

Outlook for the Global Chemical Industry: How will the Gulf Coast Participate in the Upswing?



The Houston Economic Club
22 March 2011

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Chemistry in Texas

- One of largest industries in US and Texas with \$153.4 billion in revenues (#1), making Texas 5th largest globally
- America's #1 exporter, with Texas exports of \$31 billion
- Innovative and knowledge intensive
 - #1 in Private R&D
 - 1 out of 9 Patents
- A solutions provider and enabler, making life healthier, safer and more productive
- Makes approximately 1.2 billion tons of chemistry products
- Nationwide 780,000 good jobs (76,000 in Texas supporting a total of 609,000)
- Over 10,000 companies operating 13,500 facilities (1,205 of which are in Texas)

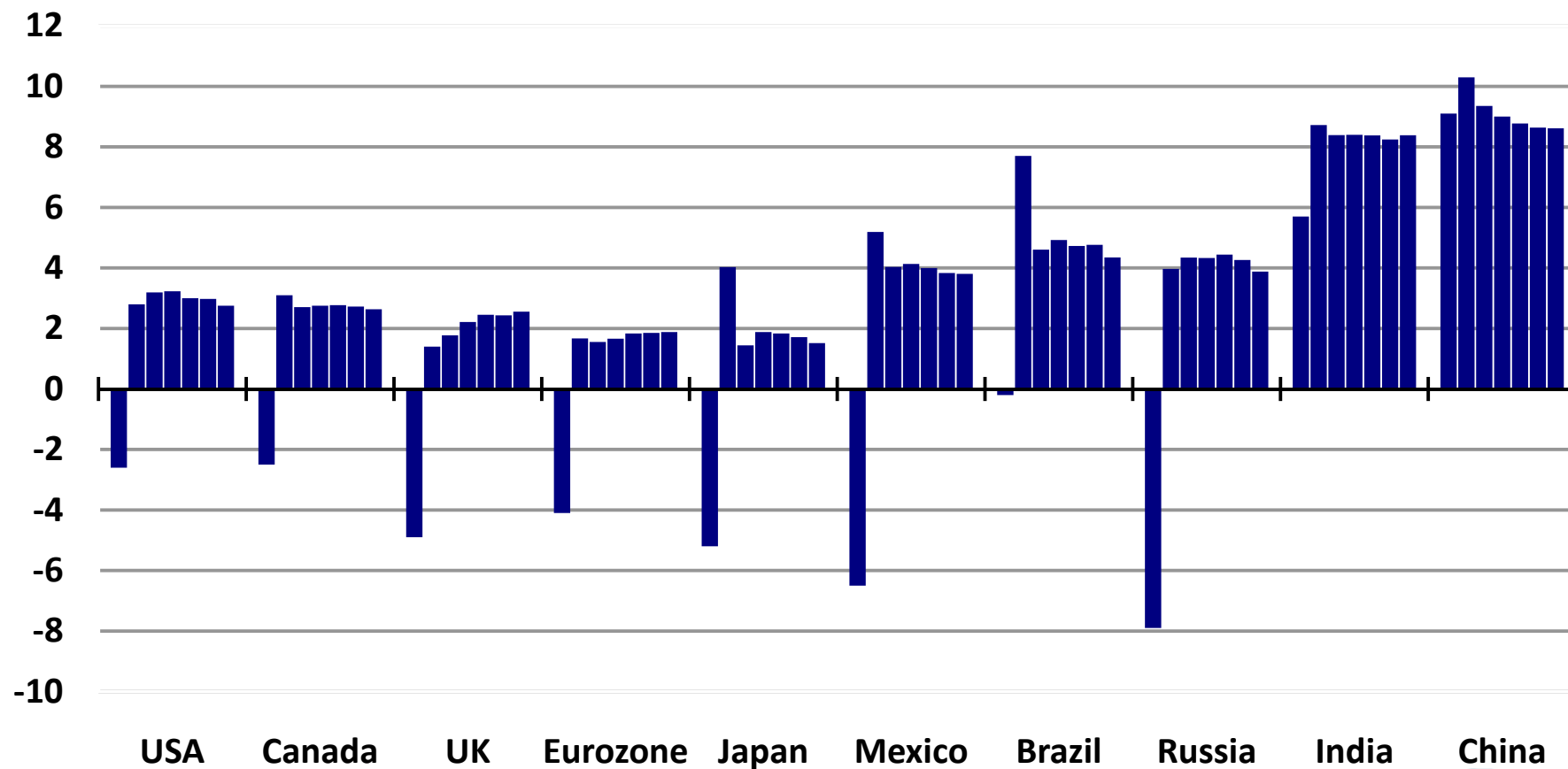


Economic Trends



Emerging Markets are Leading Economic Growth...

