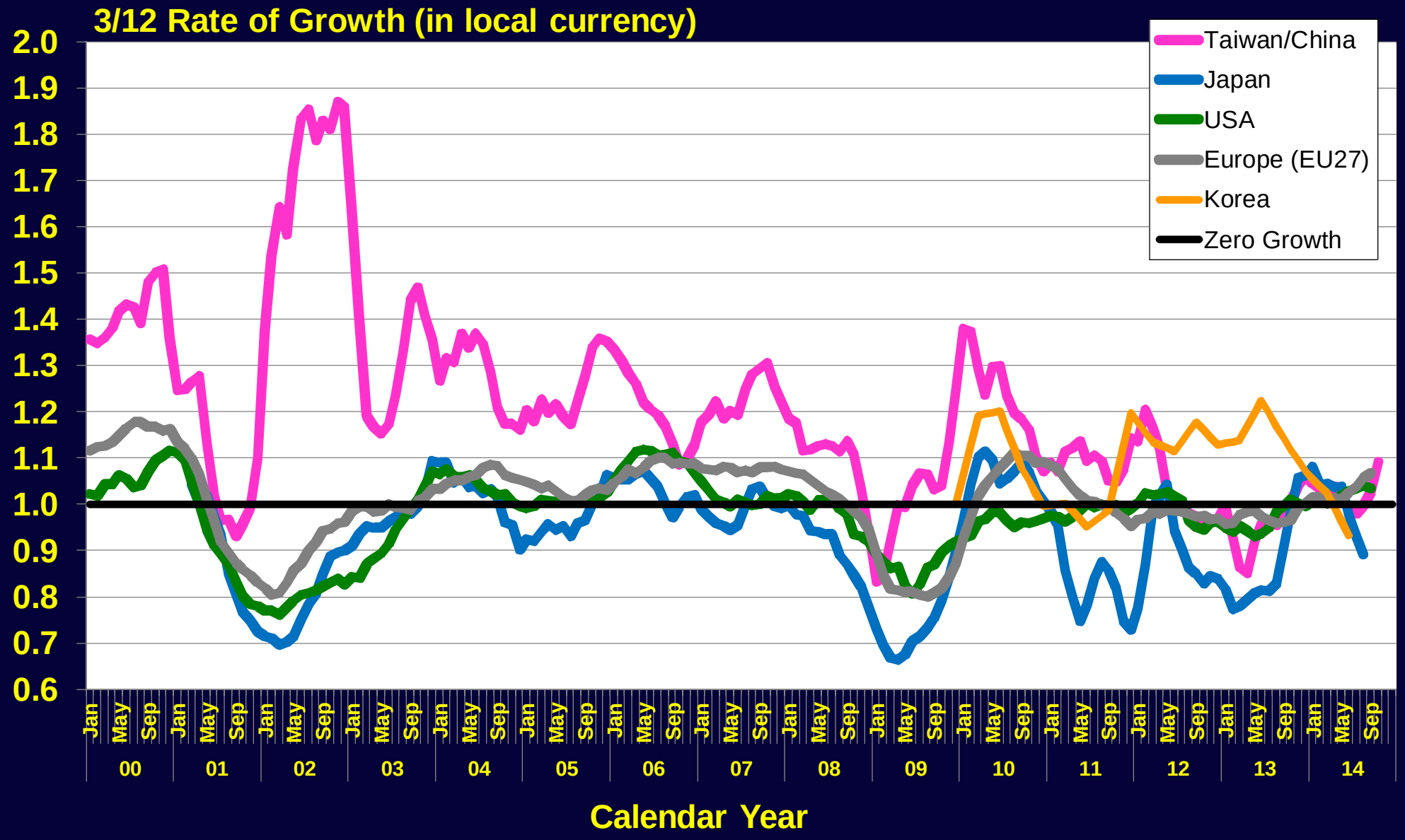
## Monthly Data




www.census.gov/indicator/www/m3/

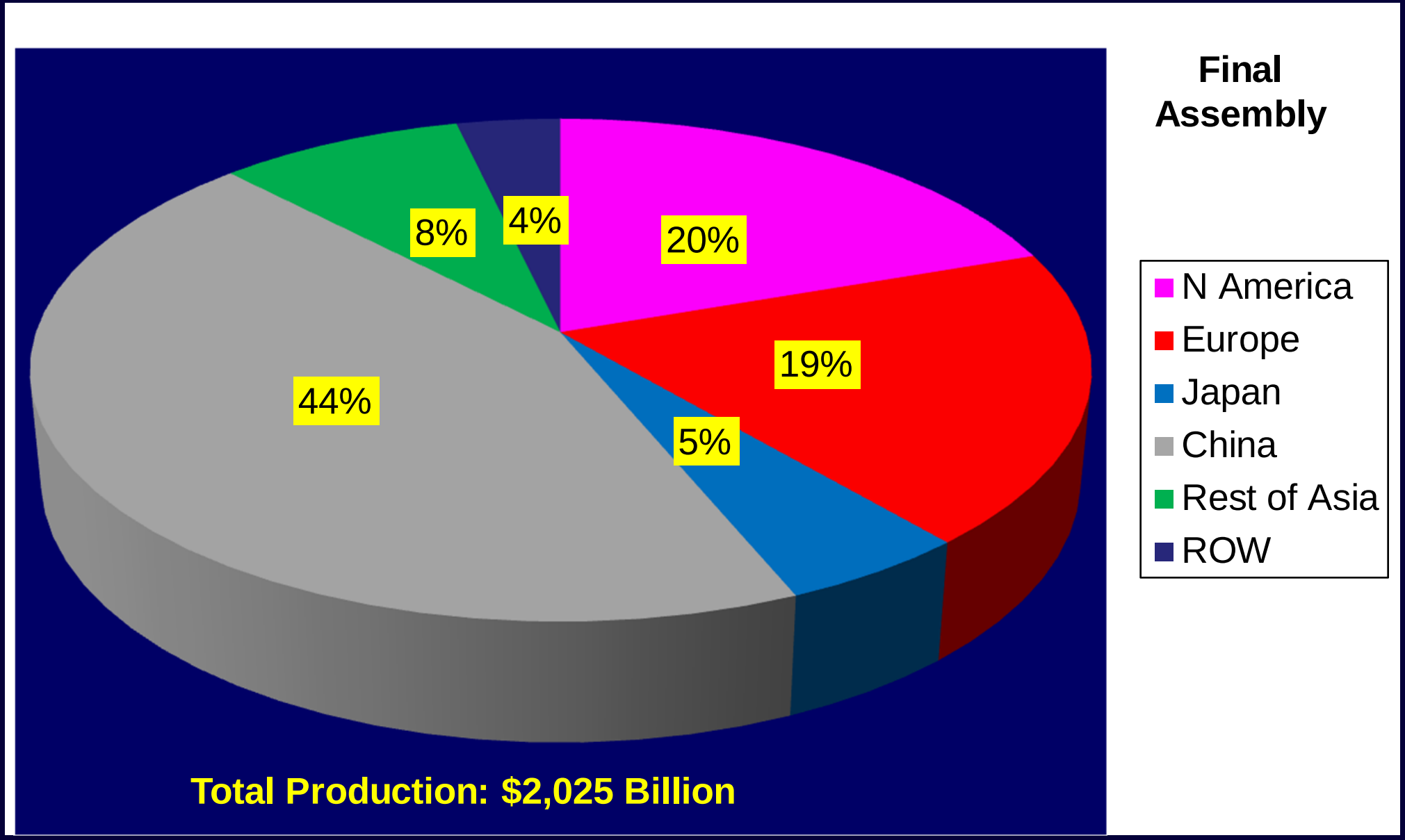
20141110

# Regional Electronic Equipment Shipment Growth




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

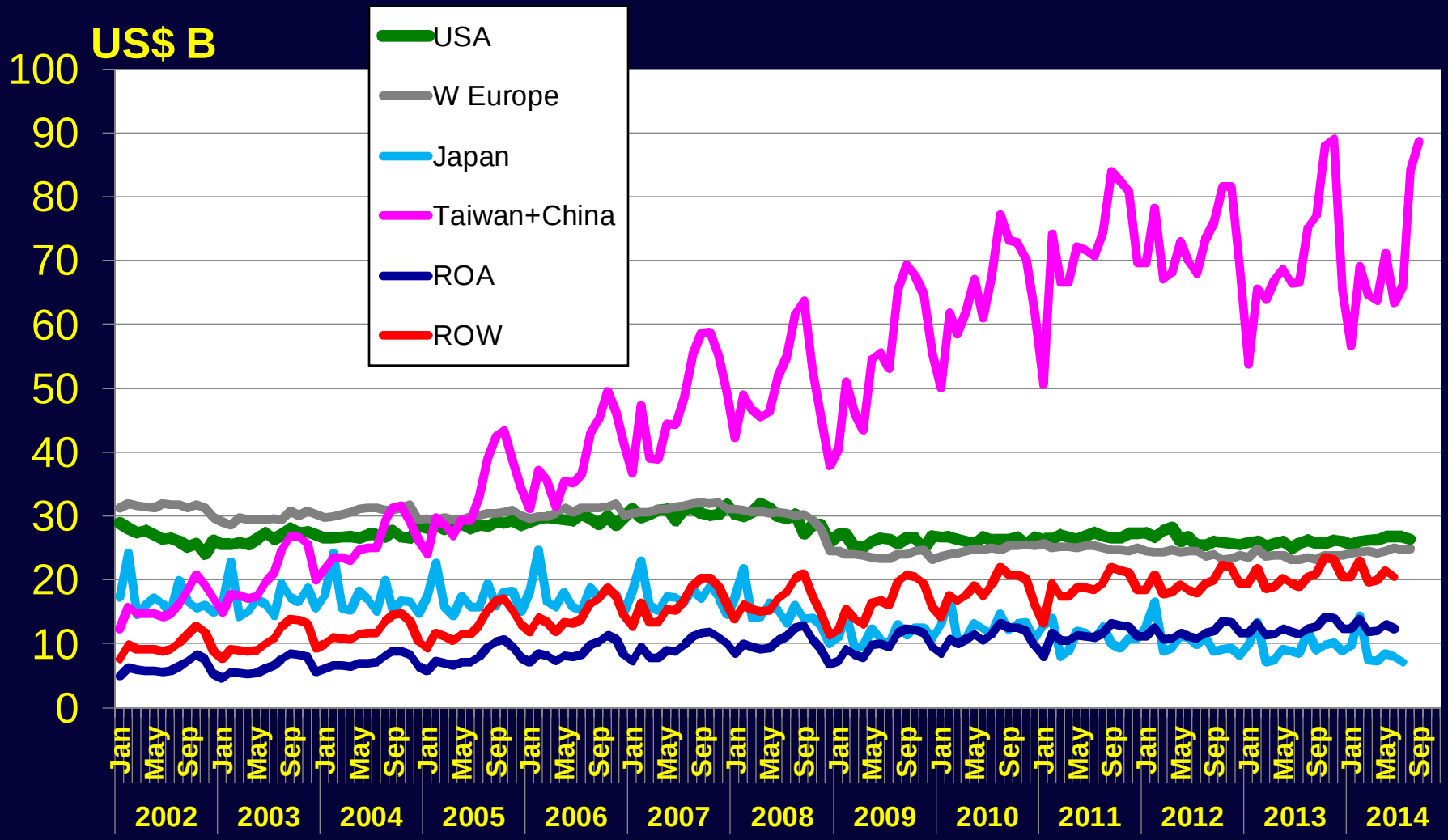
# World Electronic Equipment by Region 2013 @ 2013 Exchange Rates



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# World Electronic Equipment Monthly Shipments

## Converted @ Constant 2012 Exchange Rates

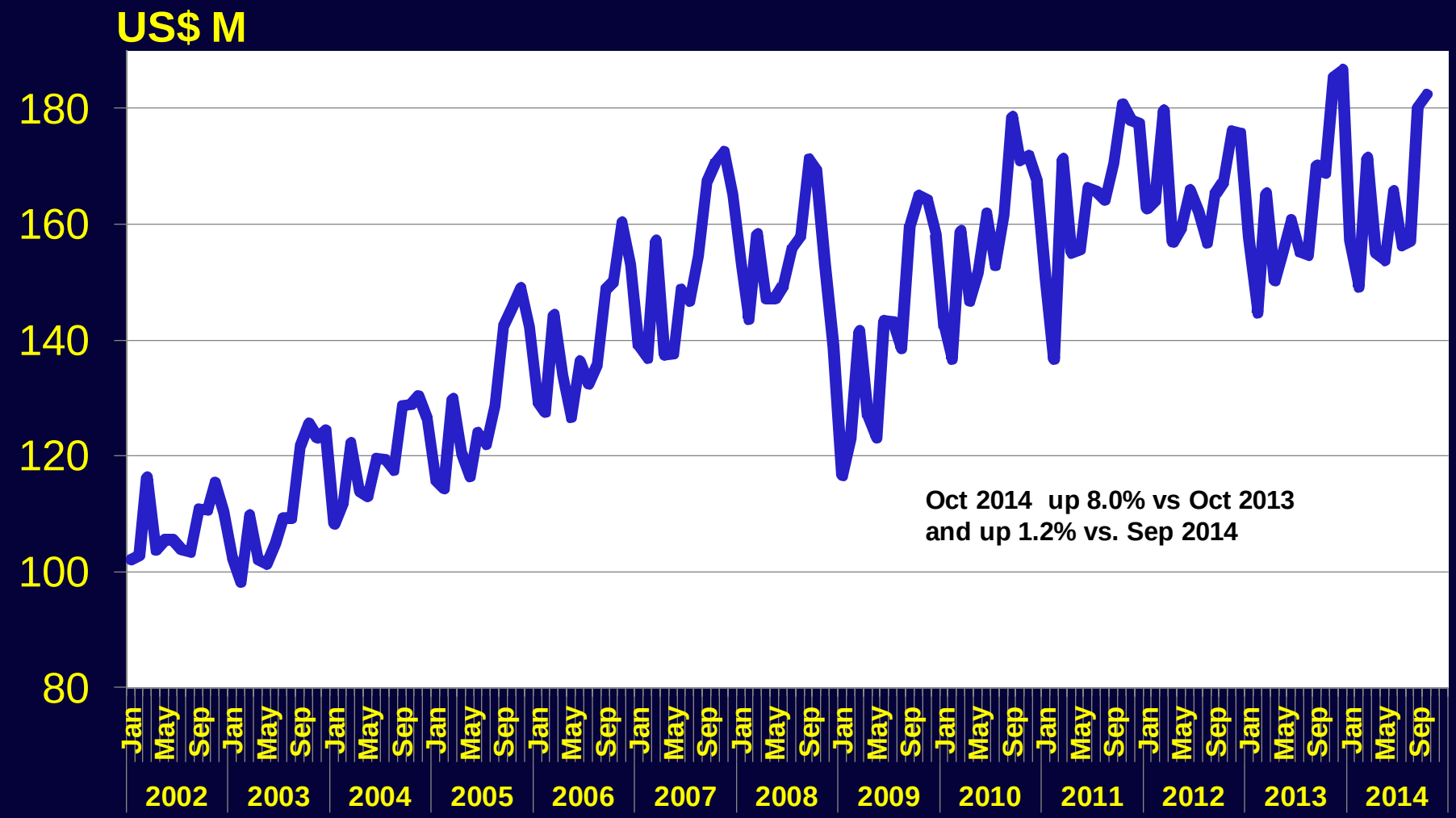



Source: Custer Consulting Group & Electronic Outlook Corp

20141110

# World Electronic Equipment Monthly Shipments

## Converted @ Fluctuating Exchange Rates




Source: Custer Consulting Group & Electronic Outlook Corp

# Market Segments

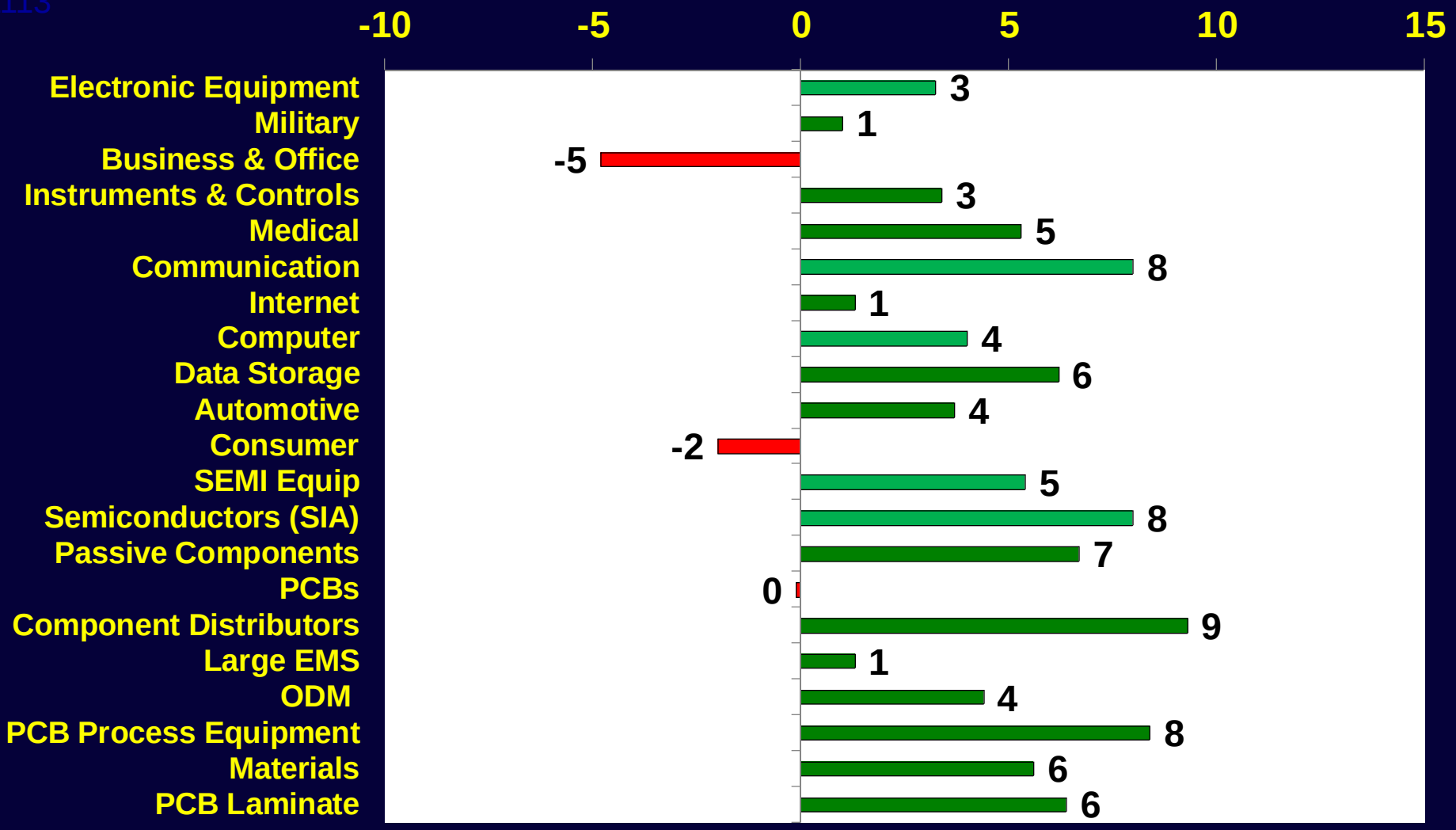
Volume (Shift to Low Cost Areas)
- Personal Computers
- Mobile Phones
- Other Consumer Electronics
- Datacom/Telecom
- Automotive

"Protected"
- Military
- Medical
- Instruments & Controls
- High IP Content

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

# Global Electronic Supply Chain Growth
# 3Q'14 vs. 3Q'13 (Preliminary)

20141113

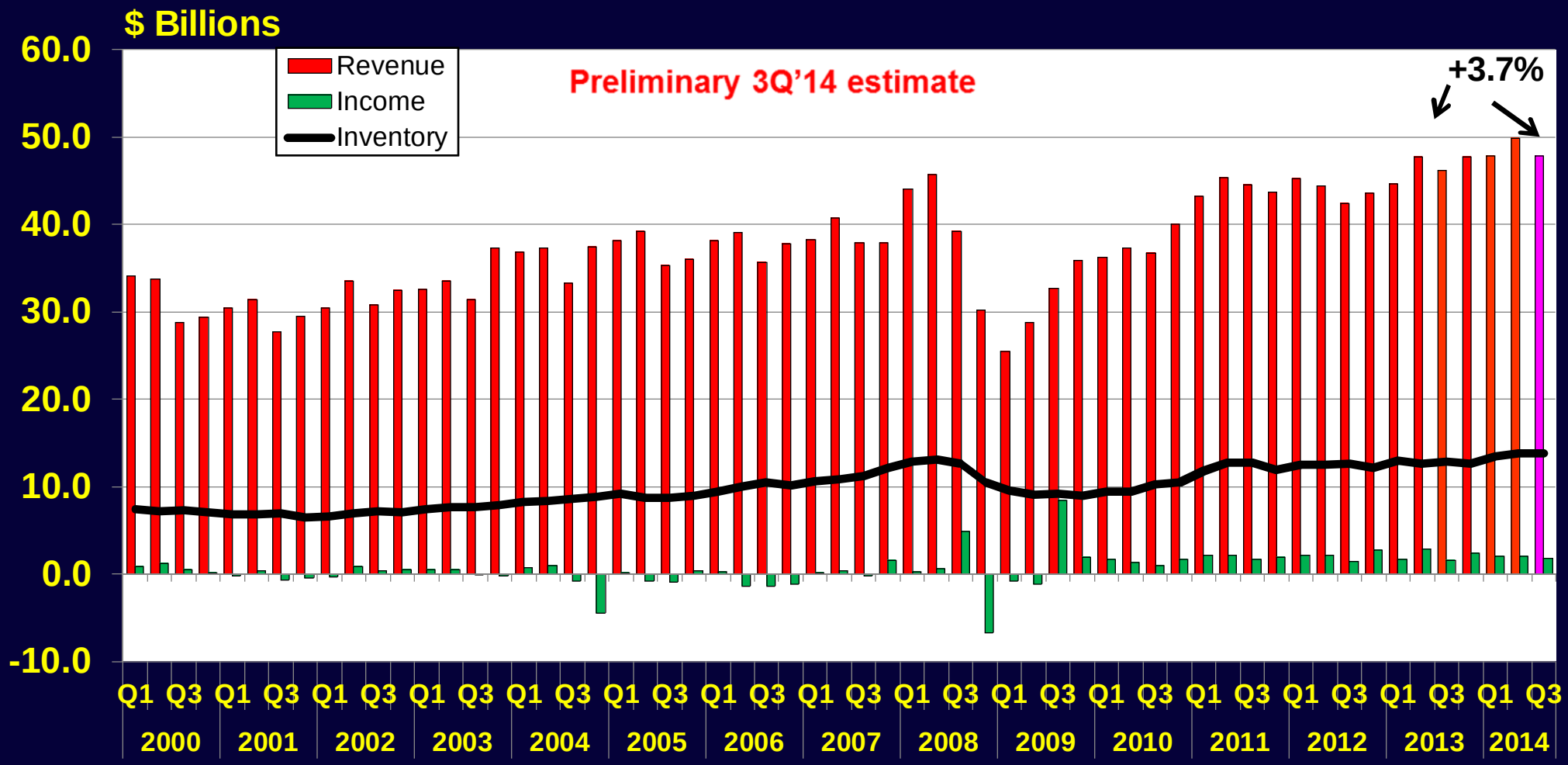



US$ equivalent at fluctuating exchange; based upon industry composites including acquisitions

# Automotive Electronics

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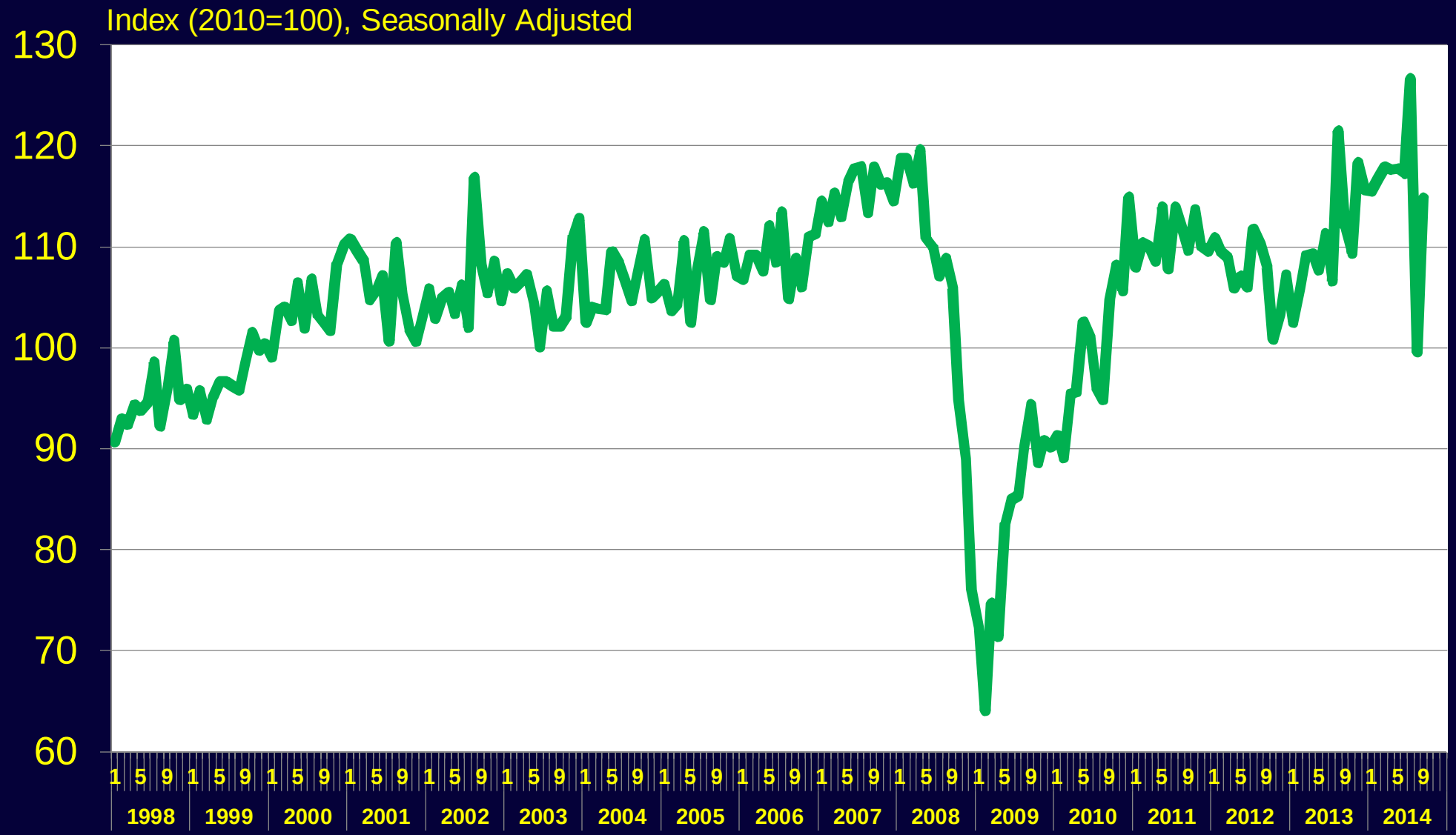
# Automotive Equipment Suppliers
# Composite of 11 Public Companies
## Revenue, Net Income & Inventory




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

20141112

# European Motor Vehicle Production



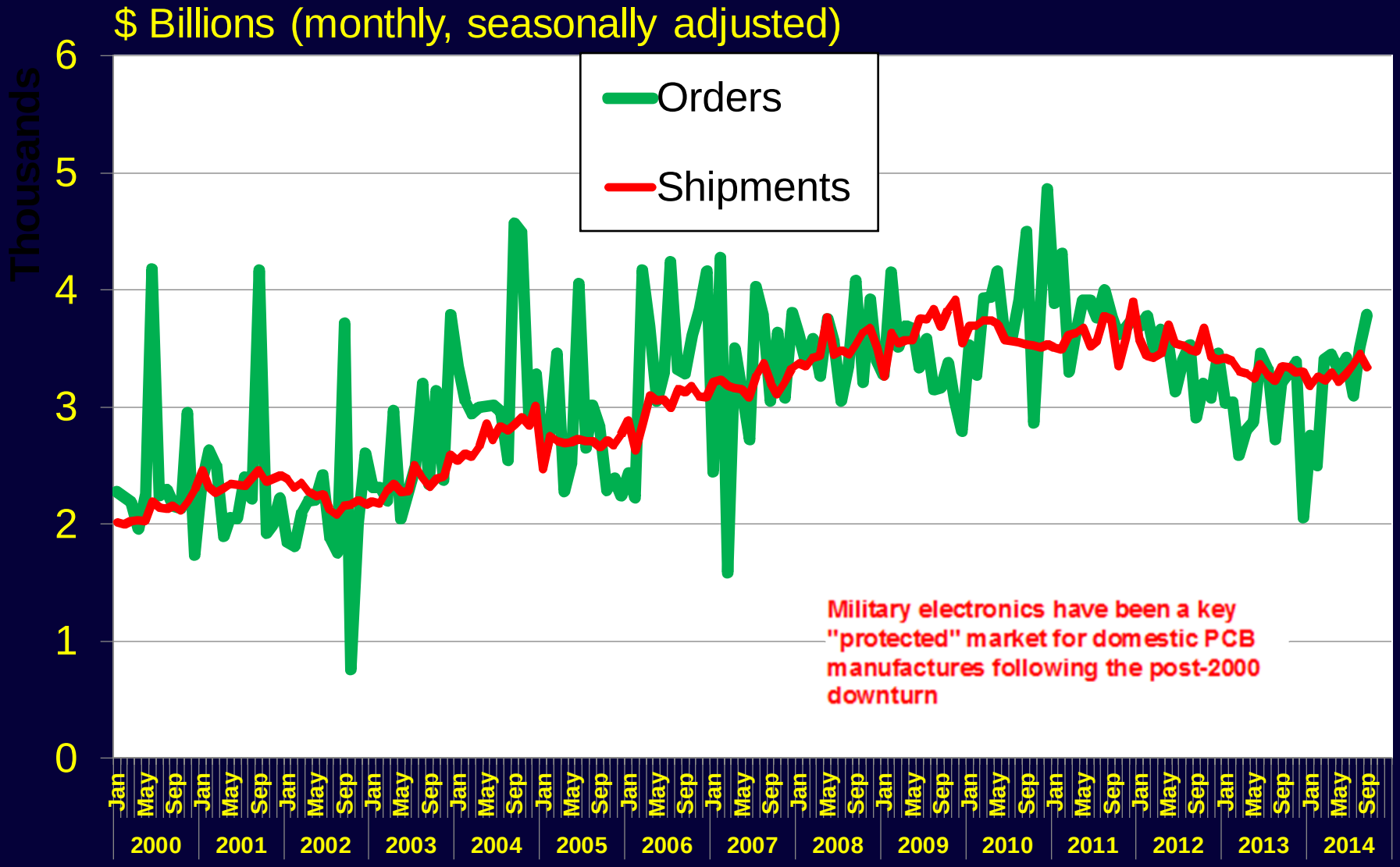

Eurostat, C291 category, EU 27 countries

# Aviation, Government & Military Electronics

20141104

# U.S. Military Electronics Orders & Shipments

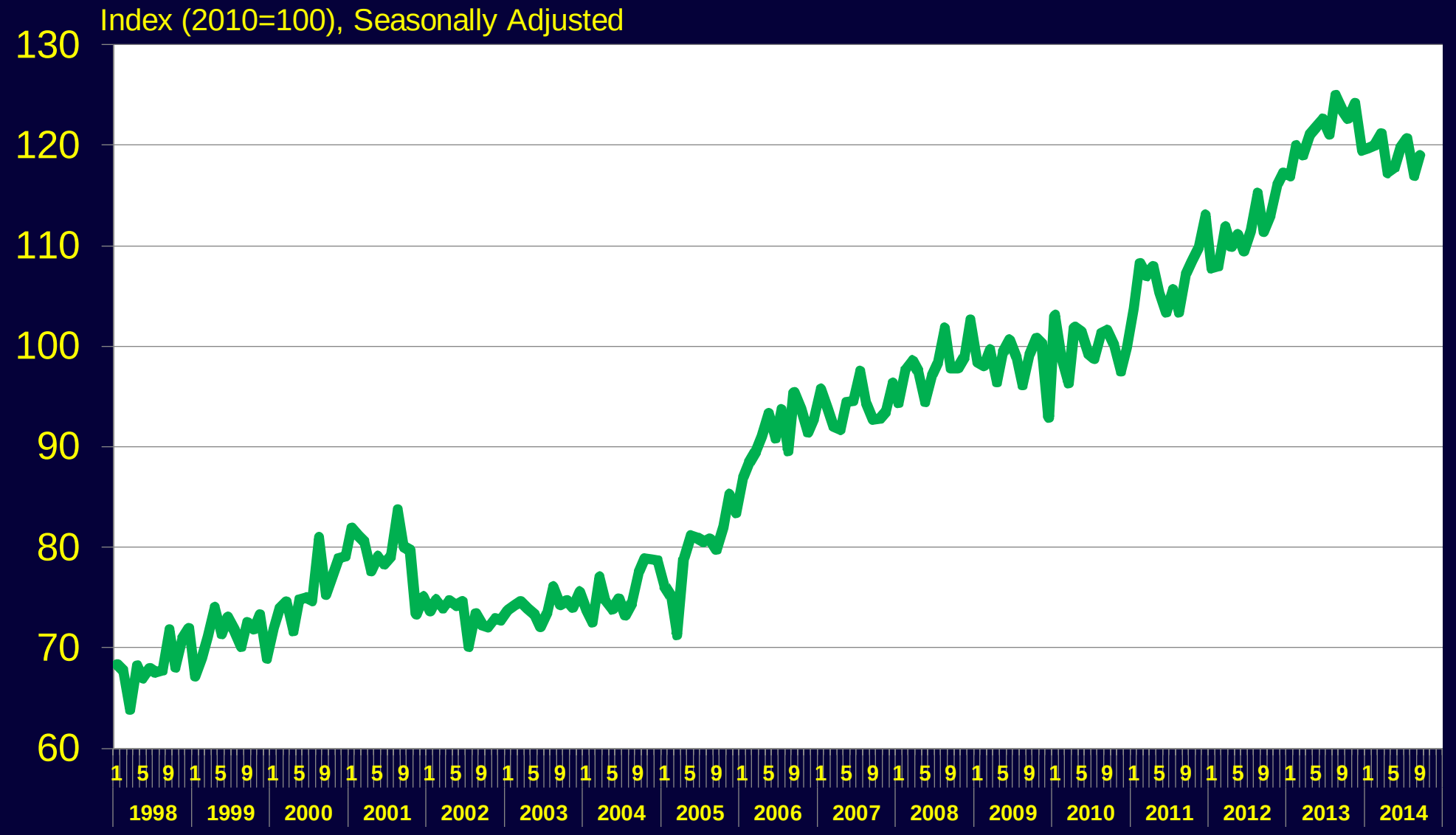
## Defense Communication & Search & Navigation Equipment




www.census.gov/indicator/www/m3/

20141112

# European Production - Aircraft, Spacecraft & Related Equipment

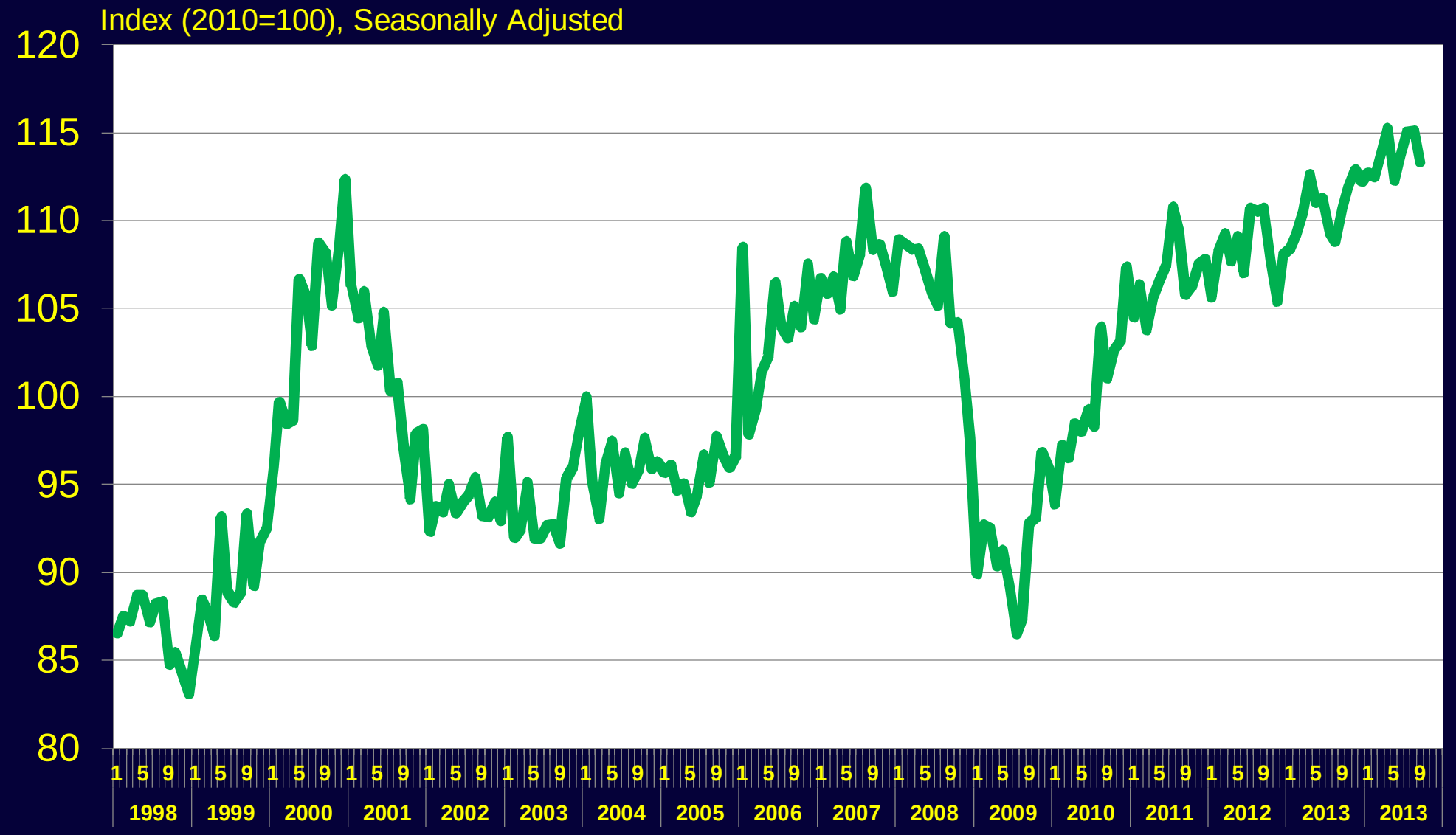



Eurostat, C303 category, EU 27 countries

# Instruments & Control Equipment

20141112

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

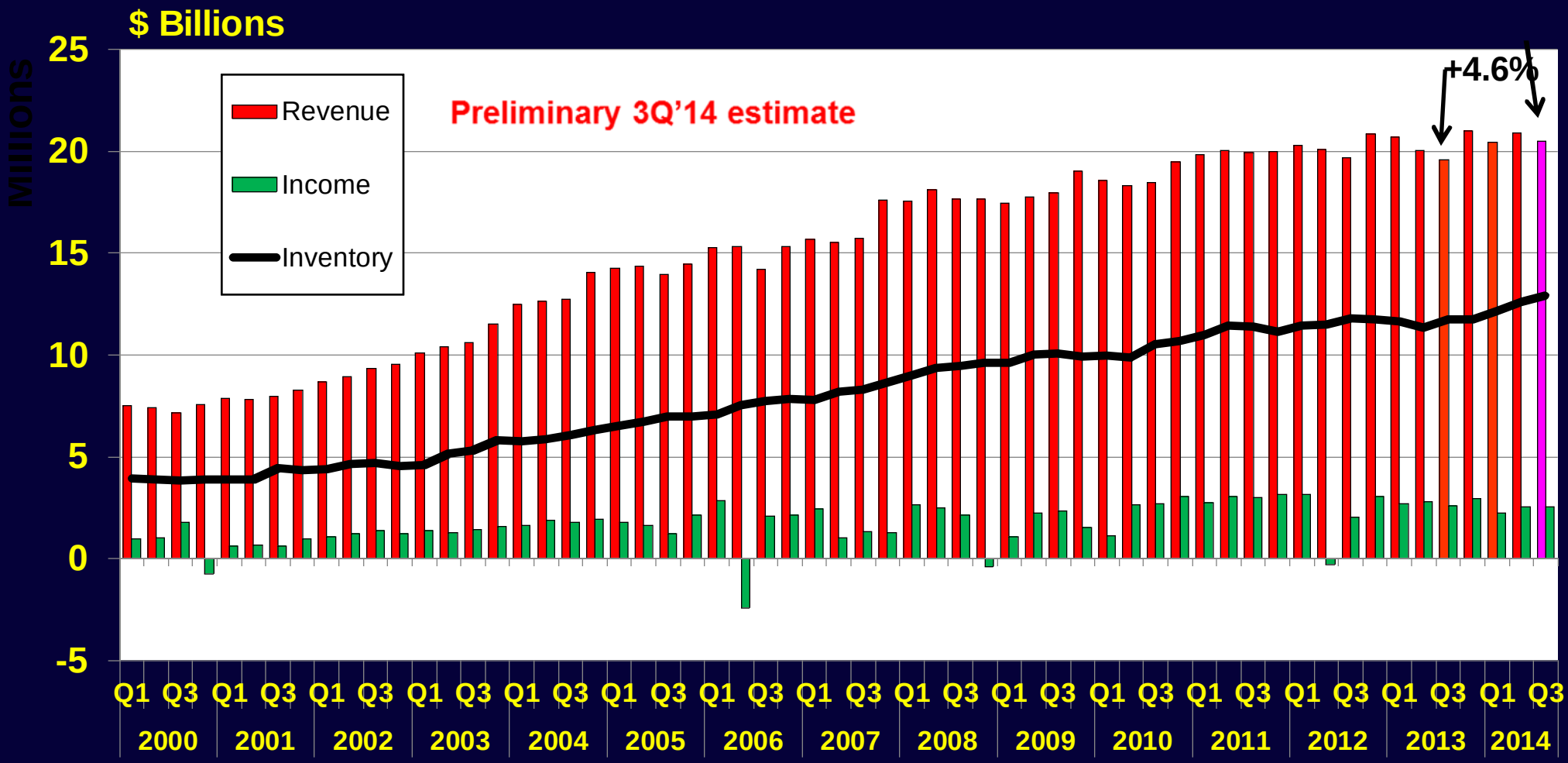



Eurostat, C2651 category, EU 27 countries

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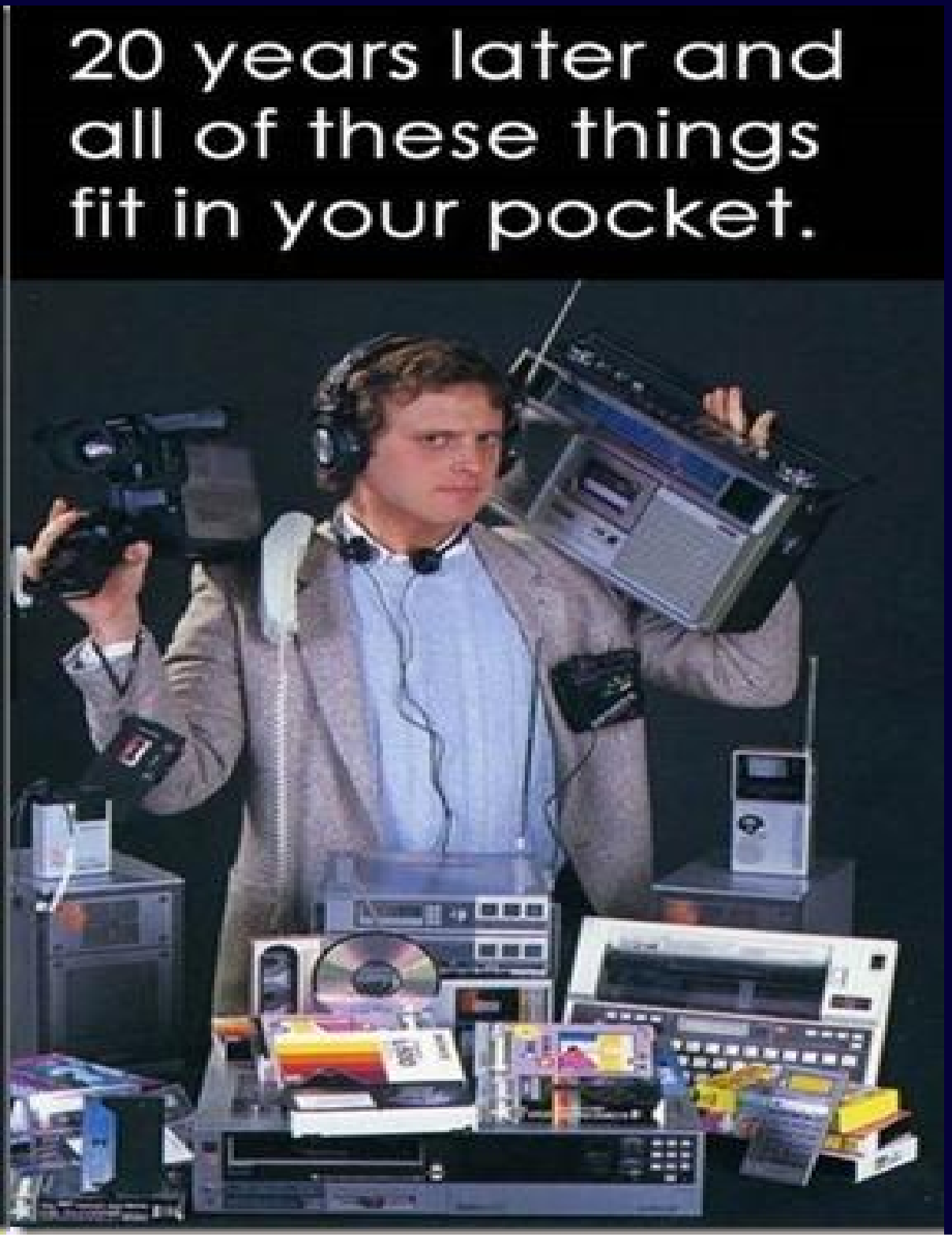
# Medical Equipment Composite of 20 Public Companies