Real GDP % Change (2009-15)



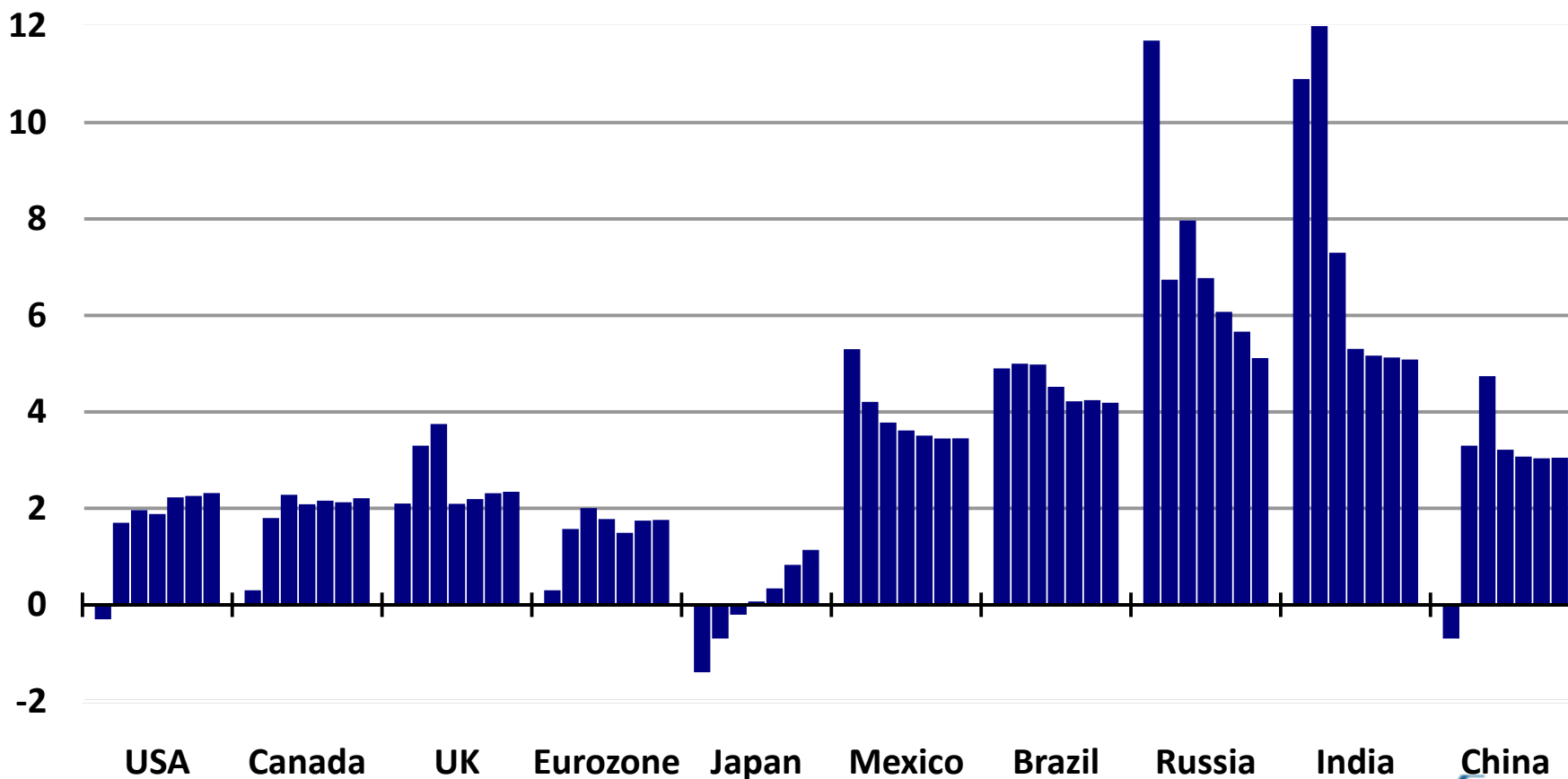
Sources: IMF, IHS Global Insight, Oxford Economics, EIU, other forecasters, ACC analysis





..and Inflationary Pressures

Consumer Prices % Change (2009-15)

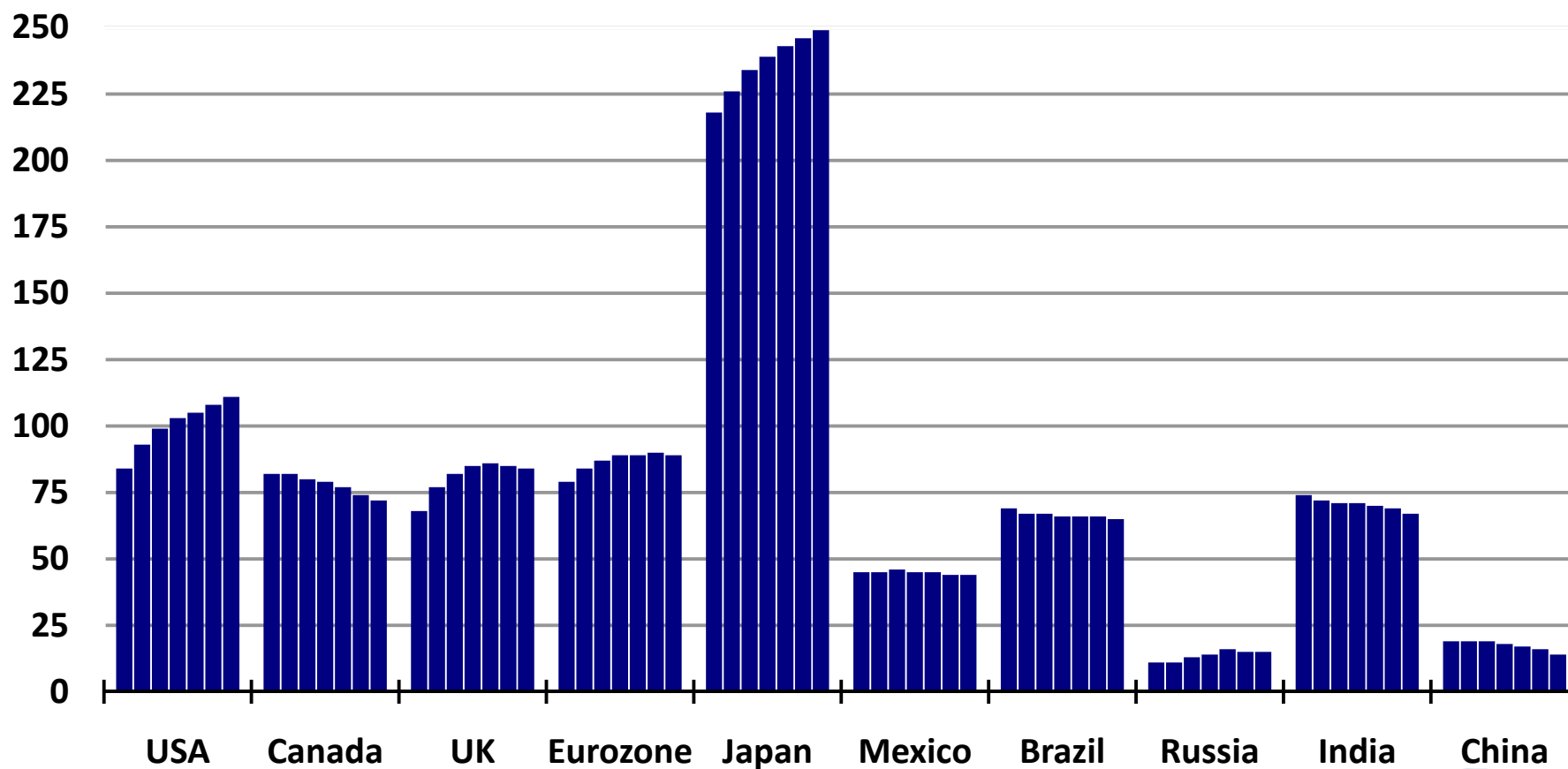


Sources: IMF, IHS Global Insight, Oxford Economics, EIU, other forecasters, ACC analysis



...but Developed Nations Lead in Debt

Central Government Gross Debt as a % of GDP (2009-15)