## Revenue, Net Income & Inventory



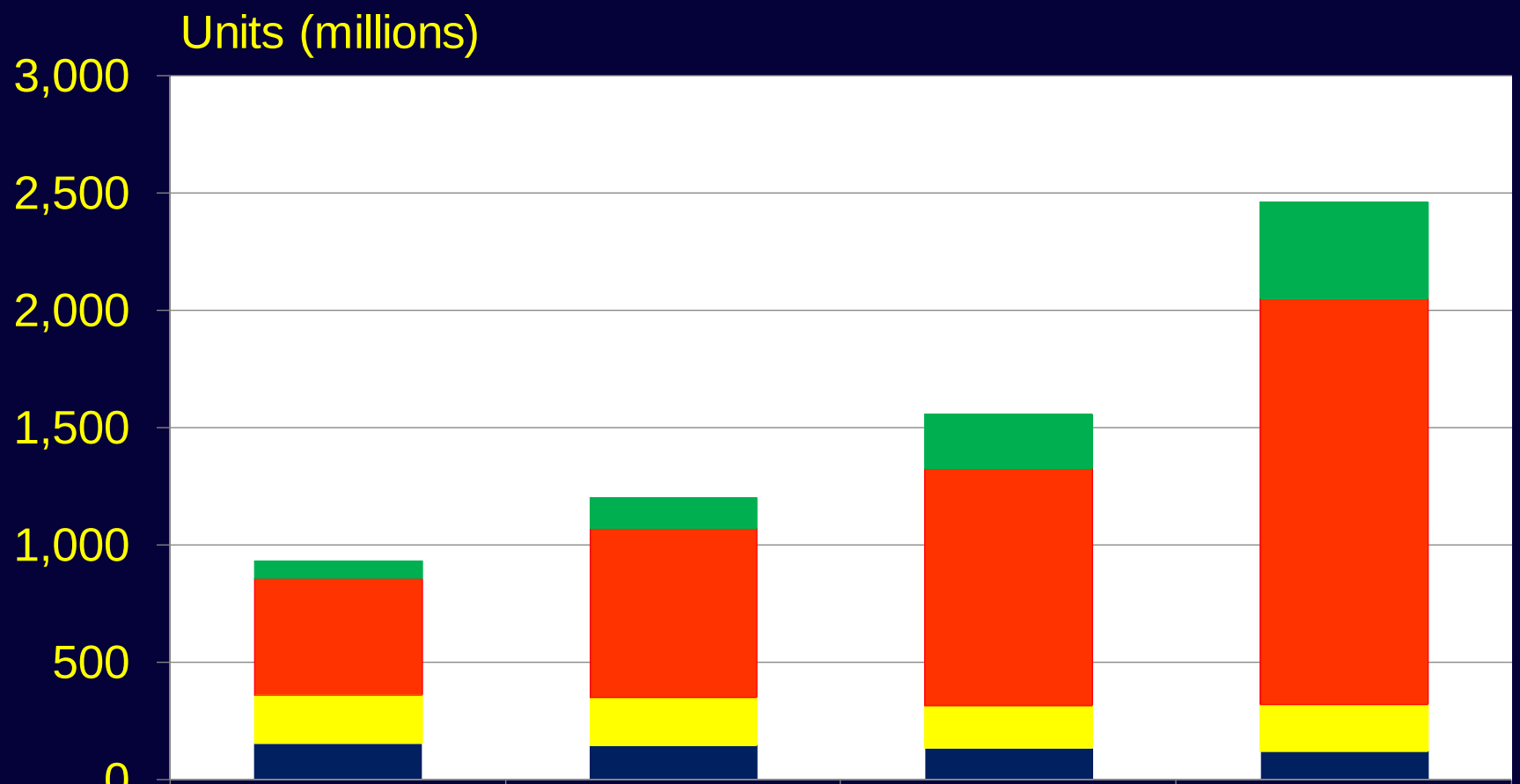

Analogic, Bio-Rad Laboratories, Boston Scientific, Bruker, CareFusion, Covidien, Draeger, Guidant, Hill-Rom, Intuitive Surgical, Invacare, Medtronic, ResMed, St Jude Medical, Smith & Nephew, STERIS, Stryker, Varian Medical, Waters, Zimmer

# High Volume Consumer Driven Markets




# Changing Electronic Equipment Markets

# Smart Connected Device Market by Type

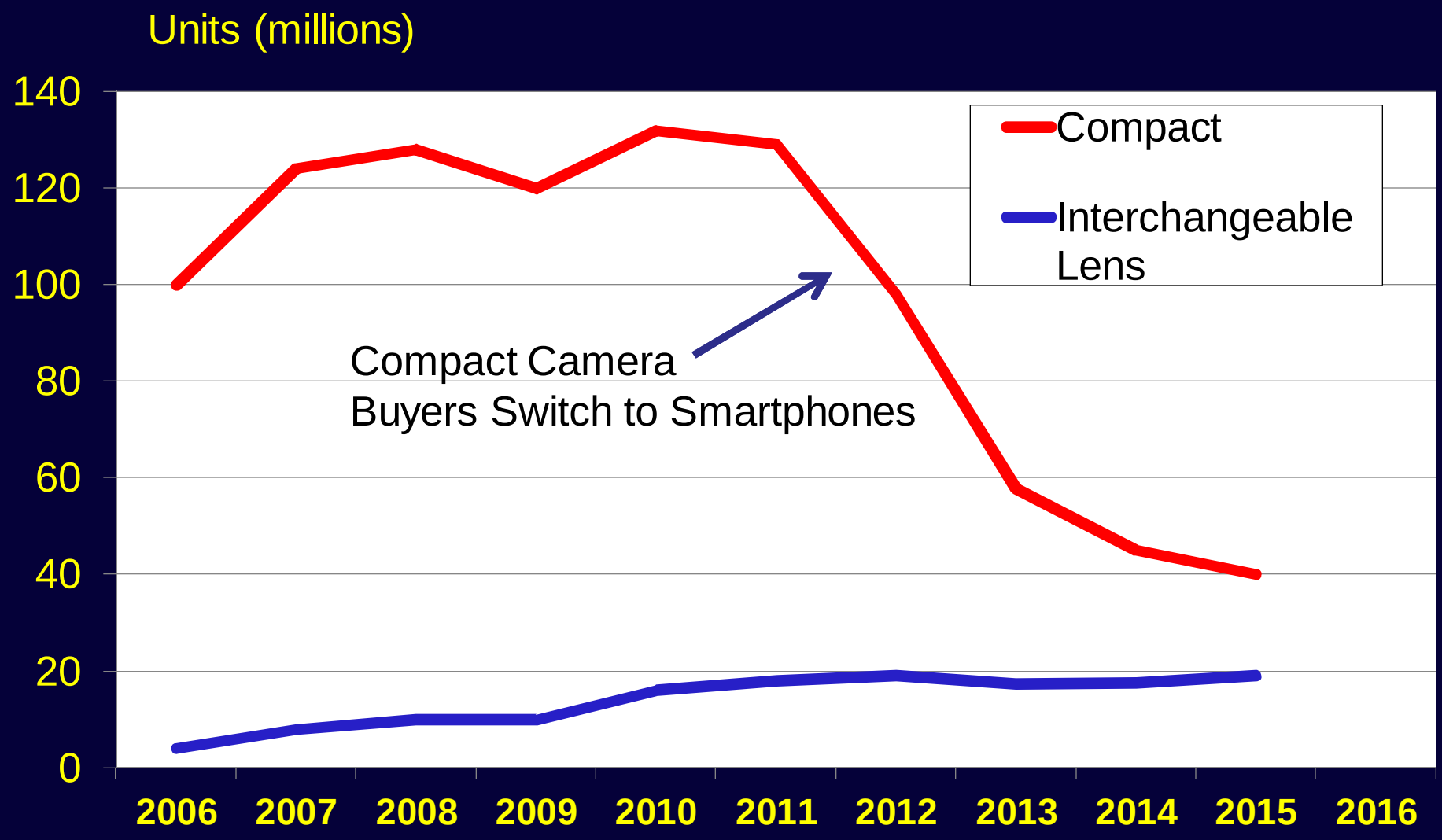



| | 2011 | 2012 | 2013 | 2017 |
|---|---|---|---|---|
| Tablet | 72 | 128 | 227 | 407 |
| Smartphone | 495 | 722 | 1,013 | 1,734 |
| Portable PC | 209 | 202 | 181 | 197 |
| Desktop | 155 | 148 | 134 | 123 |

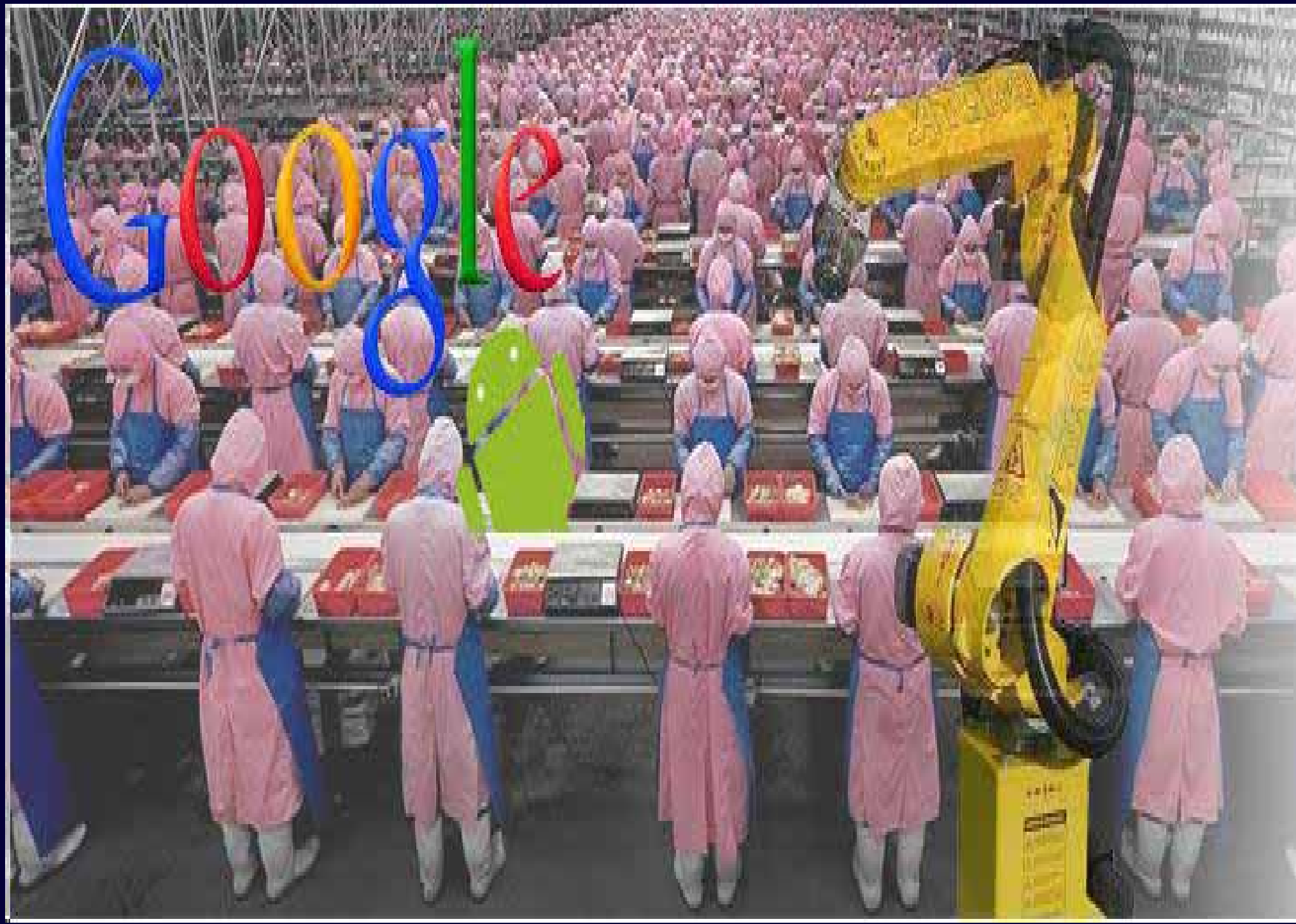
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20131108

# Global Camera Shipments
## Compact & Interchangeable Lens Cameras

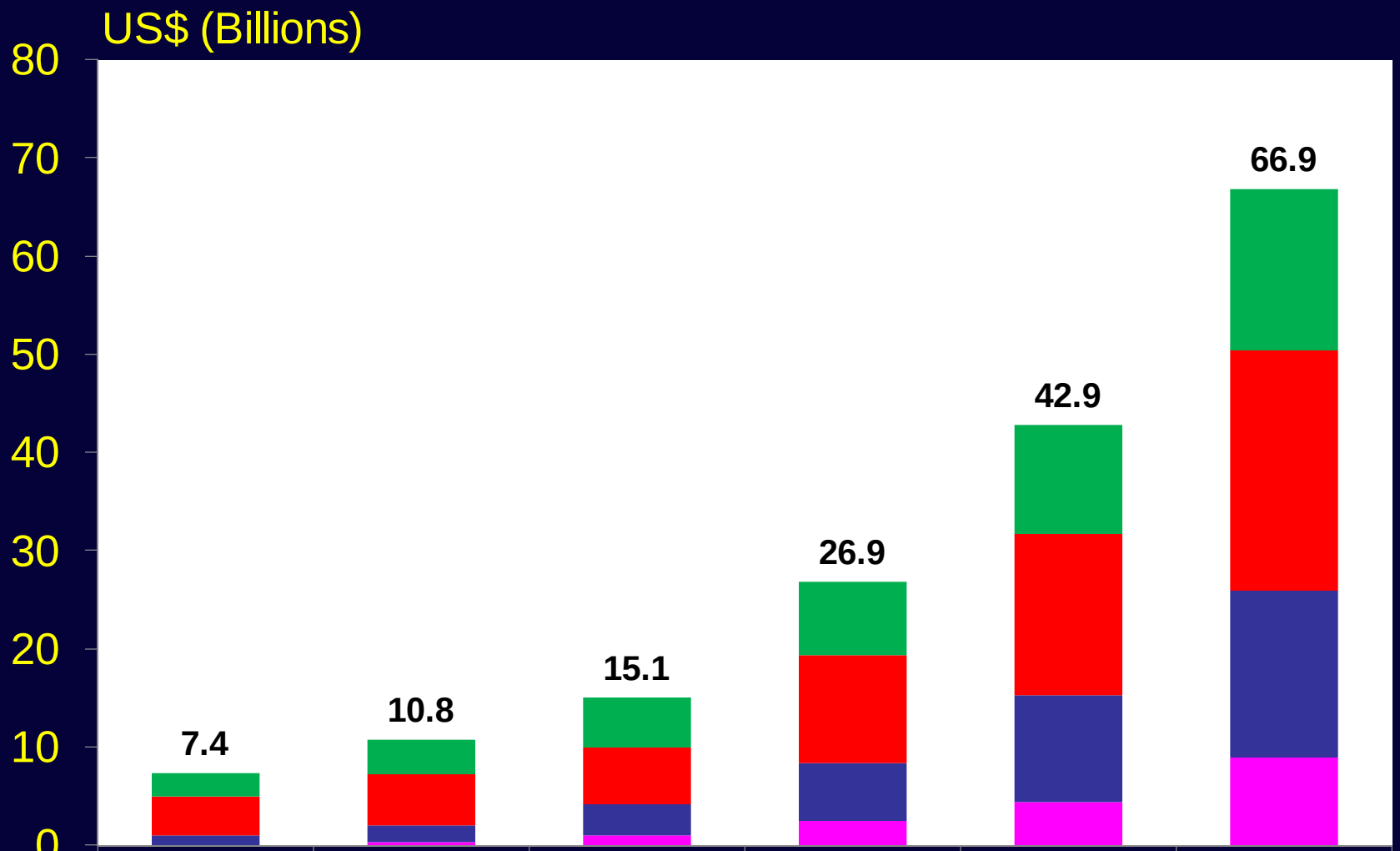



IDC 11/13


Google

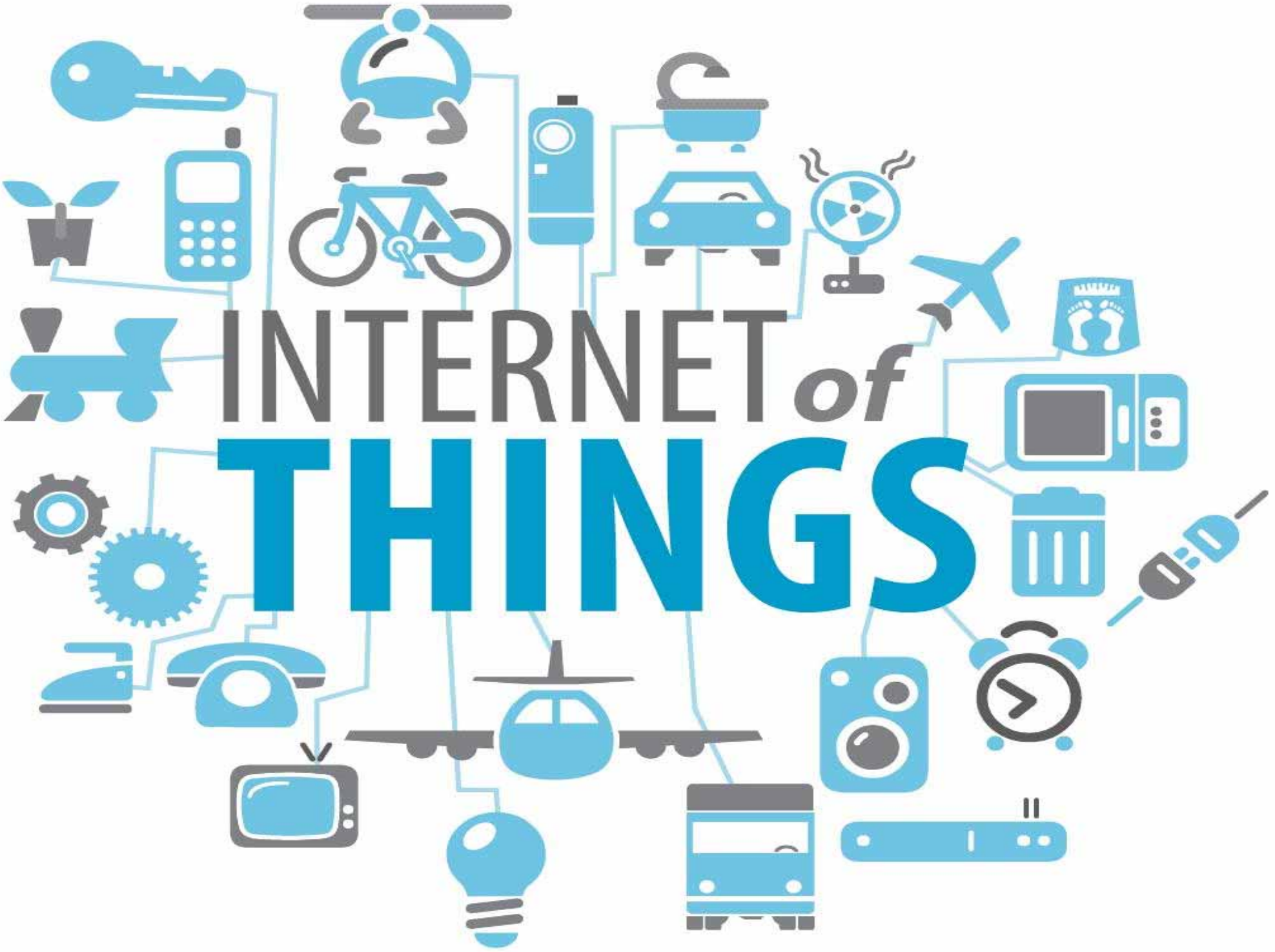
20140906

# World Spending on Robots




| | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 |
|---|---|---|---|---|---|---|
| Total | 7.4 | 10.8 | 15.1 | 26.9 | 42.9 | 66.9 |
| Military | 2.4 | 3.5 | 5.1 | 7.5 | 11.2 | 16.5 |
| Industrial | 3.9 | 5.2 | 5.8 | 11.0 | 16.4 | 24.4 |
| Commercial | 1.1 | 1.7 | 3.2 | 5.9 | 10.8 | 17.0 |
| Personal | 0.0 | 0.4 | 1.0 | 2.5 | 4.5 | 9.0 |

BCG Analysis 9/14, International Federation of Robots, Japan Robot Assoc, Japan Ministry of Economy, Trade & Industry, euRobotics, company filings


INTERNET of
THINGS

20140526

# Wearable Computing Device Shipments by Category Units (millions)

| | 2013 | 2014 | 2015 |
|---|---|---|---|
| Wearable Cameras | 6.6 | 13.6 | 15.8 |
| Smart Glasses | 0.0 | 2.1 | 10.6 |
| Smart Watches | 1.2 | 7.4 | 24.9 |
| Healthcare | 13.5 | 22.6 | 34.3 |
| Sports/Activity Trackers | 32.5 | 42.6 | 57.4 |
| Wearable 3D Motion Trackers | N/A | 0.9 | 2.0 |
| Smart Clothing | 0.0 | 0.7 | 1.2 |
| Total | 53.9 | 90.0 | 164.2 |

# Internet of Things

Internet of Things will generate 400 Zetabytes of data in 2018, up from 100 ZB in 2013 (Cisco)

Boeing 787 generates 40 TB of data/hour

Automated manufacturing facility generates 1TB of data/hour of which 5 Gb is transmitted to a data center

Cloud-based services are critical for Internet of Everything

# Semiconductors

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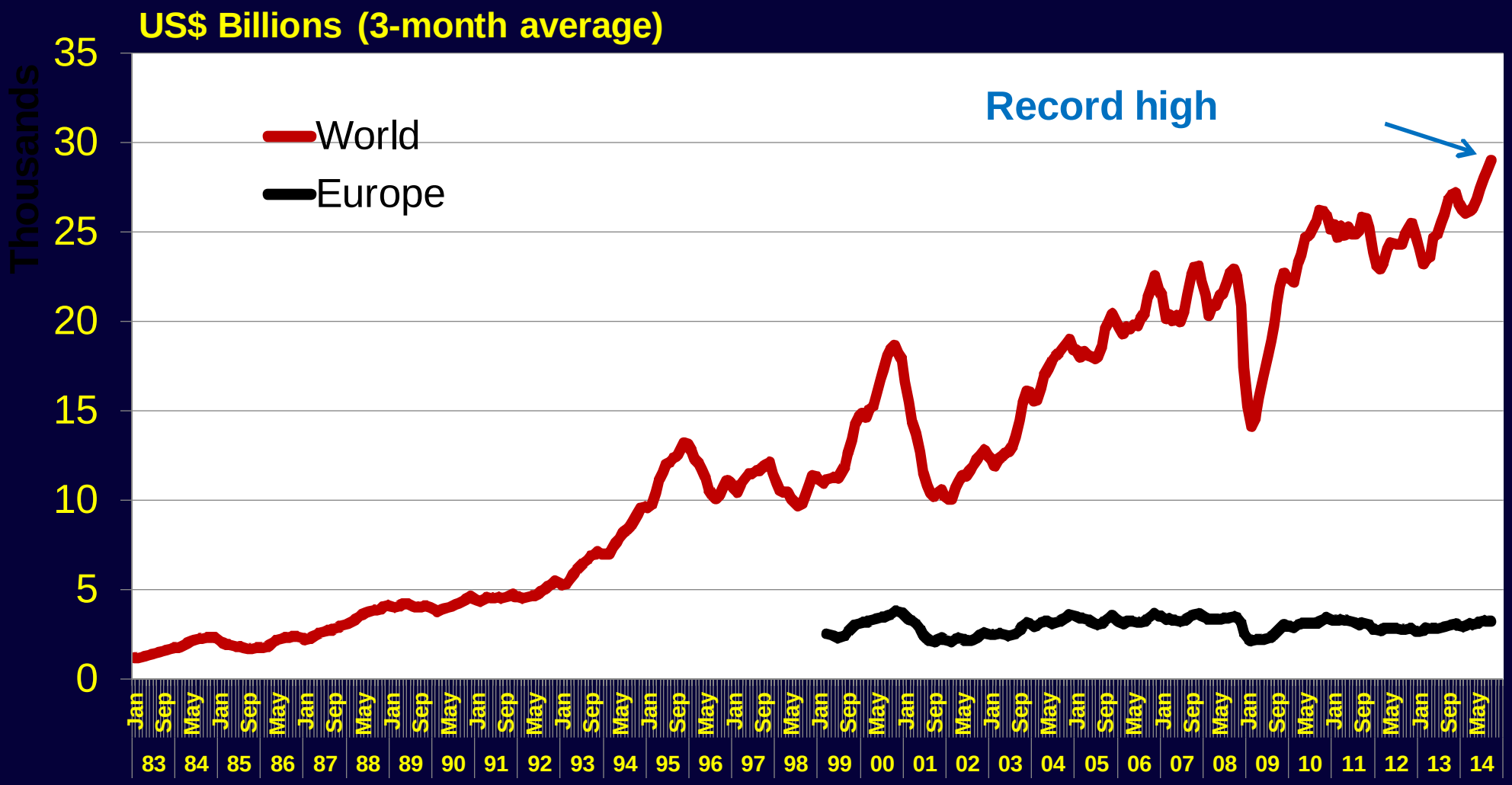
# 2014F Worldwide Semiconductor Sales Leaders (US$ millions, including Foundries)

| Rank | Maker | 2014 | 2014/2013 |
|---|---|---|---|
| 1 | Intel | 51,368 | 6% |
| 2 | Samsung Electronics | 37,259 | 8% |
| 3 | TSMC | 25,088 | 26% |
| 4 | Qualcomm | 19,100 | 11% |
| 5 | Micron+Elpida | 16,614 | 16% |
| 6 | SK Hynix | 15,838 | 22% |
| 7 | Texas Instruments | 12,179 | 6% |
| 8 | Toshiba | 11,216 | -6% |
| 9 | Broadcom | 8,360 | 2% |
| 10 | STMicroelectronics | 7,374 | -8% |
| 11 | Renesas | 7,372 | -8% |
| 12 | MediaTek+MStar | 7,142 | 25% |
| 13 | Infineon | 6,151 | 17% |
| 14 | NXP | 5,265 | 17% |
| 15 | AMD | 5,512 | 4% |
| 16 | Sony | 5,192 | 10% |
| 17 | Avago+LSI | 5,087 | 2% |
| 18 | Freescale | 4,548 | 14% |
| 19 | UMC | 4,300 | 9% |
| 20 | Nvidia | 4,237 | 9% |
| | Total Top 20 | 259,562 | 9% |