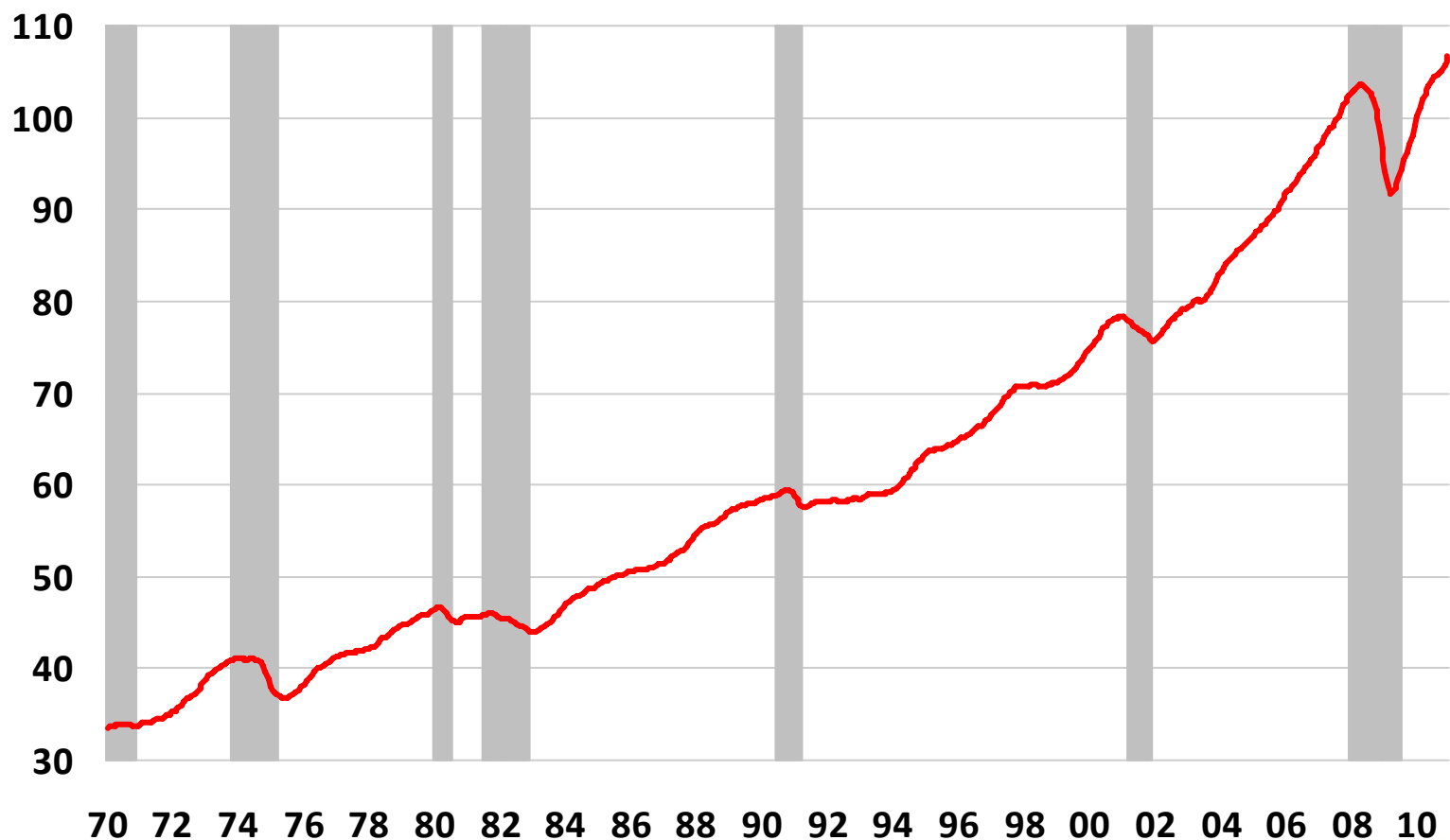


Sources: IMF



Global Industrial Production is in Expansion

Index 2007 = 100 (3MMA)