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# World Semiconductor Shipments

## Monthly US$

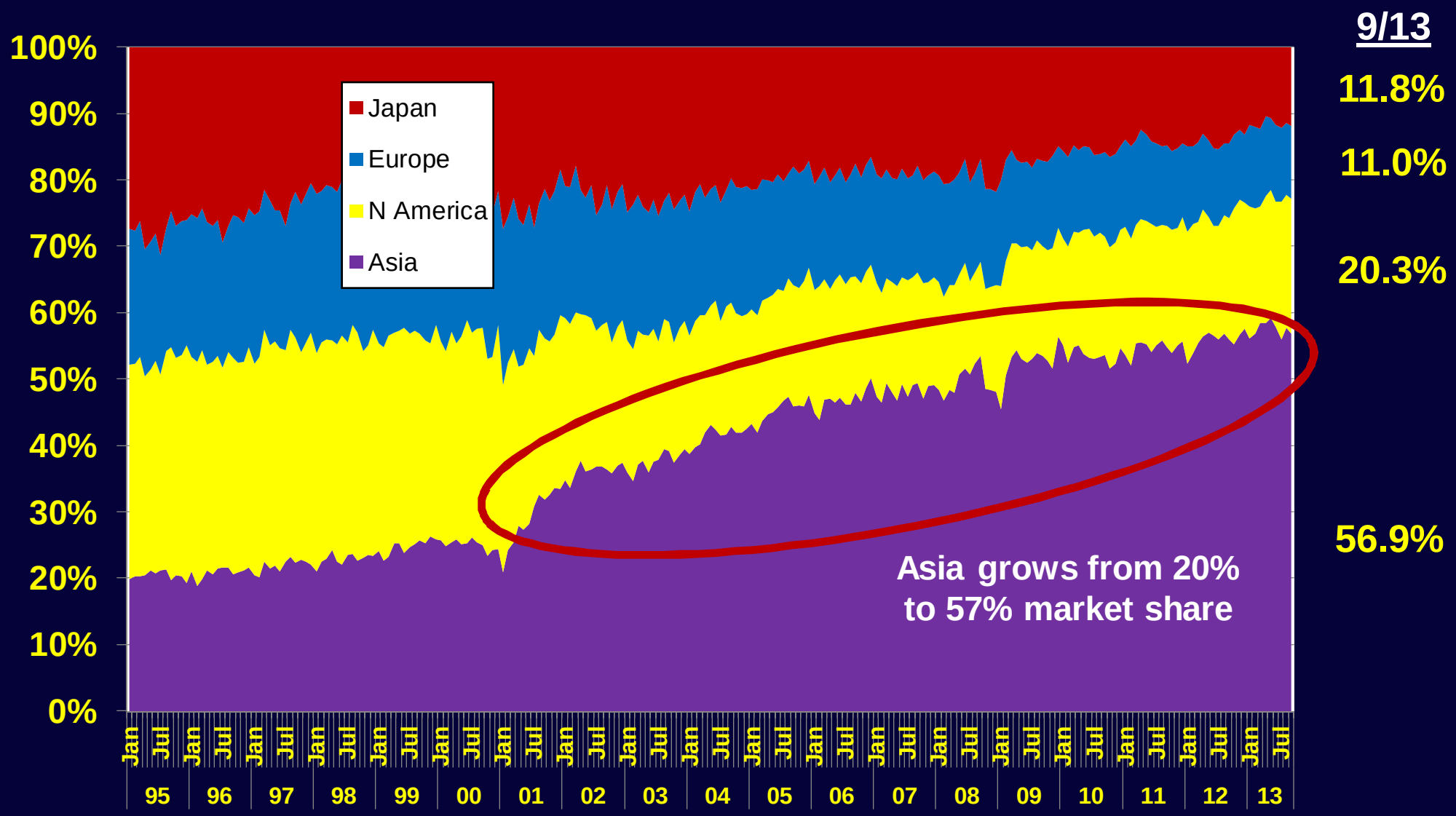



SIA

20131104

# Total Semiconductor Shipments to an Area

## Monthly Shipments - Reporting Firms



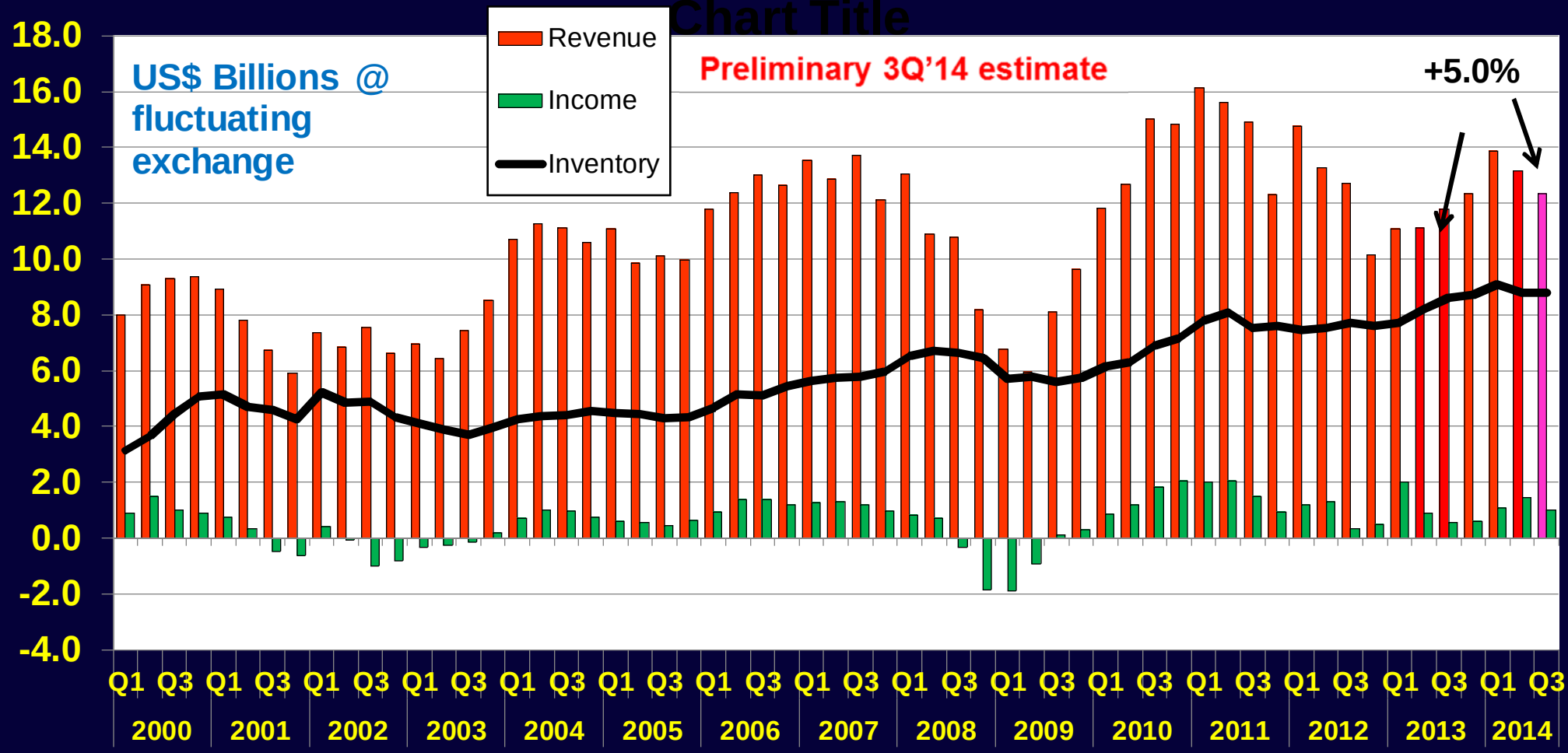

SIA website: www.sia-online.org/

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

# Semiconductor Fab, Test & Measurement
# Composite of 30 Public Companies

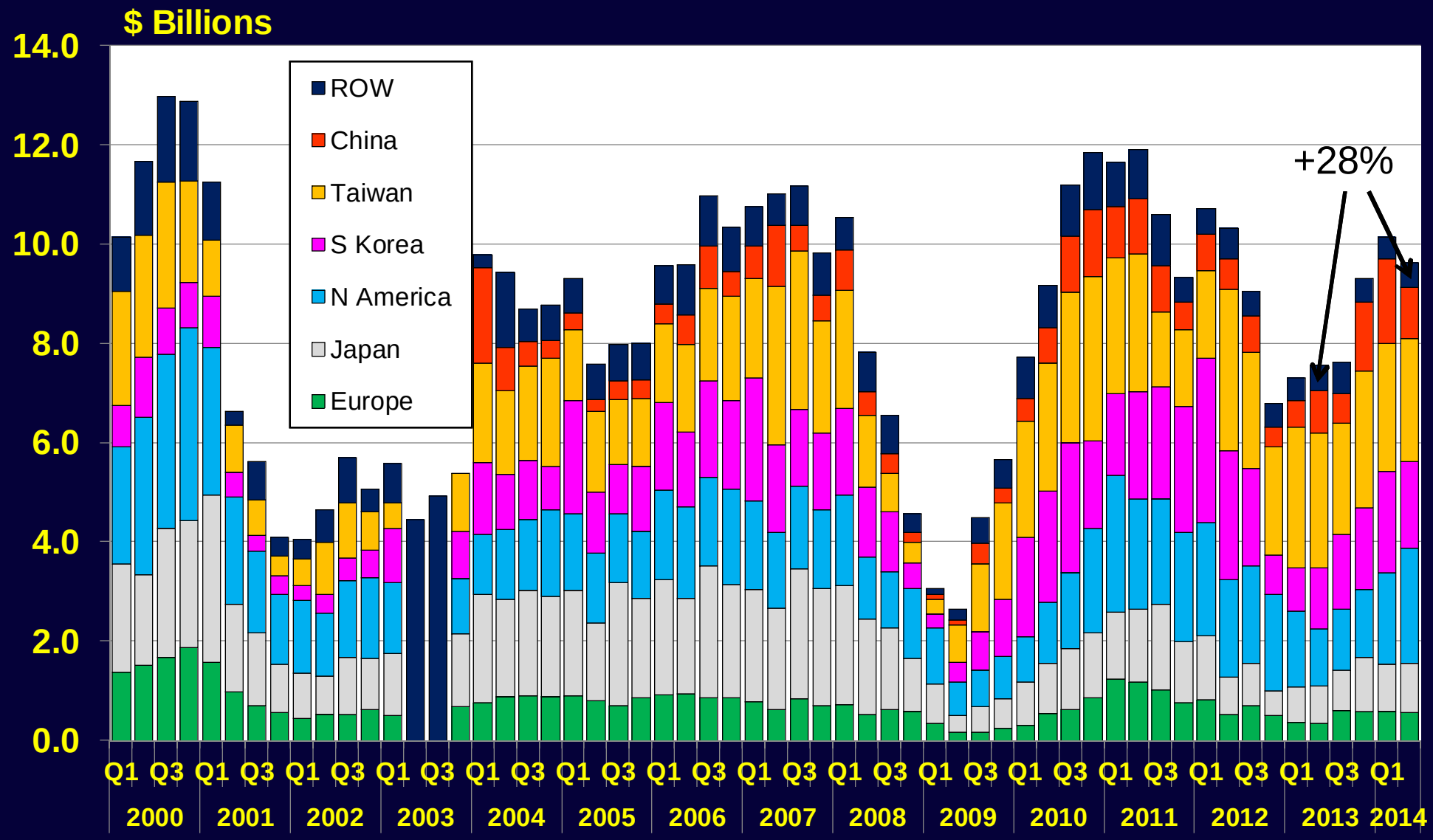
20141104

## Revenue, Net Income & Inventory




Advantest, Applied Materials, ASM Intl, ASML, Brooks Automation, BTU, CollabRx, Dainippon Screen, Disco, Electroglas, Entegris, FEI, FSI, Hitachi Hi Tech, Hitachi Kokosai, KLA-Tencor, Ibis, Intervac, Kulicke & Soffa, Lam Research, MKS Instrument, Novellus Systems, Photon Dynamics, Rudolph Technologies, Teradyne, Tokyo Electron, Ultra Clear, Ultratech Stepper, Varian Semiconductor, Veeco, Xcerra (LTX-Credence)

# Semiconductor Capital Equipment Shipments by Area

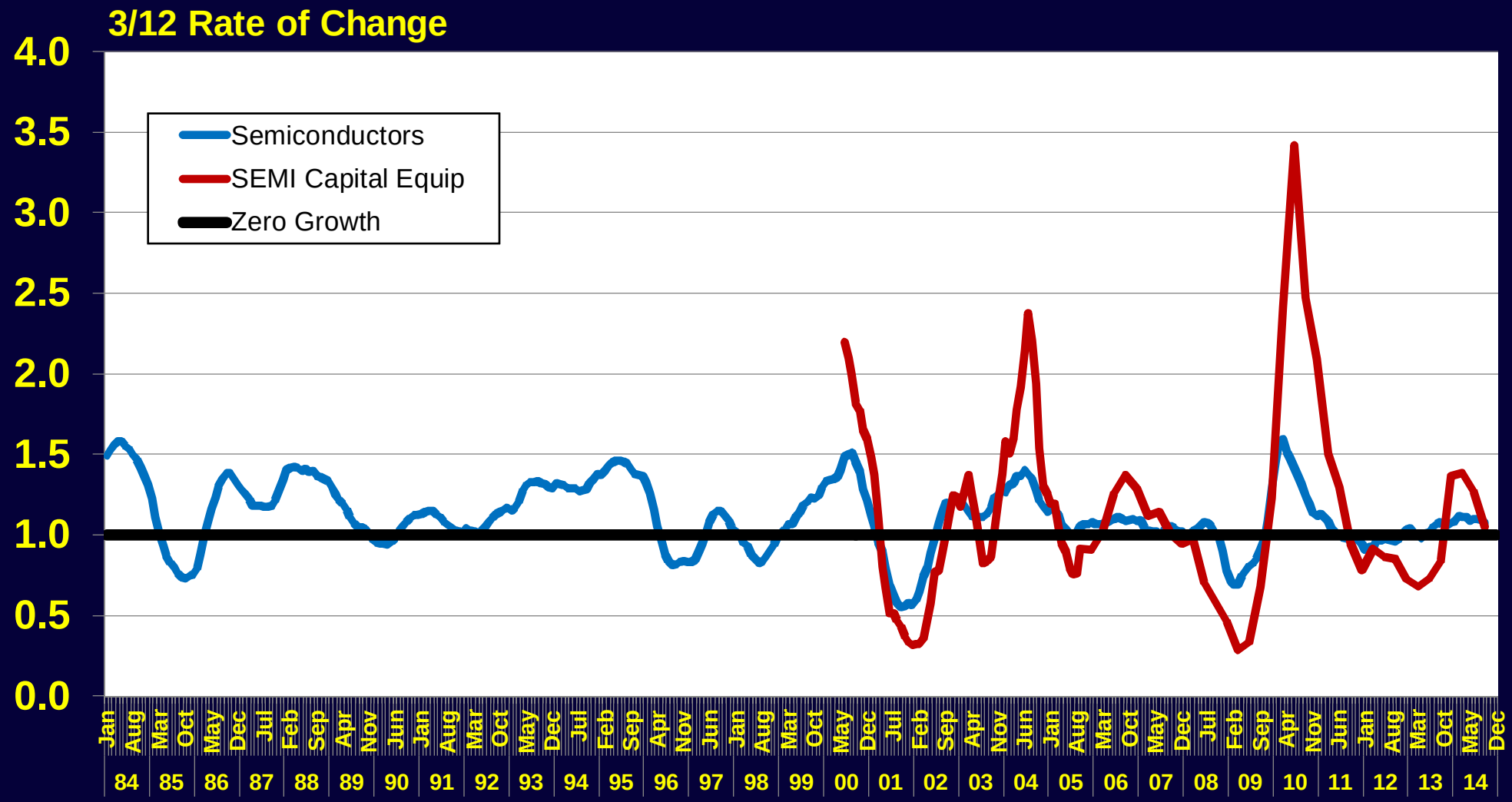



www.semi.org, www.seaj.or.jp/ 9/14

# Global Semiconductor & Semiconductor Capital Equipment

## 3-Month Shipment Growth Rates on $ Basis

20141102

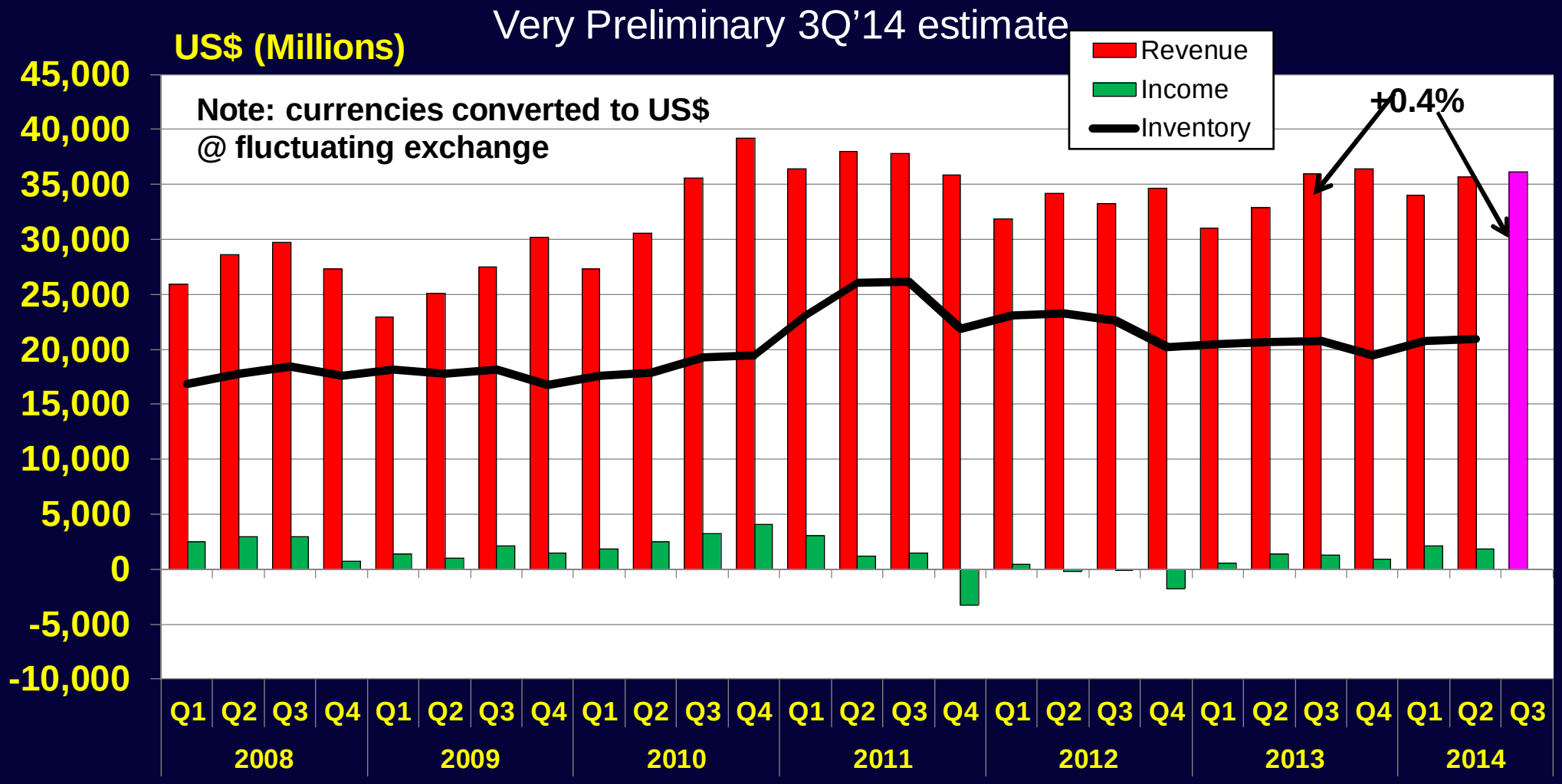



Sources: SIA; Semiconductor Equipment Association of Japan, www.semi.org, Custer Consulting Group SEMI equipment sector composite growth

# Solar/Photovoltaic

20141109

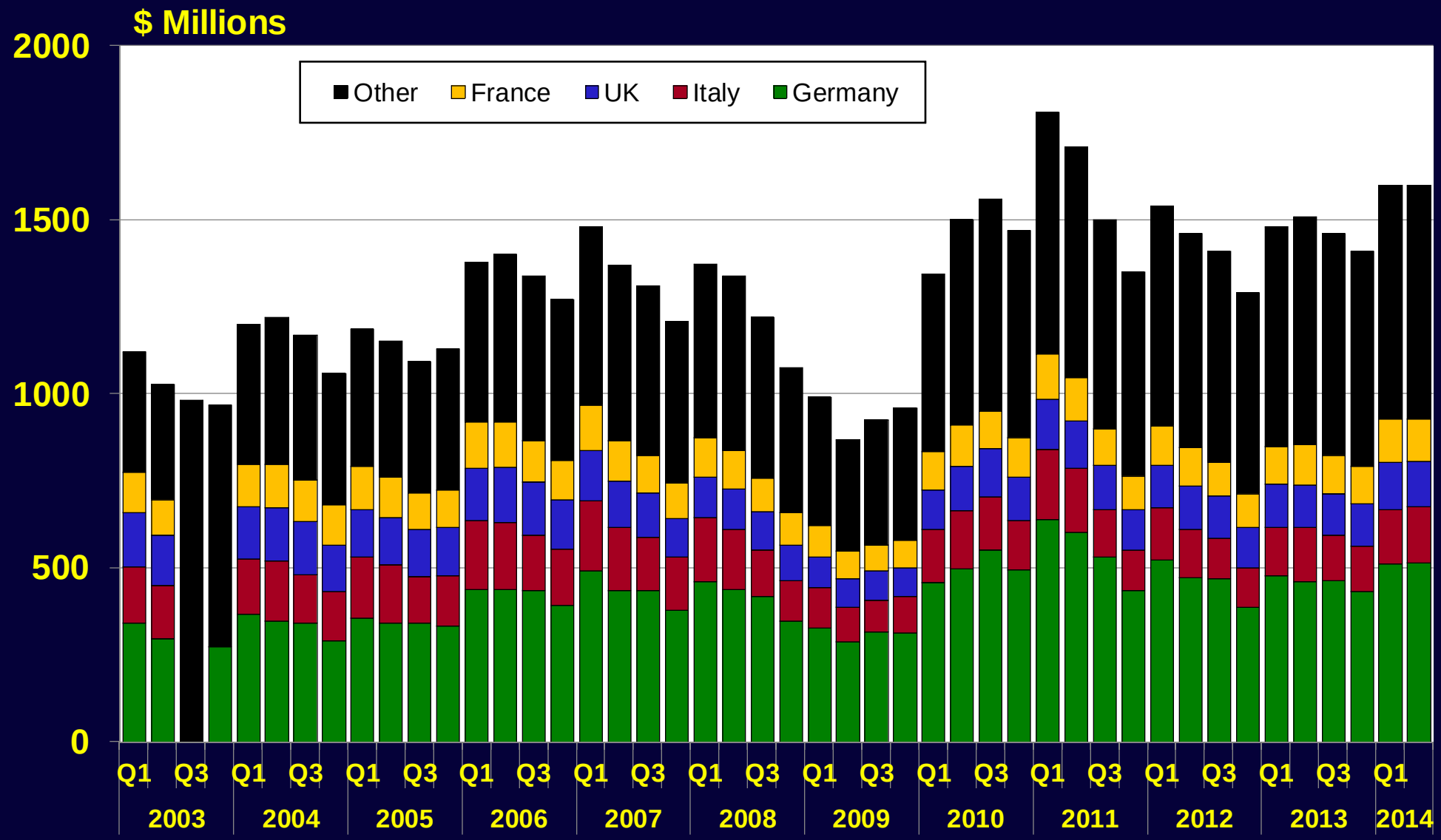
# Solar/Photovoltaic Financials
# Composite of 90 Public Global Companies
## Revenue, Net Income & Inventory