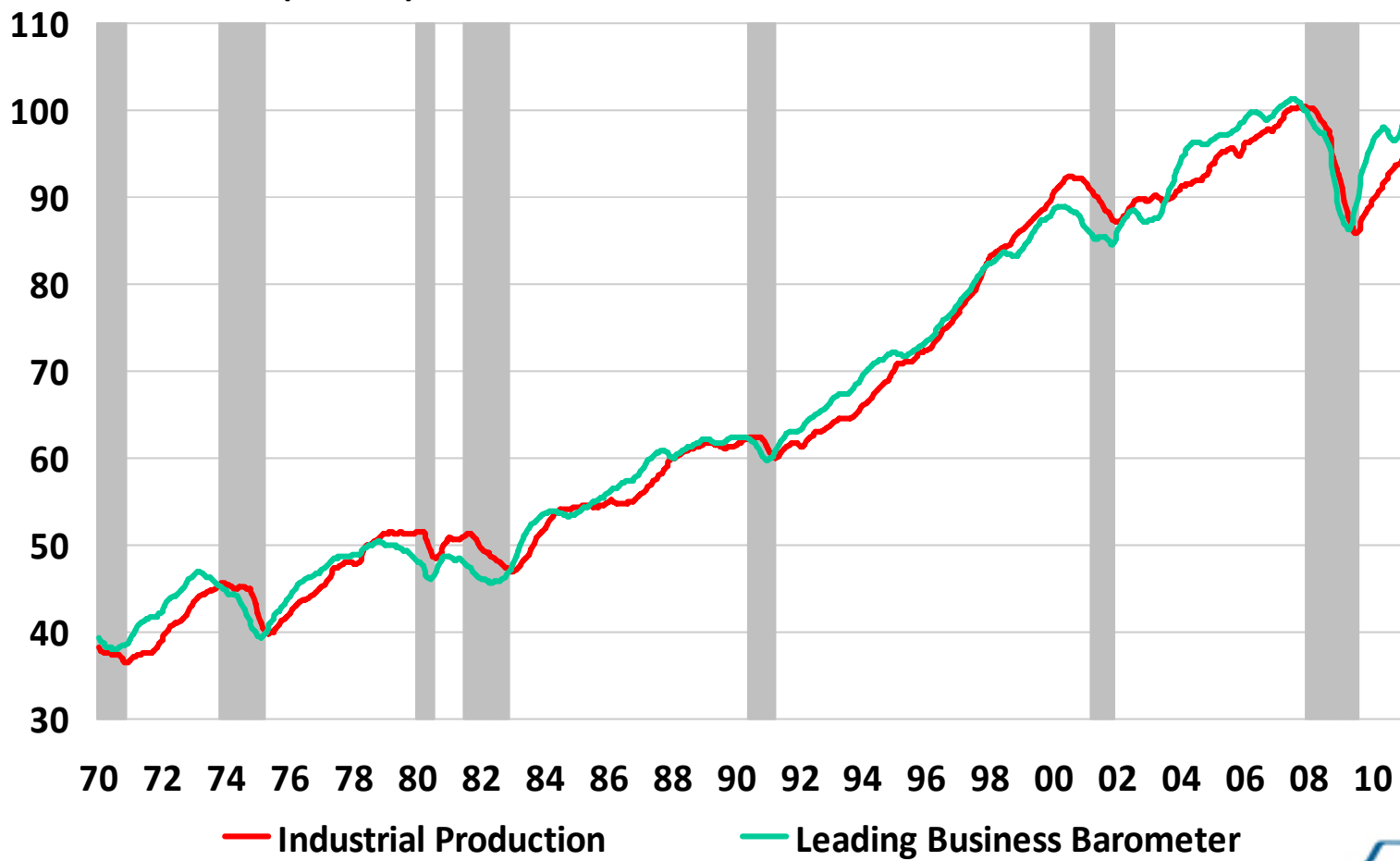
Sources: national statistical agencies





But US Industrial Production is Still Climbing Out of the Ditch

Index 2007 = 100 (3MMA)



Sources: Federal Reserve Board, author's analysis





Conclusions - Economy

- A global economy in different gears
 - Emerging markets strongest with growth lagging in US and Europe due to high unemployment, de-leveraging, and questions about sustainability of government stimulus and sovereign debt
 - Strength of the recovery is uncertain – multiple risks remain (Europe, China, oil, US housing, US government debt and deficit issues at all three levels, etc.) with potential for inflationary pressures in emerging markets
- A more unstable economic environment, with more booms and busts, more recessions in the coming decade. That is, more volatility in the business cycle.
- But economy expanding 85-90% of the time
- NA natural gas cost advantages



Key Long-Term Trends

- Greater volatility
- Currency wars – 21st century protectionism
- Fiscal austerity and rebalancing: Tension between economic security vs. economic dynamism
- Aging population and work-force
- Emerging markets
- Growing resource scarcity
- Energy, food and other commodity inflation
- Rapid technology advances



US Economic Environment

(Consensus of Forecasters)

% change on previous year (unless otherwise noted)	2009	2010	2011	2012	2013	2014	2015
GDP	-2.6	2.9	3.2	3.2	3.0	3.0	2.8
Consumer Spending	-1.2	1.8	3.2	2.9	2.6	2.7	2.7
Business Investment	-17.1	5.6	8.6	8.6	7.8	6.9	5.4
Industrial Production	-9.3	5.7	4.7	3.9	3.4	3.1	3.0
Light Vehicle Sales (mm)	10.4	11.6	13.0	14.0	14.9	15.2	15.9
Housing Starts (mm)	0.55	0.59	0.68	0.95	1.43	1.52	1.57
Consumer Prices	-0.3	1.7	2.0	1.9	2.2	2.3	2.3
Unemployment Rate (%)	3.26	3.21	3.59	4.19	4.76	4.99	5.52
10-Year Treasury Notes (%)	9.3	9.6	9.1	8.4	7.7	6.9	6.6

Sources: IHS Global Insight, Oxford Economics, EIU, company and other forecasters, ACC analysis