# Component Distributors

20120824

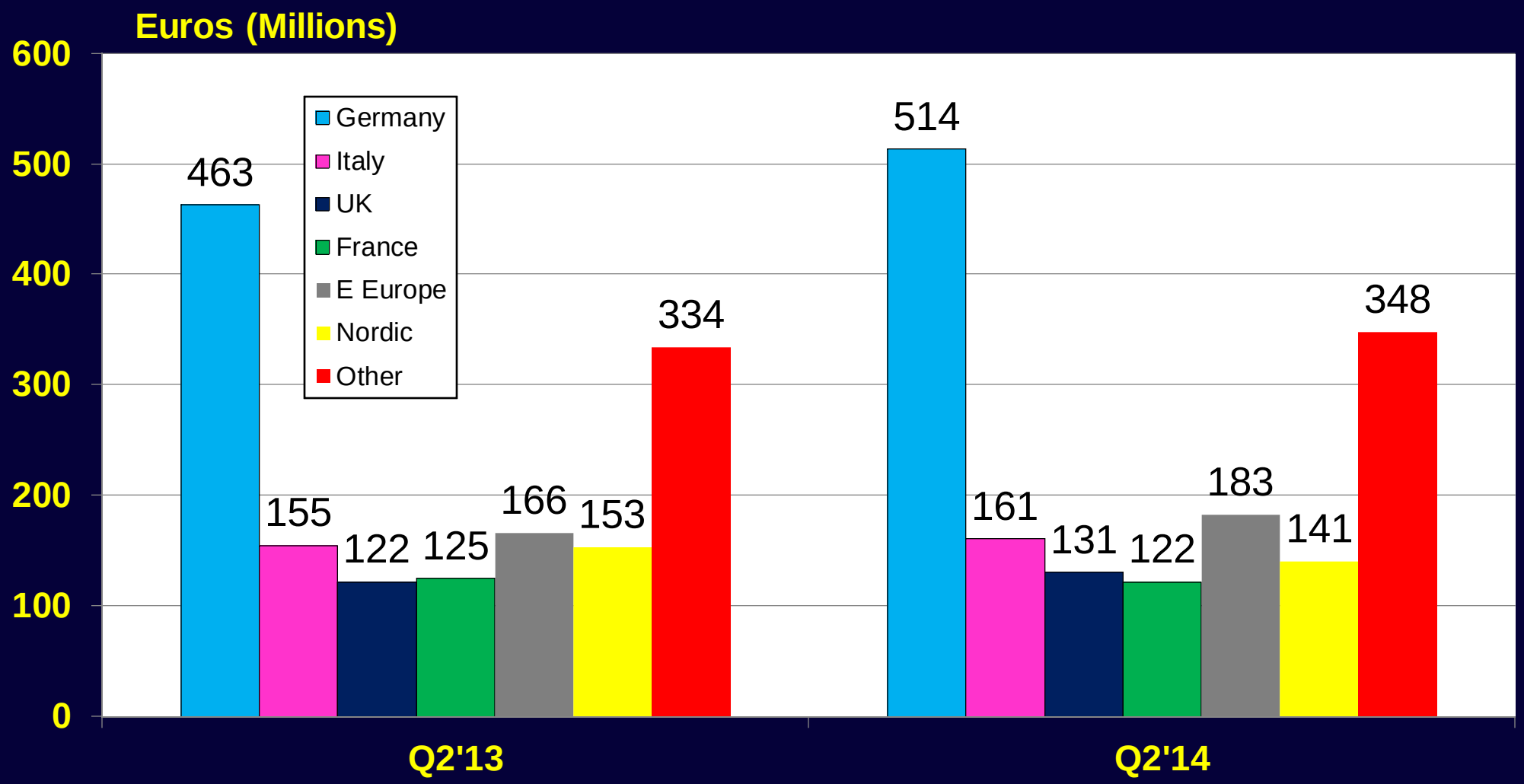
# DMASS - European Semiconductor Distribution Industry



20140824

# DMASS

## European Semiconductor Distribution Industry

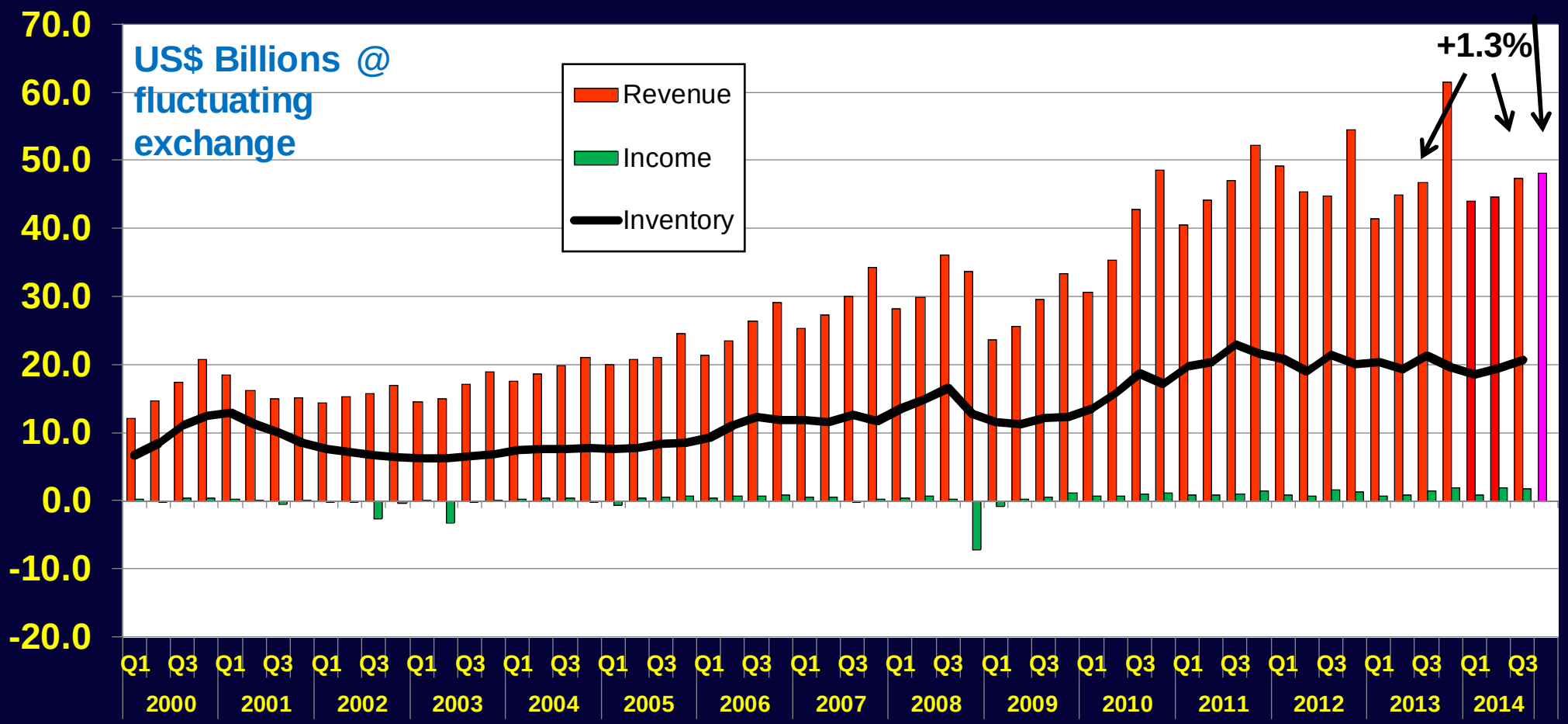



DMASS 8/2014; http://dmass.com/

# EMS & ODM Companies

20141109

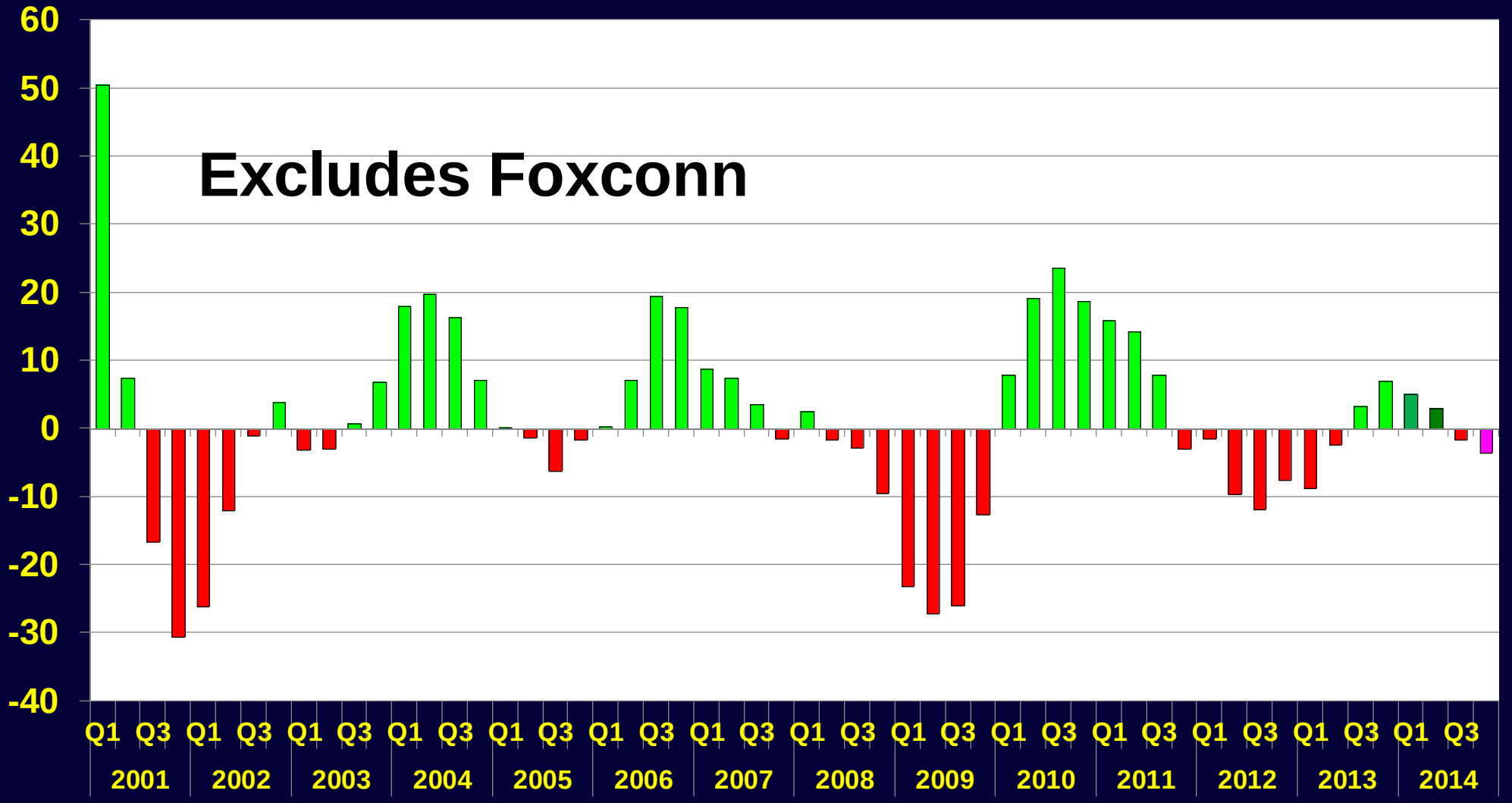
# Large EMS Providers
# Composite of 9 Public Companies
## Revenue, Net Income & Inventory




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

20141109

# Large EMS Providers
# Composite of 8 Public Companies
## Quarterly Revenue Growth




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

20140110

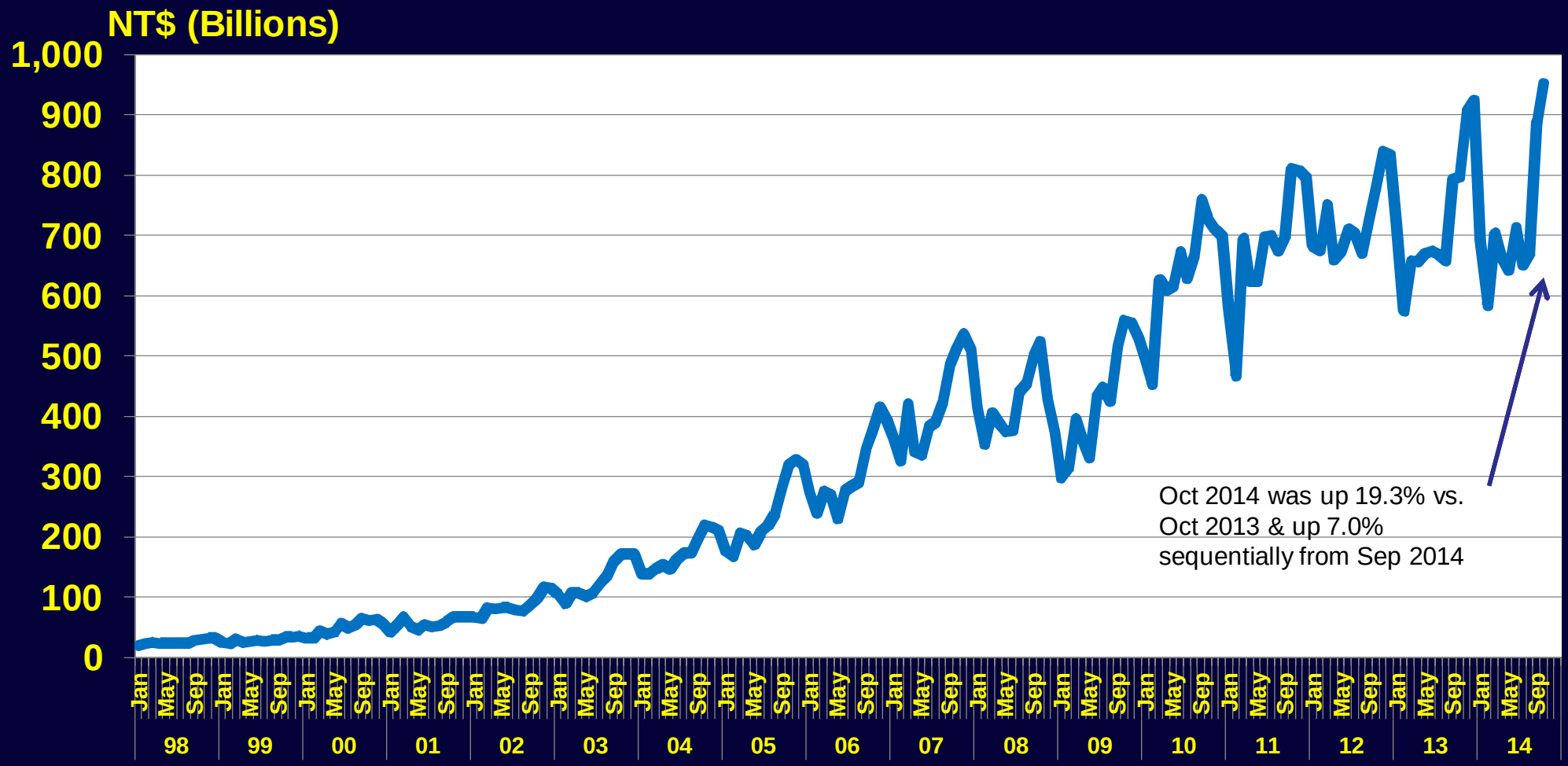
# Large Taiwan ODM Providers

## 2012 vs. 2013 Sales ($M)

| | 2012 | 2013 | 2013/2012 Growth % |
|---|---|---|---|
| Foxconn (Hon Hai) | 136,515 | 133,238 | -2% |
| Pegatron | 30,800 | 32,029 | +4% |
| Quanta Computer | 33,400 | 29,666 | -11% |
| Compal Electronics | 23,567 | 23,341 | -1% |
| Wistron | 22,869 | 21,793 | -5% |
| Inventec | 15,406 | 15,537 | +8% |
| Asustek Computer | 15,237 | 15,616 | +2% |
| Chimei Innolux | 16,241 | 14,244 | -12% |
| Lite On Technology | 7,266 | 7,171 | -1% |
| Total | 301,301 | 292.635 | -3% |

Source: Company data, NT$ converted at constant avg 2013 exchange (29.672 NT$ = 1US$)
Consolidated company sales (to be updated soon to consolidated sales)

# Taiwan ODM Companies
# Composite Sales of 11 Large Manufacturers




**Company Financial Releases**

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

20141014

# European Loaded Electronic Board Production



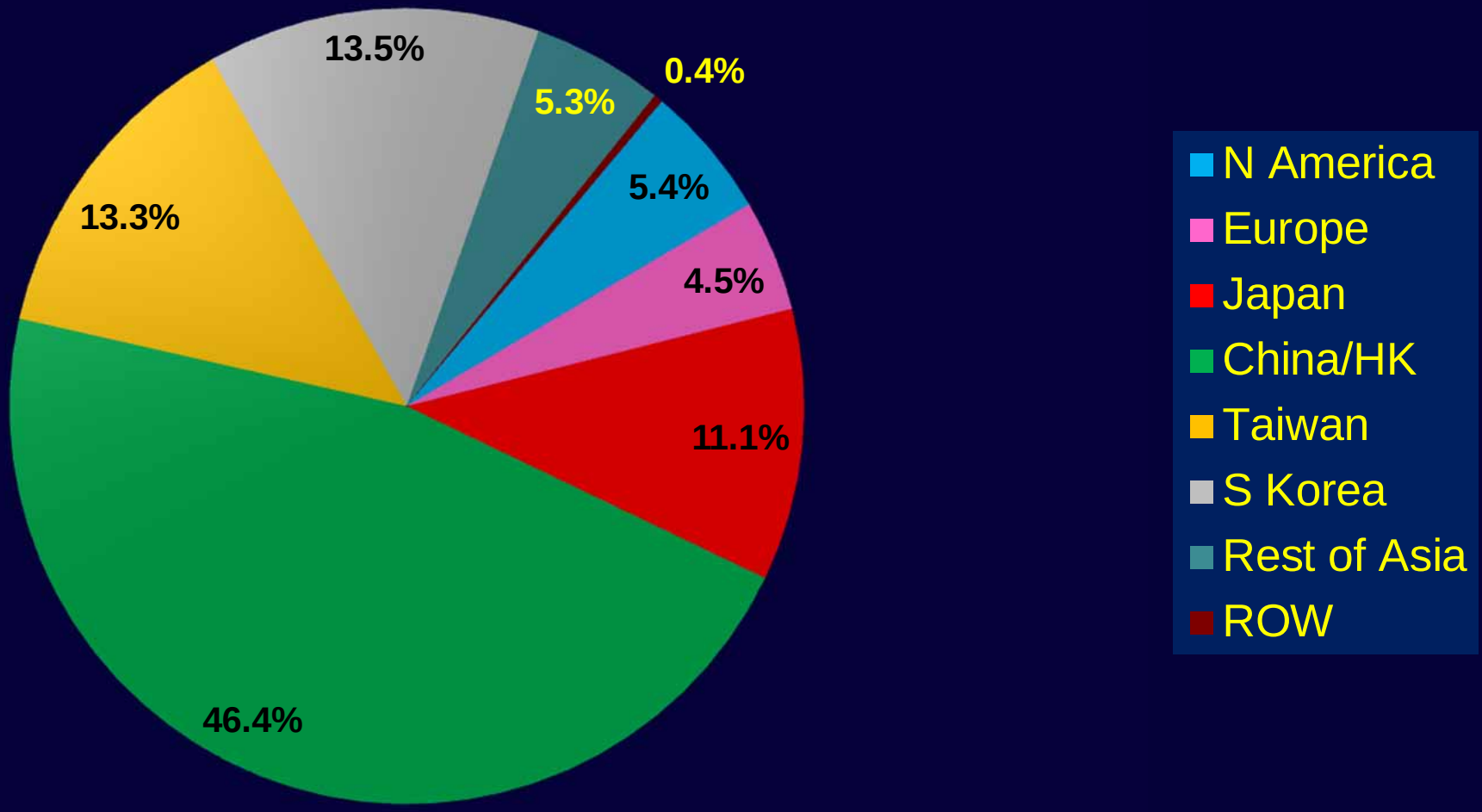

Eurostat, C2612

# PCB Fabrication

20140916

# 2013 World Rigid PCB Production by Geographical Area

**(US$ M @ Average 2013 Exchange)**



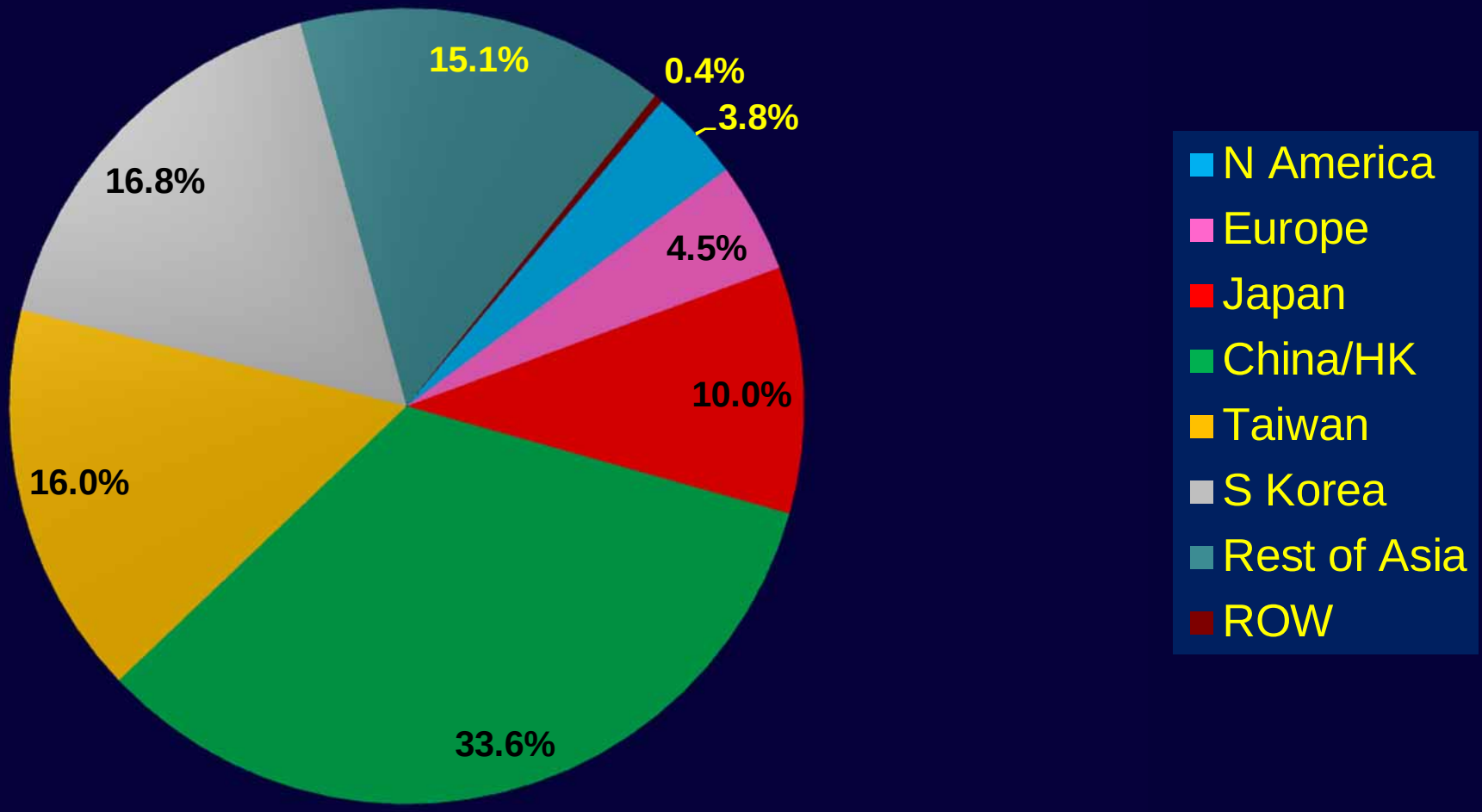

**Total: $49.2 Billion**

IPC 8/14

# 2013 World Flex & Rigid-Flex PCB Production by Geographical Area

20140916

**(US$ M @ Average 2013 Exchange)**




**Total: $10.2 Billion**

IPC 8/14

20131111

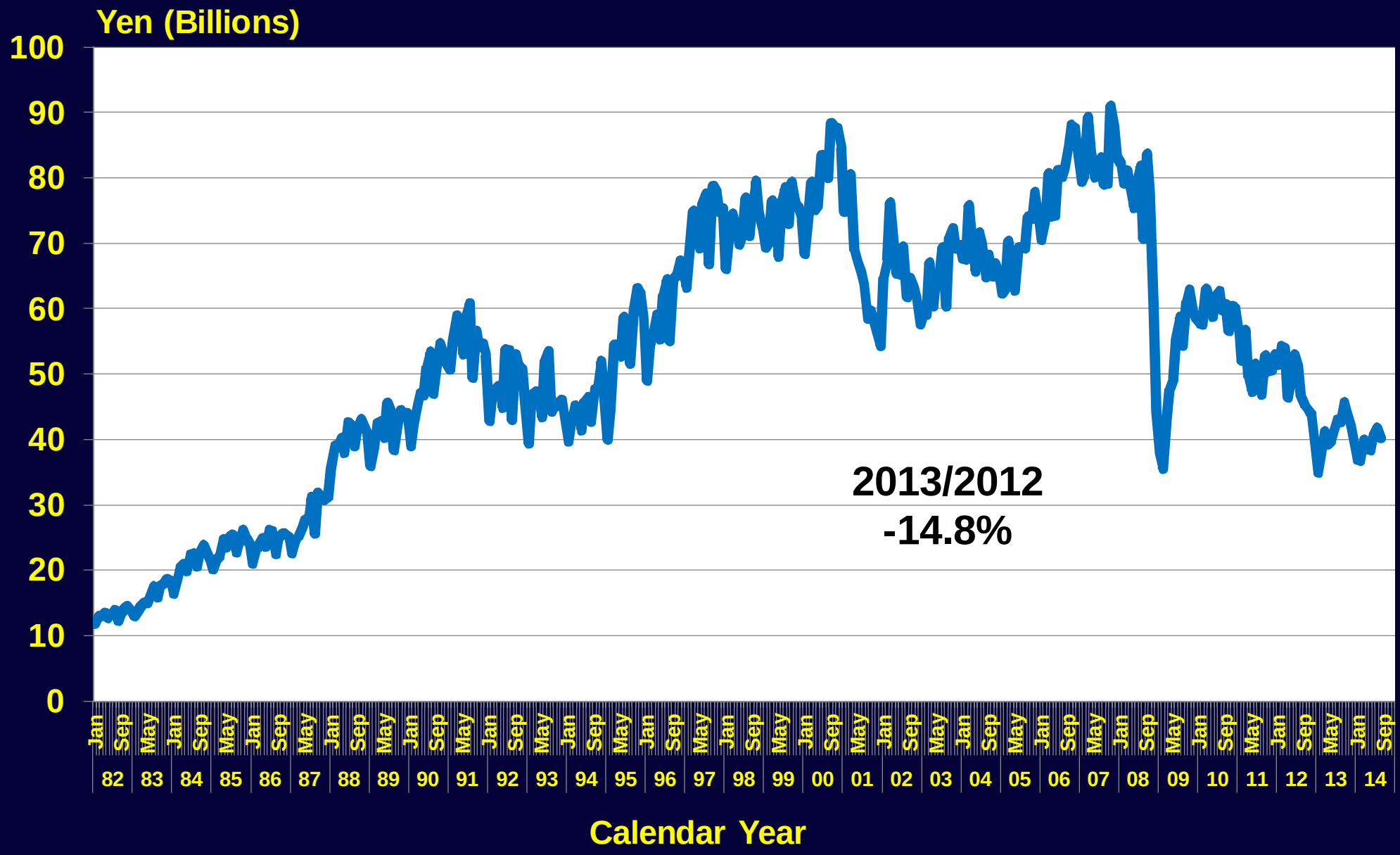
# World's Top PCB Companies - 2013

| Rank | Maker | Country | US$M |
|---|---|---|---|
| 1 | Nippon Mektron | Japan | 2,530 |
| 2 | Young Poong Group | Korea | 2,253 |
| 3 | Unimicron | Taiwan | 2,148 |
| 4 | Zhen Ding Technology | Taiwan | 2,117 |
| 5 | SEMCO | Korea | 1,865 |
| 6 | Ibiden | Japan | 1,506 |
| 7 | Tripod | Taiwan | 1,382 |
| 8 | Sumitomo Denko PC | Japan | 1,379 |
| 9 | TTM Technologies | USA | 1,368 |
| 10 | Daeduck Group | Korea | 1,297 |
| 11 | Nanya PCB | Taiwan | 1,097 |
| 12 | Compeq | Taiwan | 1,047 |
| 13 | PSA PCB Group | Taiwan | 1,023 |
| 14 | Viasystems Group Inc | USA | 1,008 |
| 15 | Kingboard PCB Group | China | 922 |
| 16 | Shinko Denki | Japan | 800 |
| 17 | Meiko | Japan | 792 |
| 18 | Mflex | USA | 788 |
| 19 | AT&S | Austria | 786 |
| 20 | Kinsus | Taiwan | 783 |
| 21 | Multek | USA | 730 |
| 22 | SI Flex | Korea | 726 |
| 23 | CMK | Japan | 710 |
| 24 | TPT (Taiwan Techvest) | Taiwan | 707 |
| 25 | WUS Group | Taiwan | 703 |

Dr Hayao Nakahara, N.T. Information Ltd 8/2014

20141024

# Japan PCB Shipments

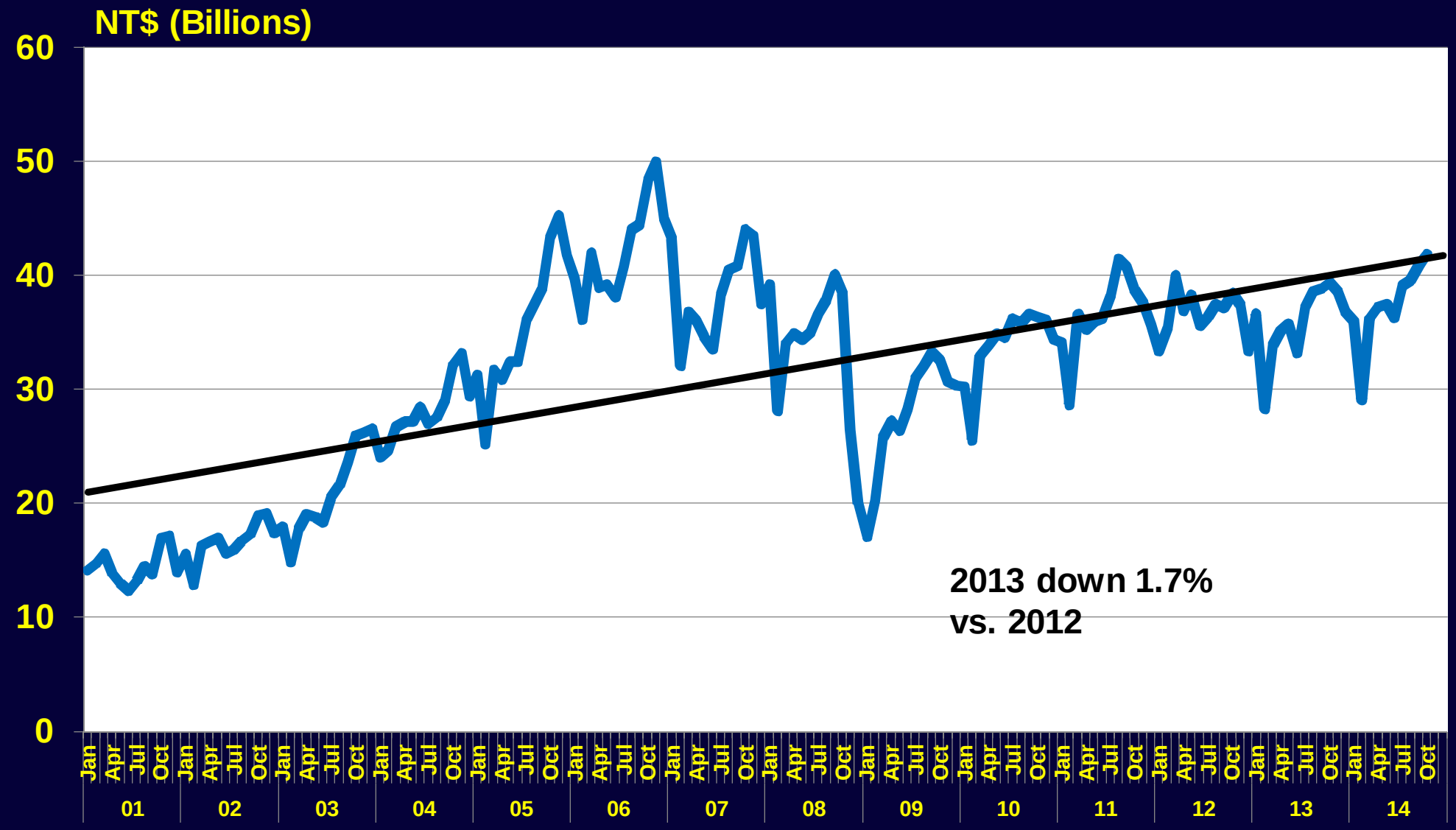



www.jpca.org/kikaitoukei/kikai2013.xls

20141013

# Taiwan Rigid & Flex PCB Shipments

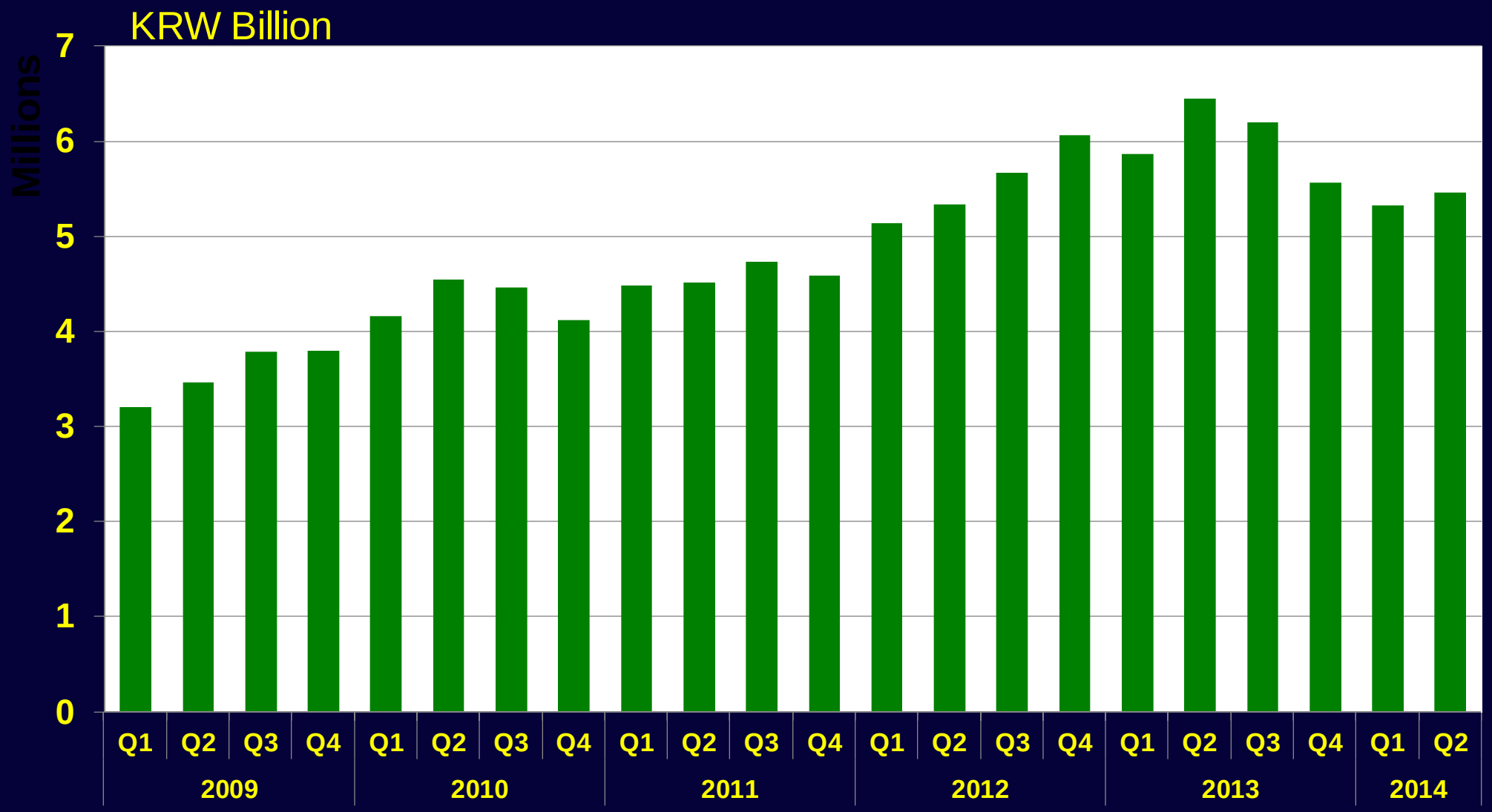
## Broad Composite of 46 Taiwan-listed Manufacturers




Company Financial Releases

20140620

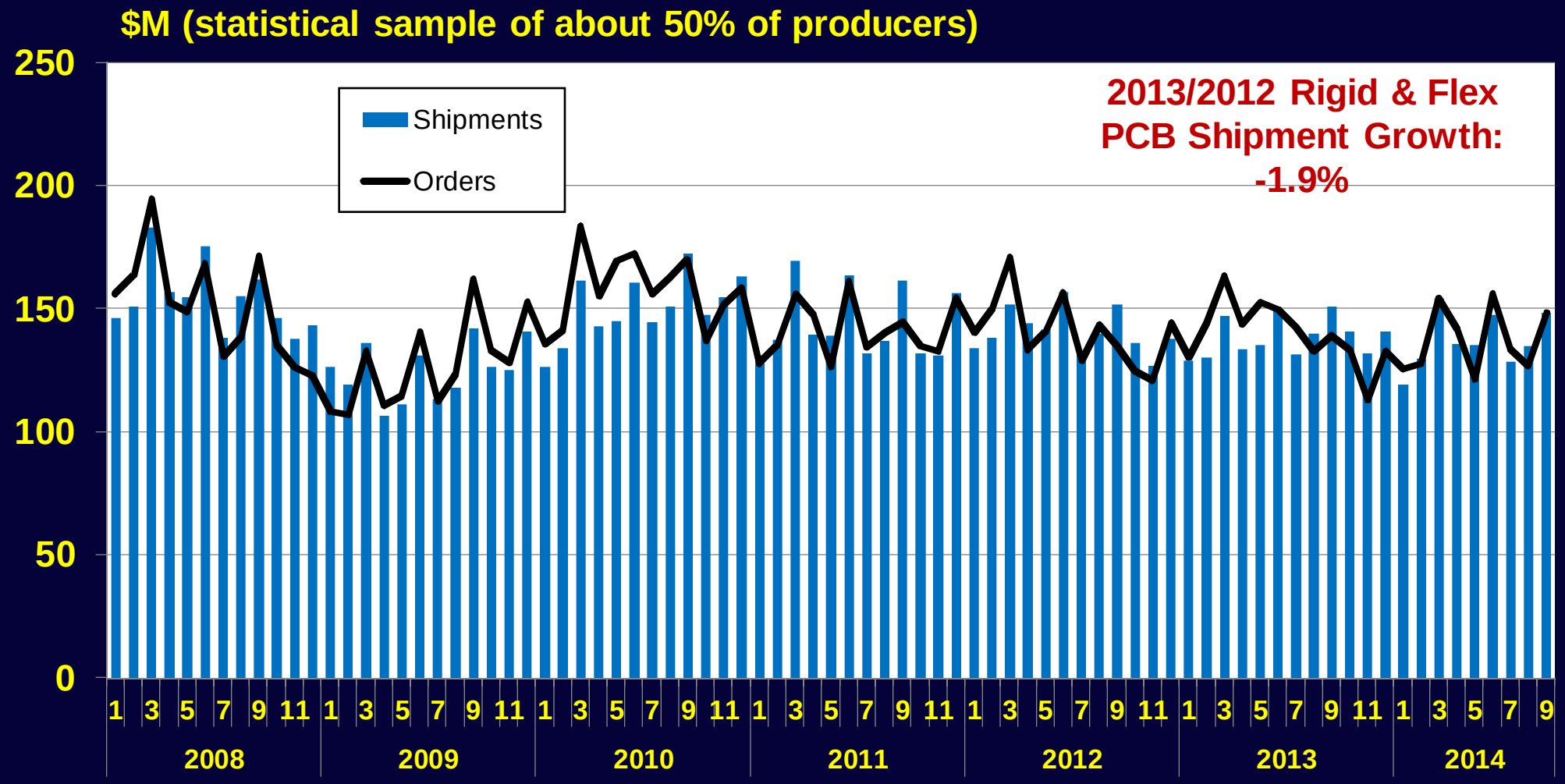
# S. Korean PCB Revenues
# Composite of 11 Publicly Traded Manufacturers
## Quarterly Revenue




Samsung EM, Young Poong, Daeduck, Simm Tech, Isu Petasys, Flexcom, DAP, BH, Samsung Techwin, Korea Circuit

# N American Rigid & Flexible PCB Shipments & Orders

20141001

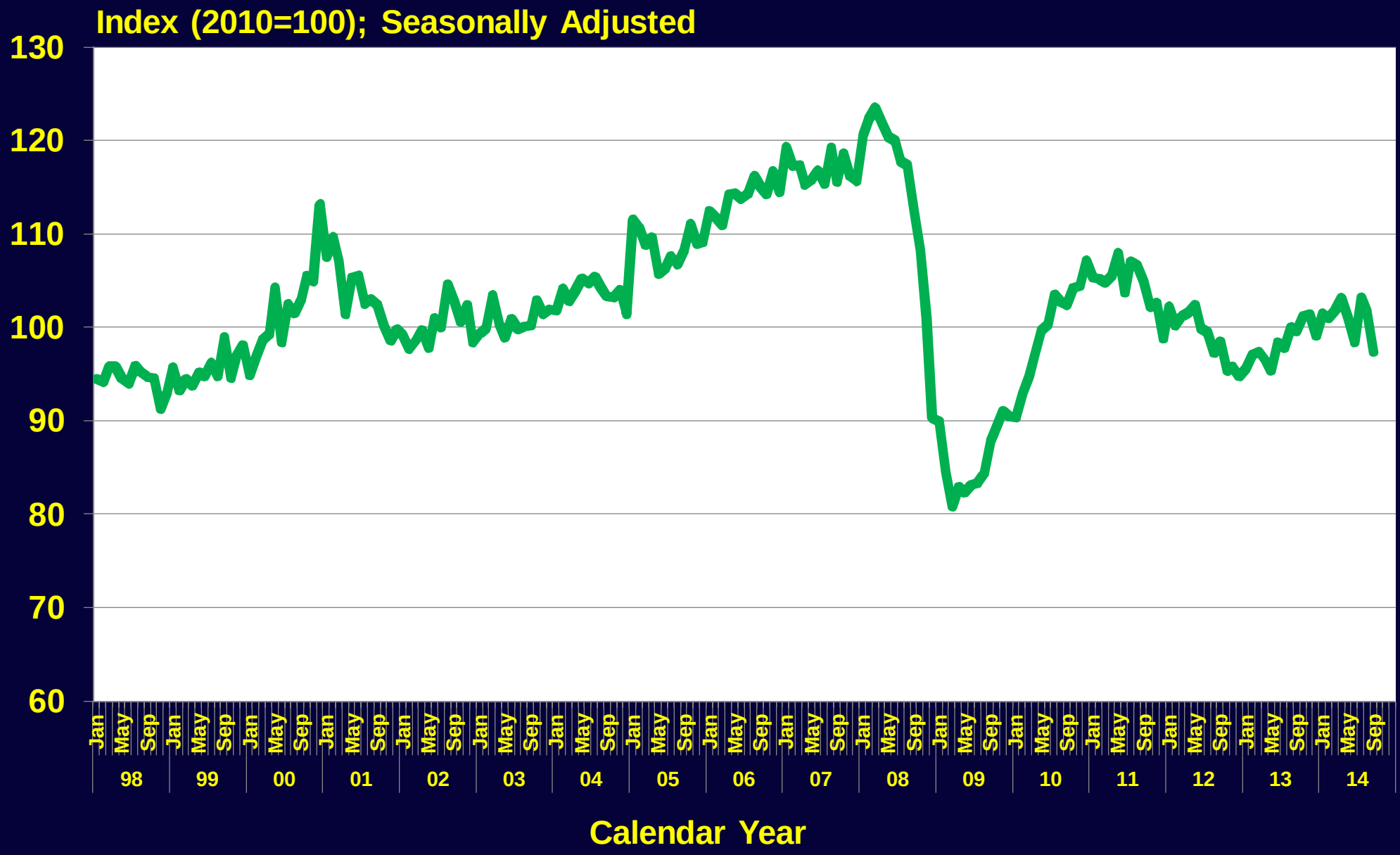



Note: IPC survey captures "market" not domestic production. About 15% of the above represents imported boards resold by N American PCB producers in survey.