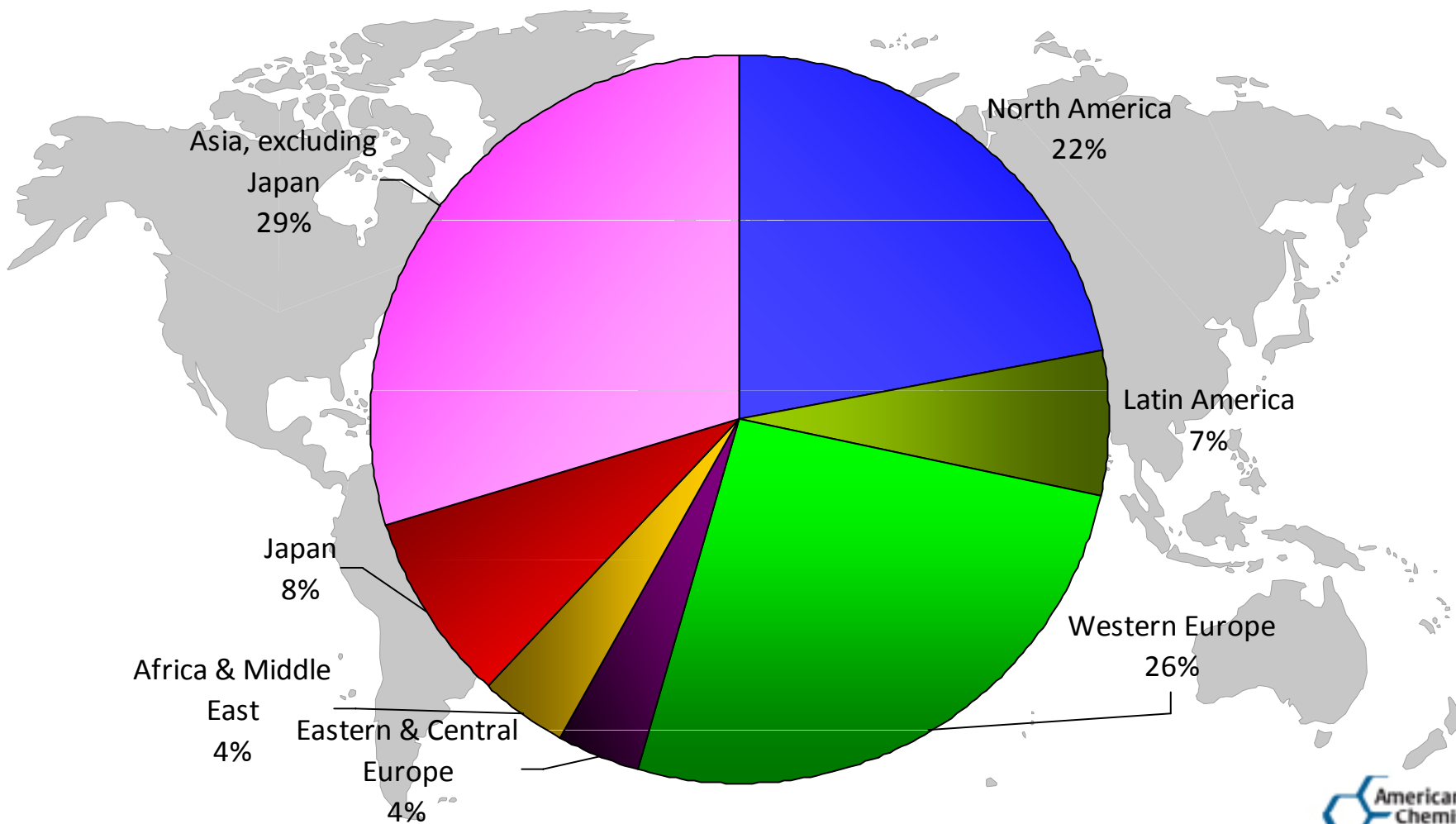




Global Chemistry



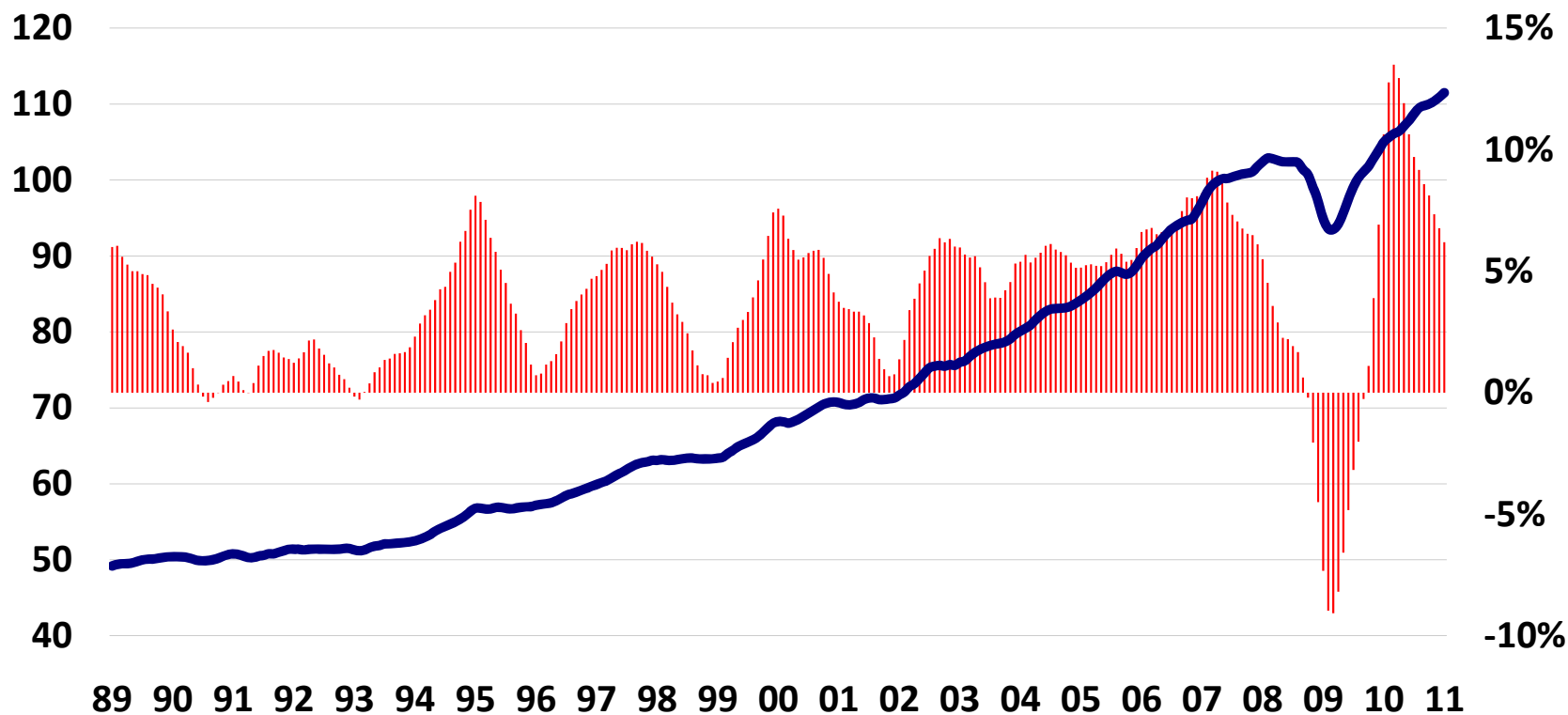
2009 Global Chemistry (by Country/Region)





Global Chemistry Production Volumes

Index where 2007 = 100 (3 MMA)



■ Year-over-Year % Change - 3 MMA (right) — Global Business of Chemistry Production Index - 3 MMA (left)