IPC

20141112

# European Electronic Wiring Devices

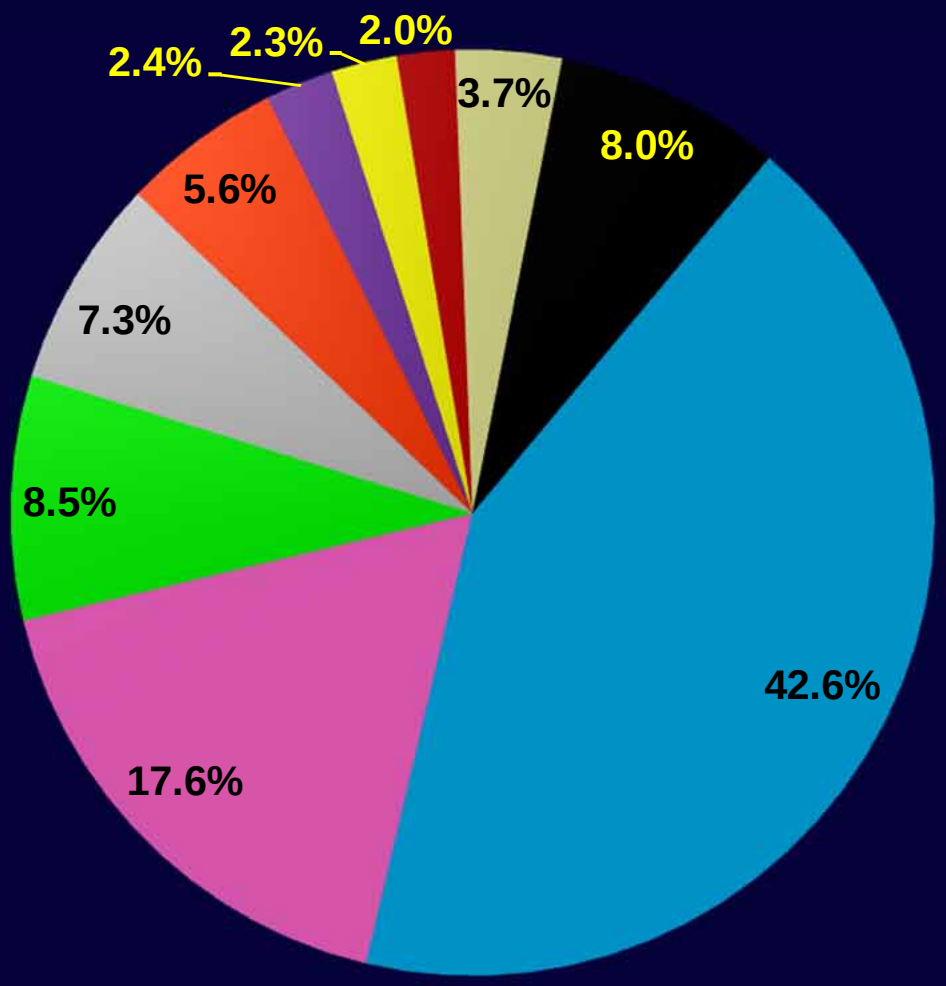



Eurostat

20131111

# 2013 European Rigid & Flex PCB Production

## Euros

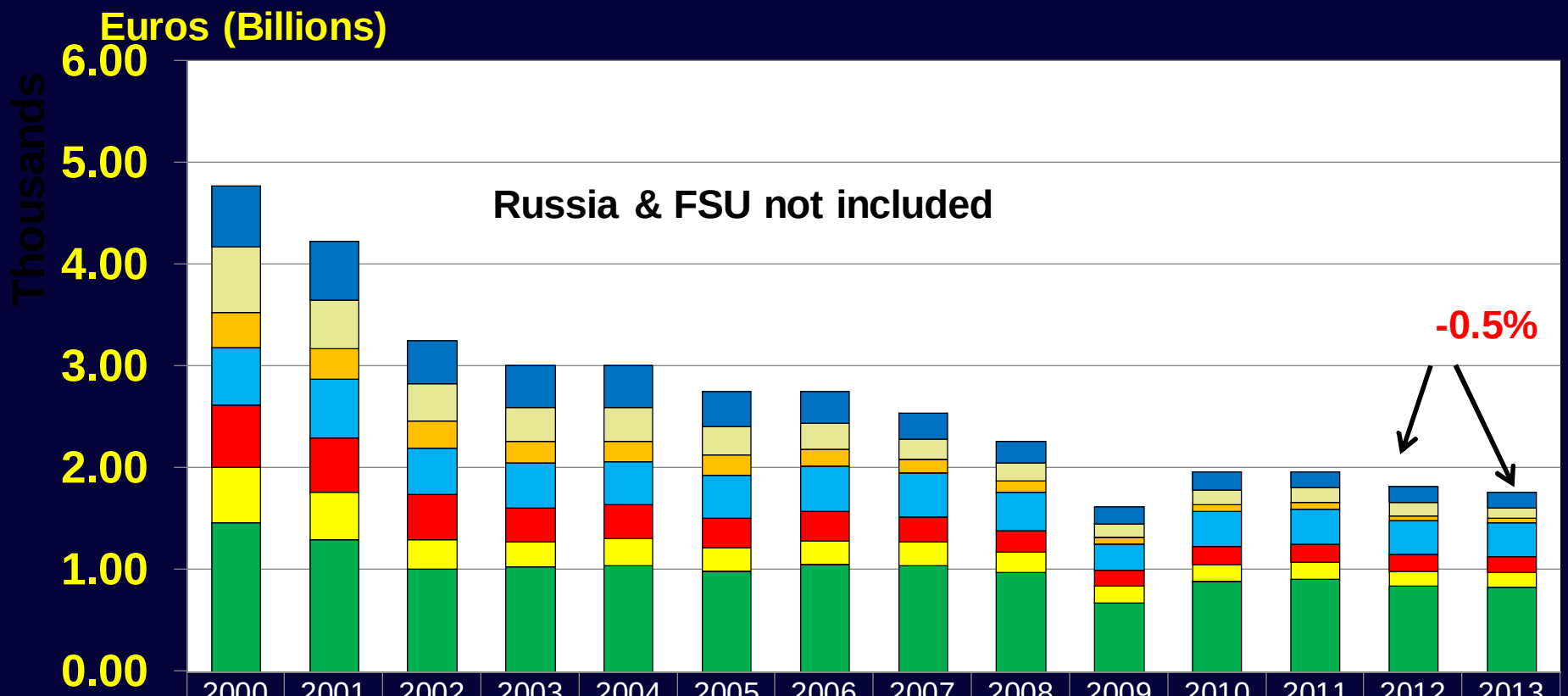



**Total: Eur 1,878 Million**

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

20131111

# European PCB Production




| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Other | 601 | 577 | 422 | 408 | 410 | 346 | 309 | 264 | 221 | 163 | 170 | 155 | 154 | 151 |
| UK | 641 | 478 | 368 | 340 | 330 | 278 | 252 | 197 | 177 | 137 | 149 | 145 | 135 | 105 |
| Scandanavia | 351 | 309 | 260 | 201 | 200 | 198 | 169 | 137 | 103 | 60 | 64 | 64 | 50 | 45 |
| Austria/Switzerland | 561 | 575 | 463 | 447 | 427 | 427 | 447 | 427 | 378 | 258 | 341 | 343 | 325 | 330 |
| Italy | 619 | 530 | 444 | 338 | 324 | 281 | 284 | 248 | 212 | 156 | 181 | 186 | 174 | 160 |
| France | 541 | 465 | 287 | 244 | 266 | 240 | 234 | 231 | 206 | 165 | 170 | 166 | 147 | 137 |
| Germany | 1461 | 1300 | 1006 | 1027 | 1044 | 981 | 1054 | 1039 | 970 | 676 | 883 | 902 | 835 | 830 |

**M Gasch 11/13, ZVEI 5/14**

20130127

# European PCB Market Comments

The European PCB industry had an acceptable year - no spectacular growth but also no spectacular collapses. The few companies that went out of business in Europe this year have been small (<10M EUR revenues per year).

A group of 5 countries (Austria, Switzerland, Germany, France and UK) account for about 80% of the total European production volume. This group will end 2014 at a similar level as 2013. While minor shifts do occur there will be no major changes.

**Michael Gasch, Data4PCB 11/2014**

20130127

# European PCB Market Comments

Supplies to certain end-markets offer some protection against Asian competition. All five countries mentioned supply to industrial electronic industries. Small volumes per part-number and protection of IP quite often require need of proximity to the customer.

In addition, each country has identified individual niches in which they excel. Switzerland is strong in the medical industry; Austria and Germany have their stronghold in the automotive sector, France and UK in defense and aeronautics.

**Michael Gasch, Data4PCB 11/2014**

20130127

# European PCB Market Comments

There have been certain set-backs for each industry. Among others the cuts in defense budgets, unfavorable rates of exchange, export sanctions against Russia or a reduction in investments may show isolated consequences and may intensify next year. However, we expect – in EUR-terms – the same volume as last year.

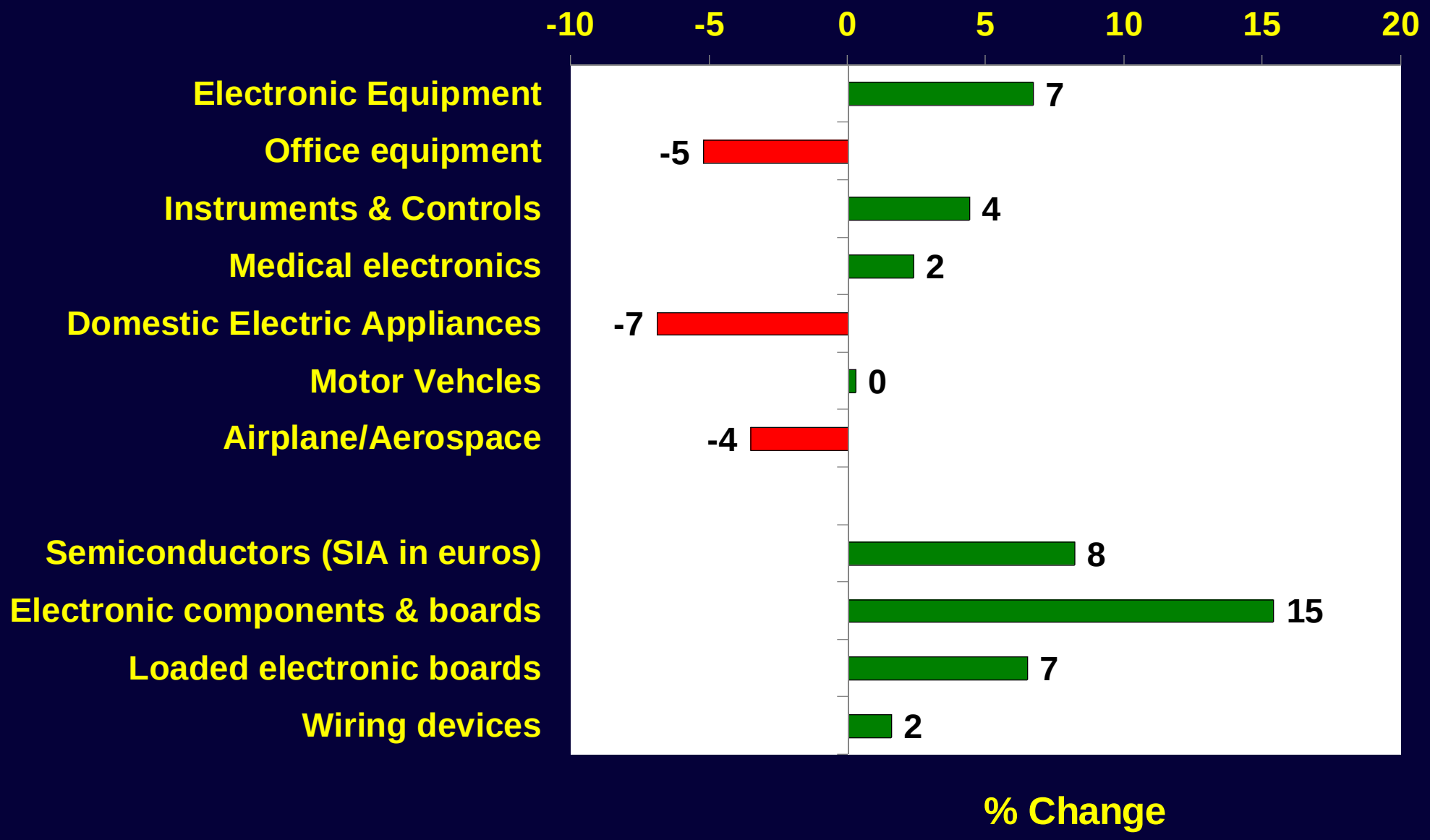
Concerns in the industry are caused by further concentration of suppliers.

The choice of raw materials used for the manufacturing of specialties may narrow down. Whether or not this will turn out to be a threat to certain projects remains to be seen.

**Michael Gasch, Data4PCB 11/2014**

20141014

# European Electronic Supply Chain Growth 3Q'14 vs 3Q'13



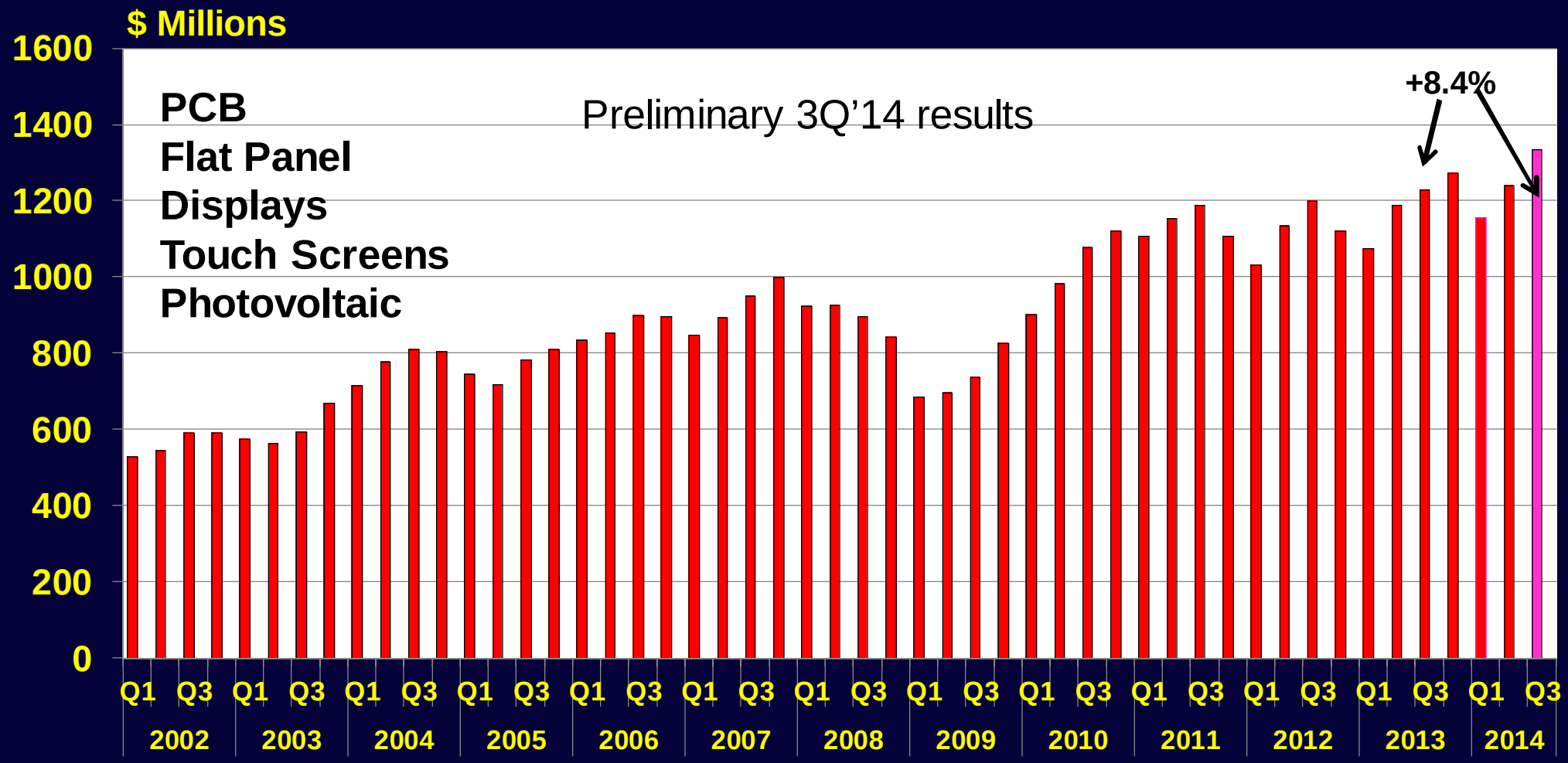

Euro denominated growth rates; Eurostat, SIA & Custer Consulting Group

# Process Equipment, Laminate & Materials Suppliers

# Process Equipment Related Suppliers
# Composite of 9 Companies

20141106

## Revenue

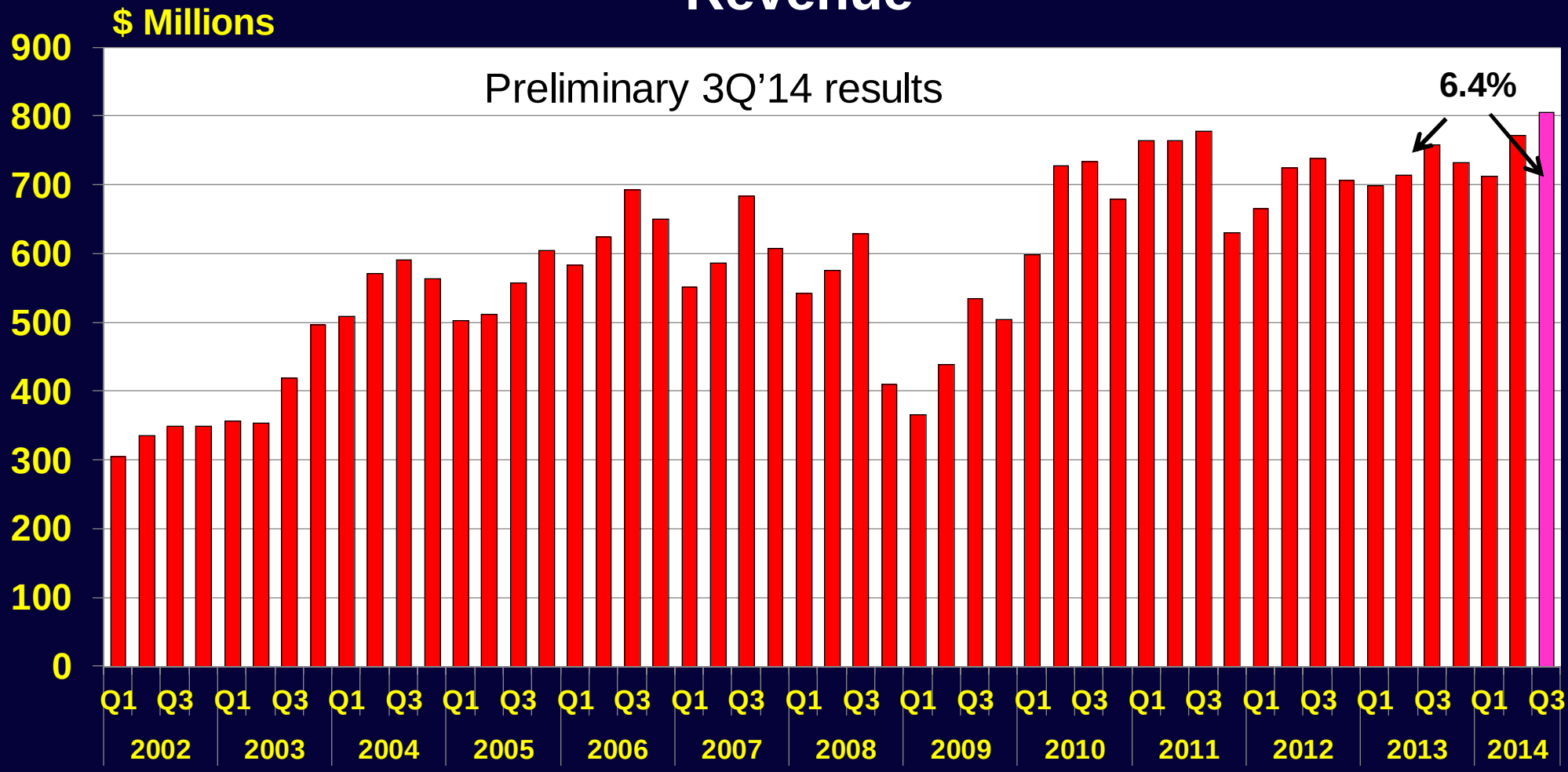



C-Sun,Tailing Technology, Camtek, ESI, GSI Group, Orbotech, Mentor Graphics, Nordson, Coherent

20141102

# Rigid & Flex Laminate Suppliers
# Composite of 13 Companies

## Revenue



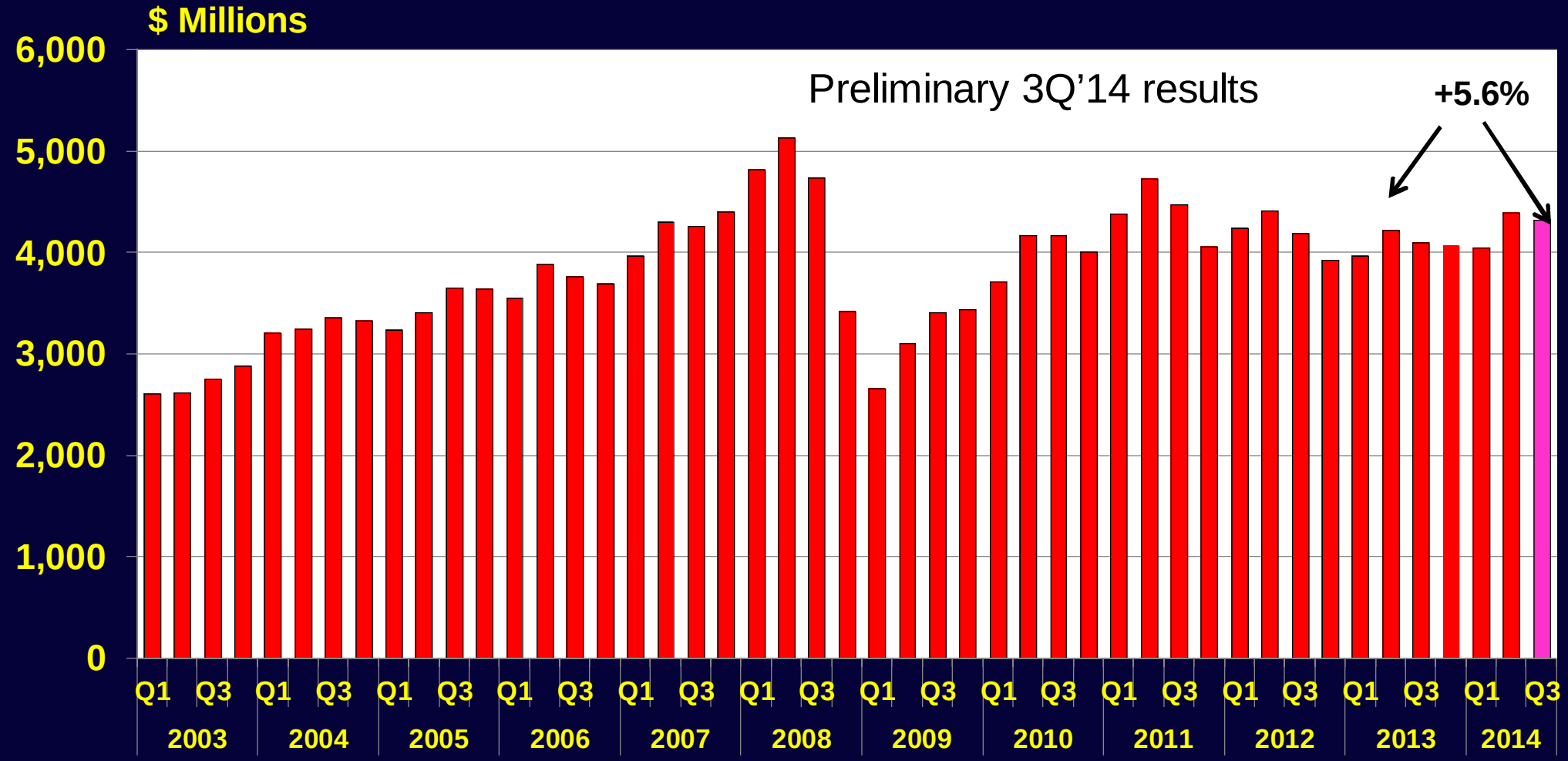

Arisawa, Arlon Electronic Materials, Elite Materials, Hwa Woei, Iteq, Microcosm, Park Electrochemical, Rogers, Shinemore, Taiflex, Thinflex, Top Union, Uniplus

NT$ converted at fluctuating exchange

# Material Suppliers (excluding laminate) Composite of 14 Companies

20141102

## Revenue

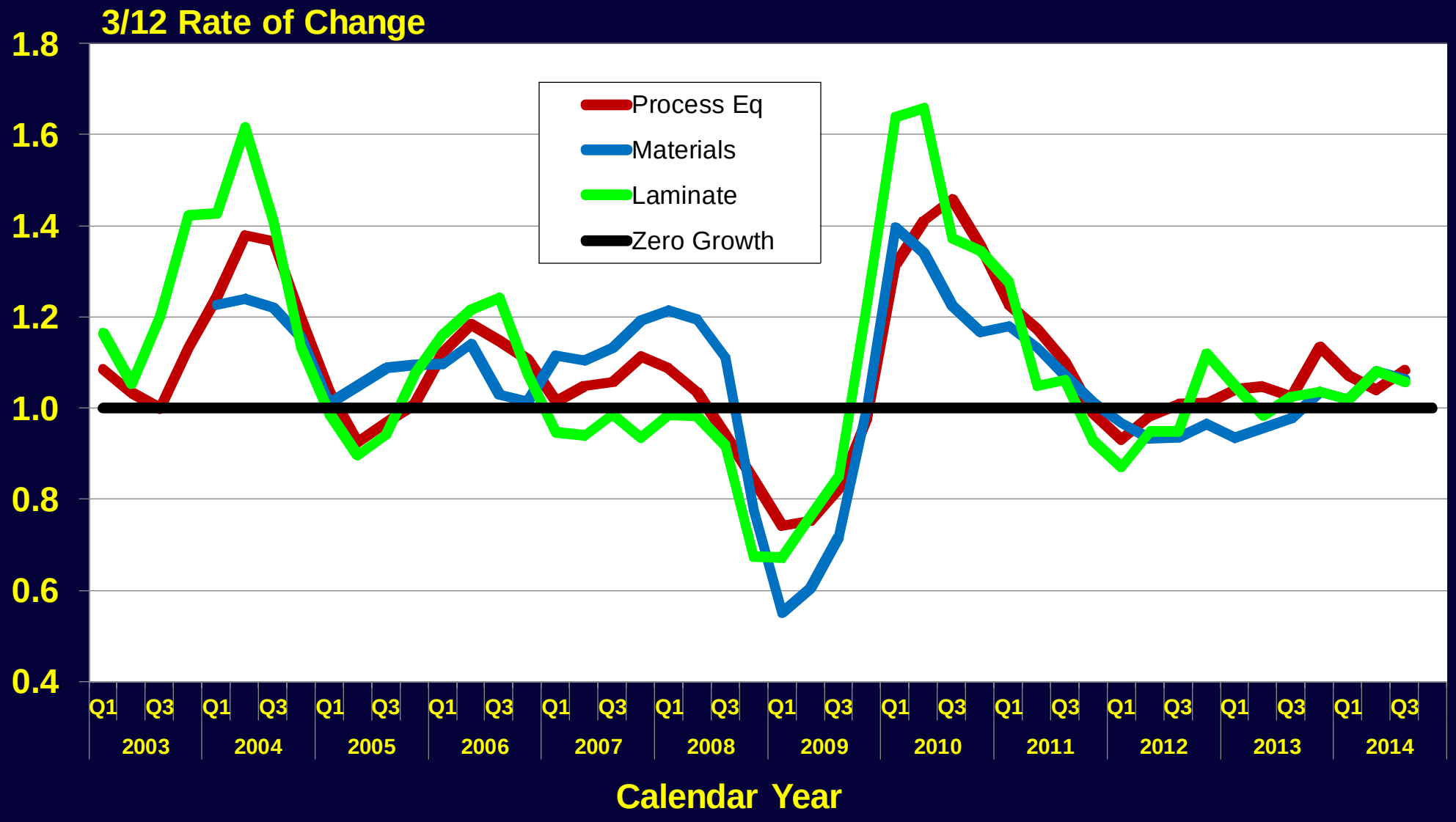



Momentive, OM Group, Taiwan Glass, Baotech, Glotech, Shenmao, Wahlee,Topoint, Cabot Micro, Chemtura, Cookson Elec, Eternal Chemical, Hexcel, Chang Wah

NT$ & GBP converted to US$ at fluctuating exchange

20141102

# Global Growth Rates
# Process Equipment, Materials & Laminate

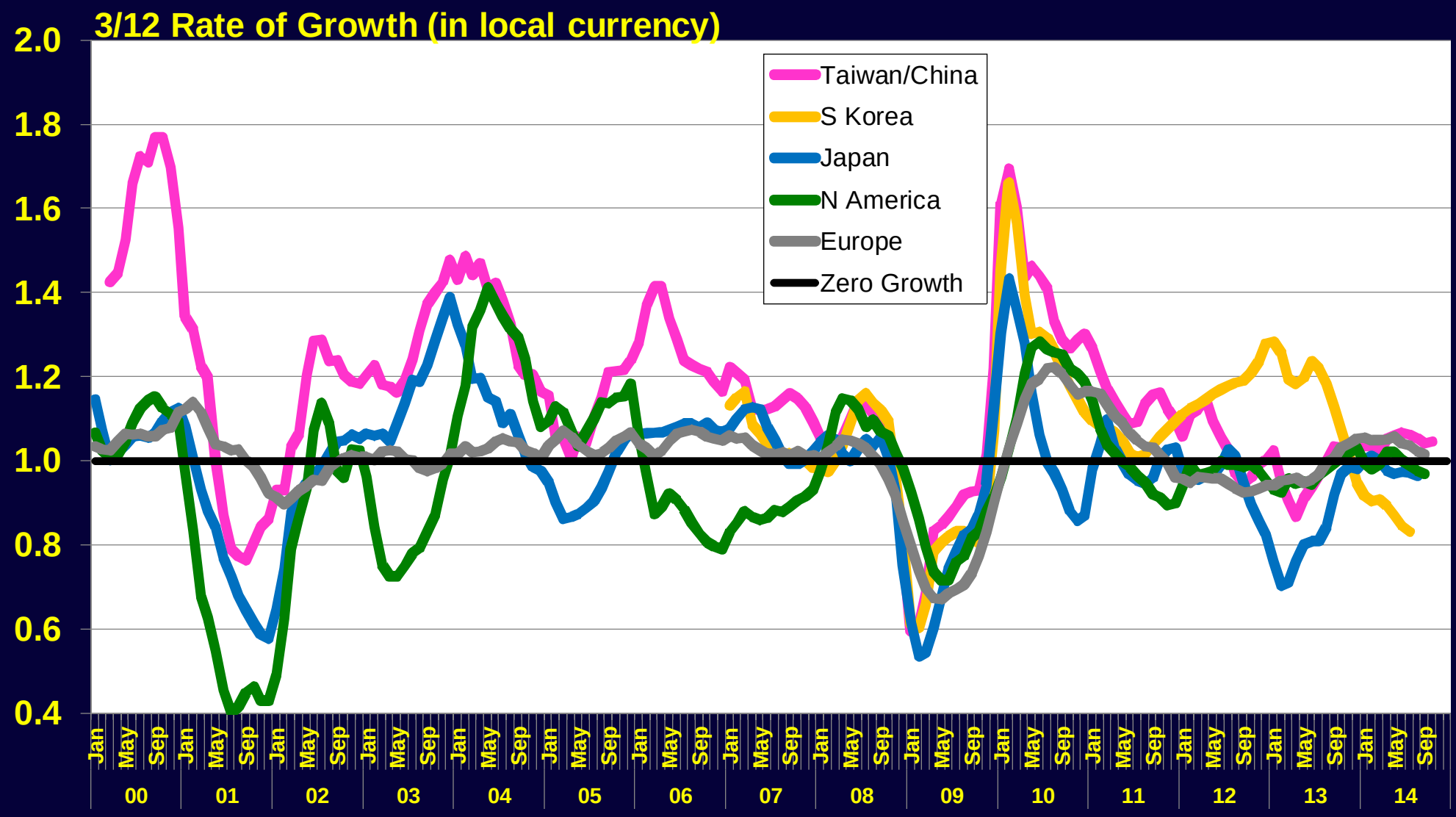



Company Financials of 12 Laminate suppliers, 13 material suppliers & 8 Process Equipment Suppliers

# World PCB Model

20141112

# Regional PCB Shipment Growth

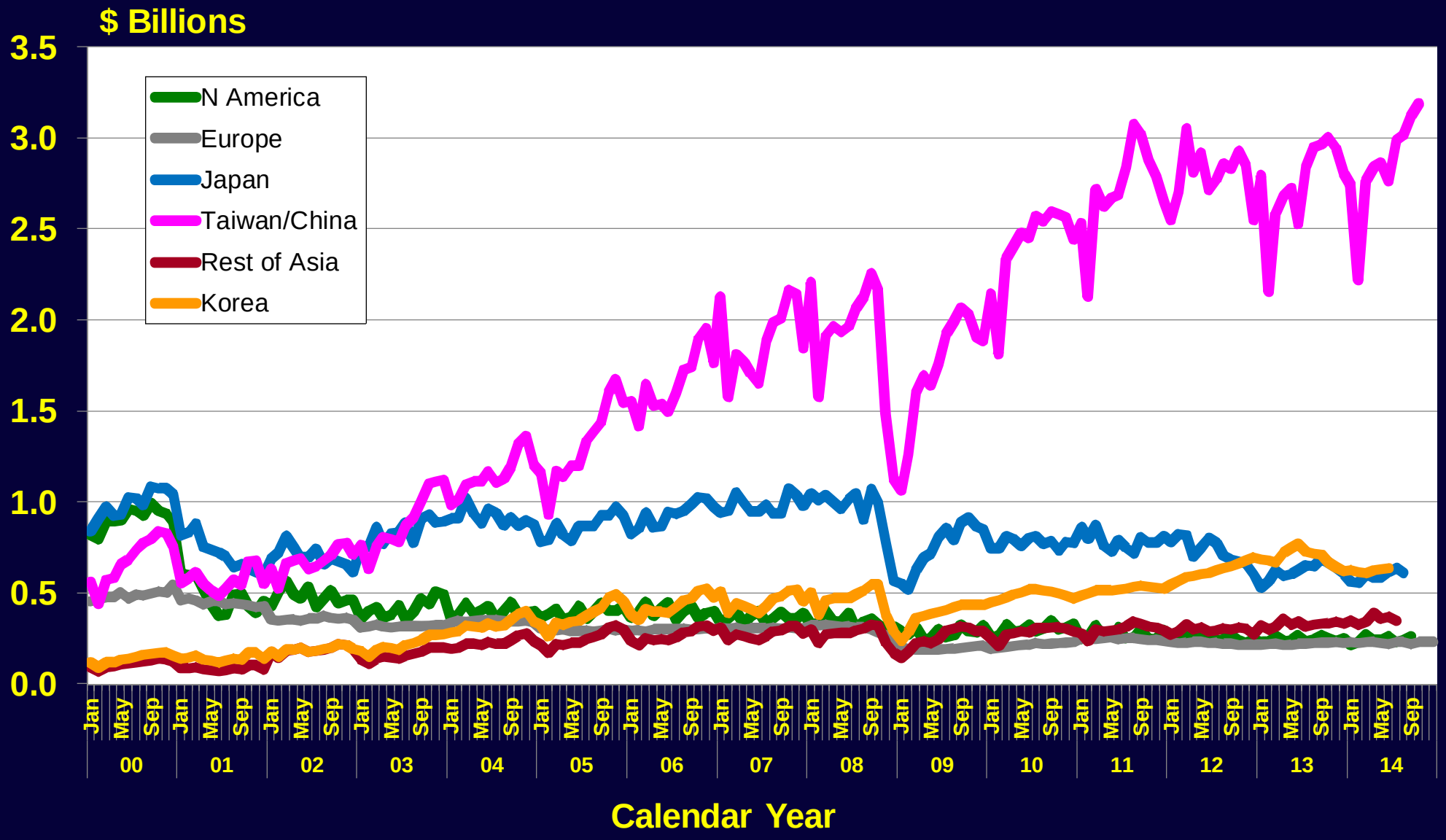



Sources: IPC, JPCA, Taiwan/China composite; Eurostat "wiring devices" for Europe

20141112

# World PCB Monthly Shipments

## Converted @ Fluctuating Exchange Rates




Source: Custer Consulting Group

20141112

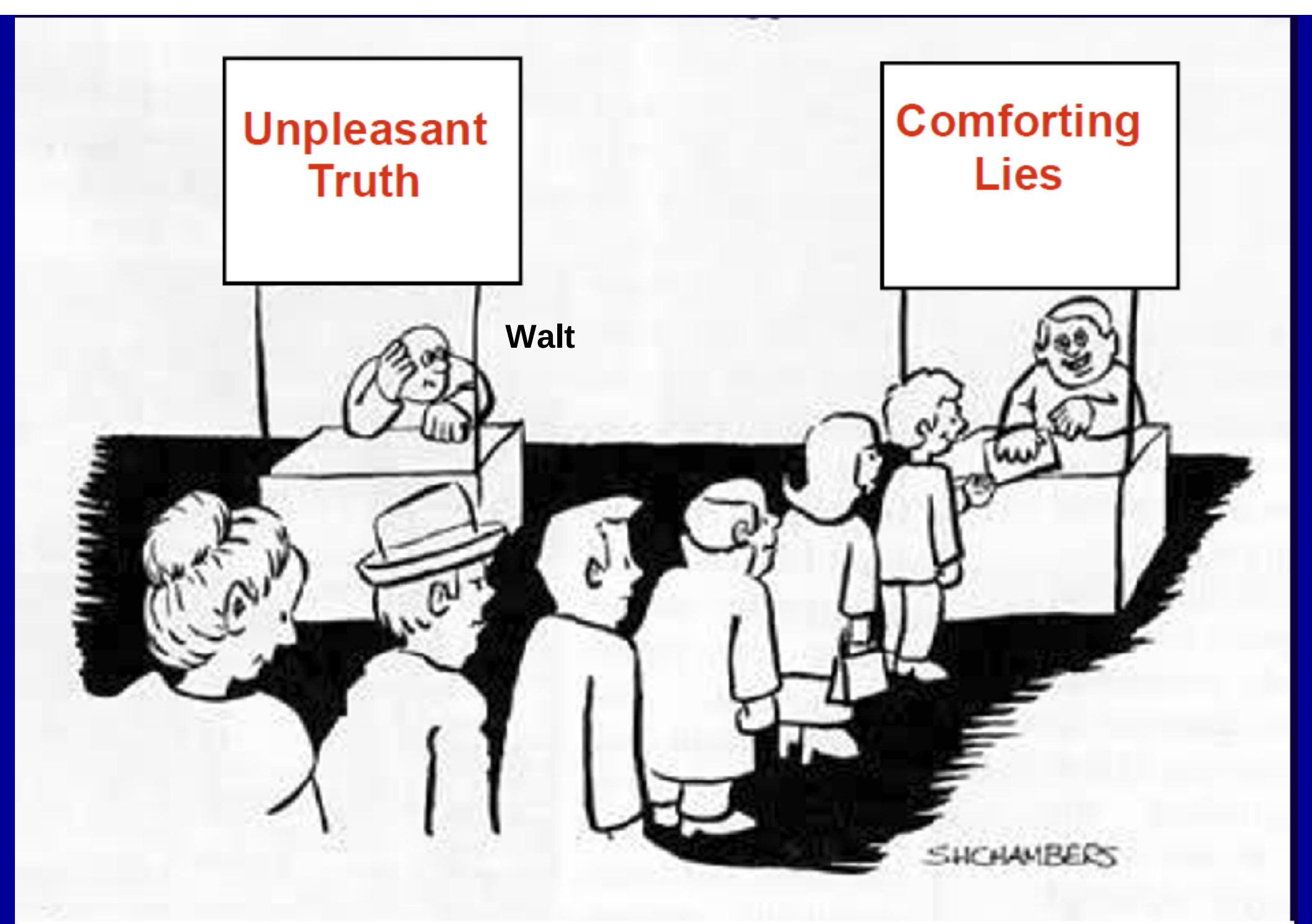
# World PCB Shipments (with forecast)

## 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

# Forecasts


Unpleasant Truth
Comforting Lies
Walt
S.H.CHAMBERS

20141109

# GDP Growth

Constant $ Growth Rates Converted @ Constant Exchange Rates

| | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|
| World | 2.6 | 2.6 | 2.8 | 3.3 | 3.5 |
| USA | 2.3 | 2.2 | 2.5 | 2.9 | 3.1 |
| Europe | -0.1 | 0.3 | 1.3 | 1.5 | 1.9 |
| Japan | 1.5 | 1.5 | 1.1 | 1.3 | 1.2 |
| Four Tigers | 1.9 | 2.6 | 3.2 | 3.5 | 4.0 |
| China | 7.7 | 7.7 | 7.5 | 7.0 | 6.9 |

Henderson Ventures 11/2014
www.hendersonventures.com

# Electronic Equipment Production Growth

20141109

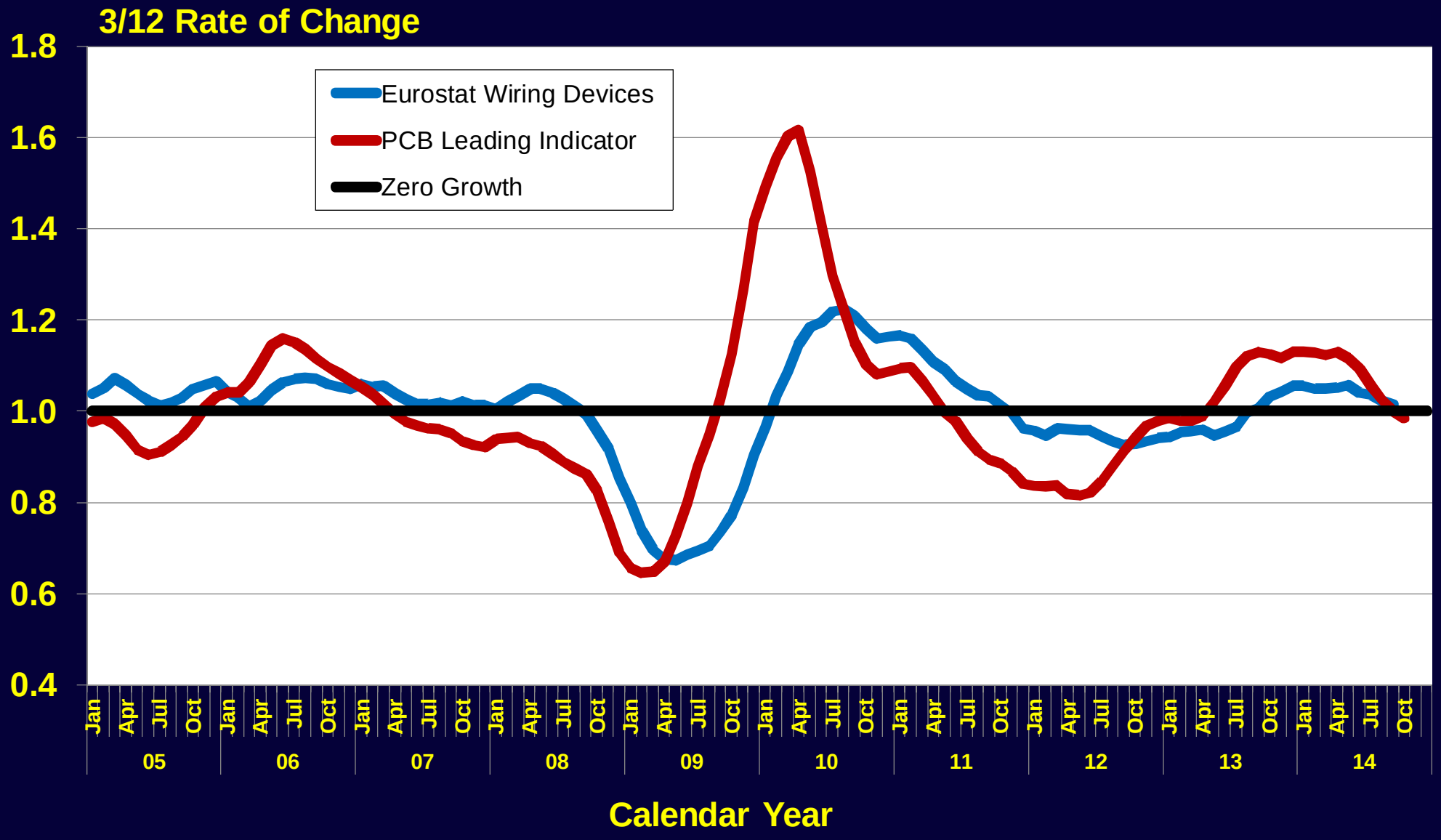
Constant $ Growth Rates Converted @ Constant Exchange Rates

| | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|
| World | 1.0 | 0.3 | 3.9 | 5.1 | 5.5 |
| USA | -0.9 | -4.1 | 2.8 | 4.9 | 5.7 |
| Europe | -3.2 | -0.7 | 2.5 | 3.5 | 3.7 |
| Japan | -2.6 | -4.2 | 1.4 | 2.5 | 2.7 |
| Four Tigers | -1.3 | 2.2 | 3.8 | 5.3 | 5.7 |
| China | 2.6 | 2.4 | 5.4 | 6.4 | 6.8 |

Henderson Ventures 11/2014
www.hendersonventures.com

20141112

# Europe PMI Leading Indicator vs. Europe Wiring Devices

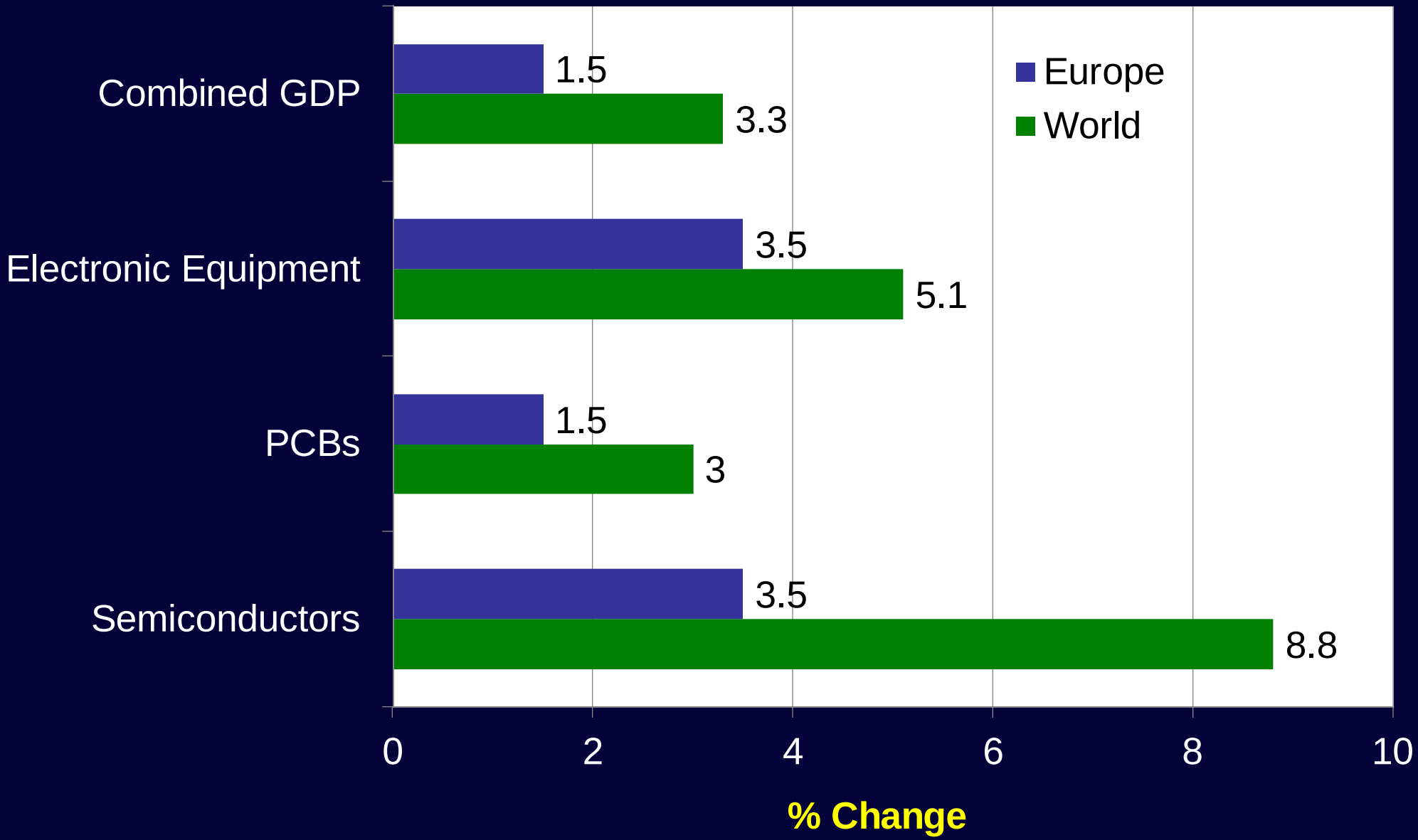



Source: Custer Consulting Group

20131112

# Global Electronic Supply Chain Forecast

## 2015 vs. 2014



# Conclusions

**Target Markets**
**Existing – instruments, automotive, defense, medical**
**Emerging – Internet of Things ?**

**Cyclical demand - modest growth in 2015 but promising business ahead**

**Watch monthly data & leading indicators**

**Much more information is available**

20111007

# 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**