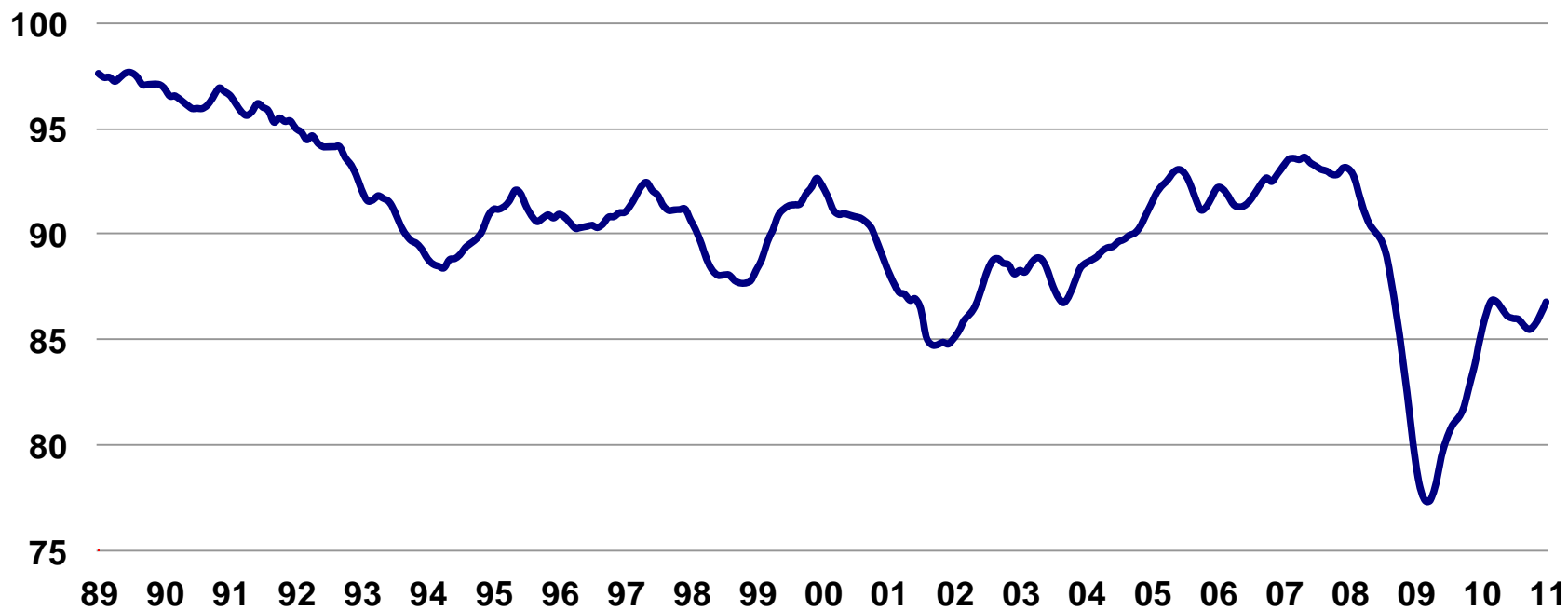


Source: ACC



Capacity Utilization in Global Chemistry

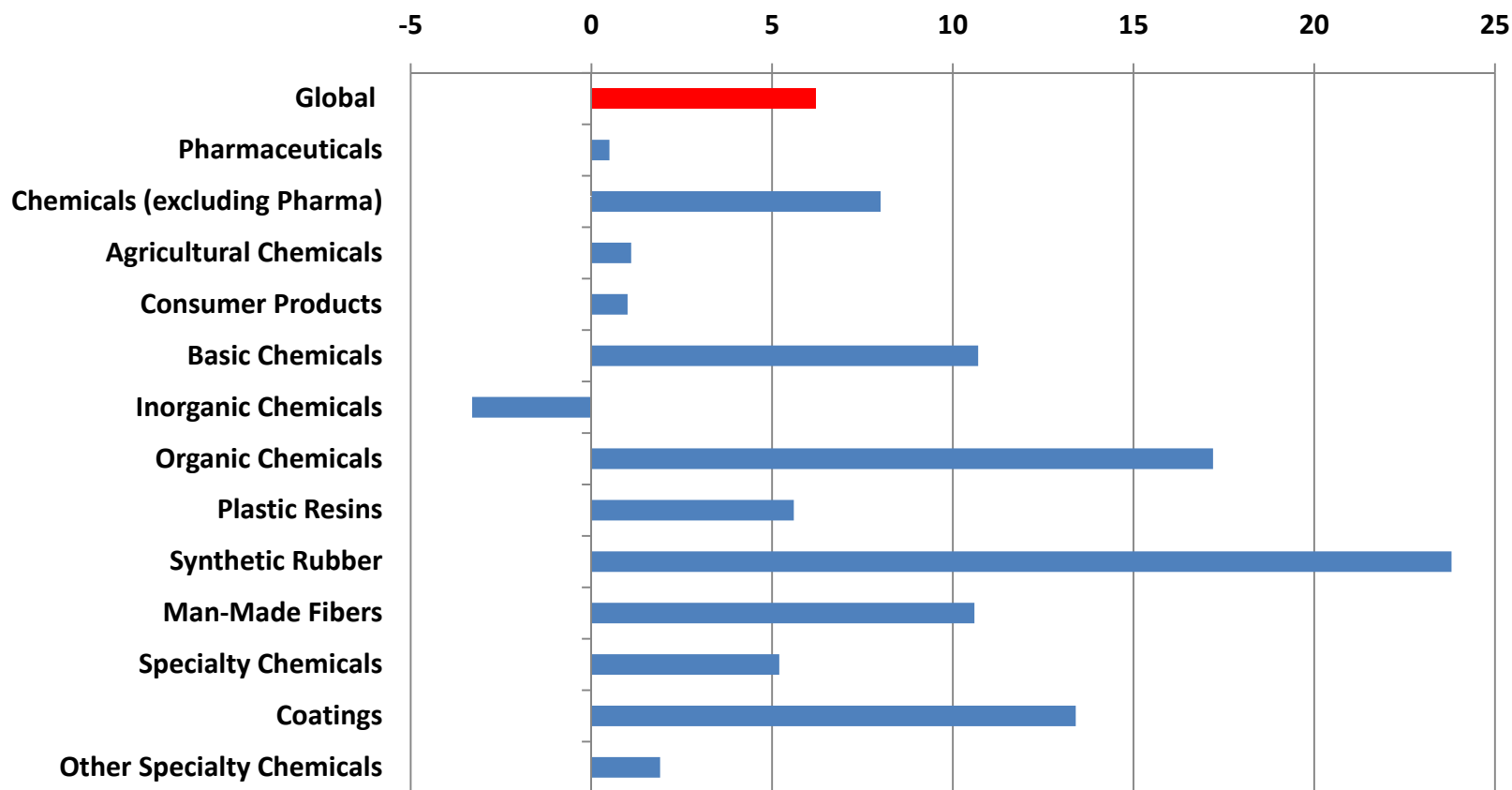
Capacity Utilization Rate (%)





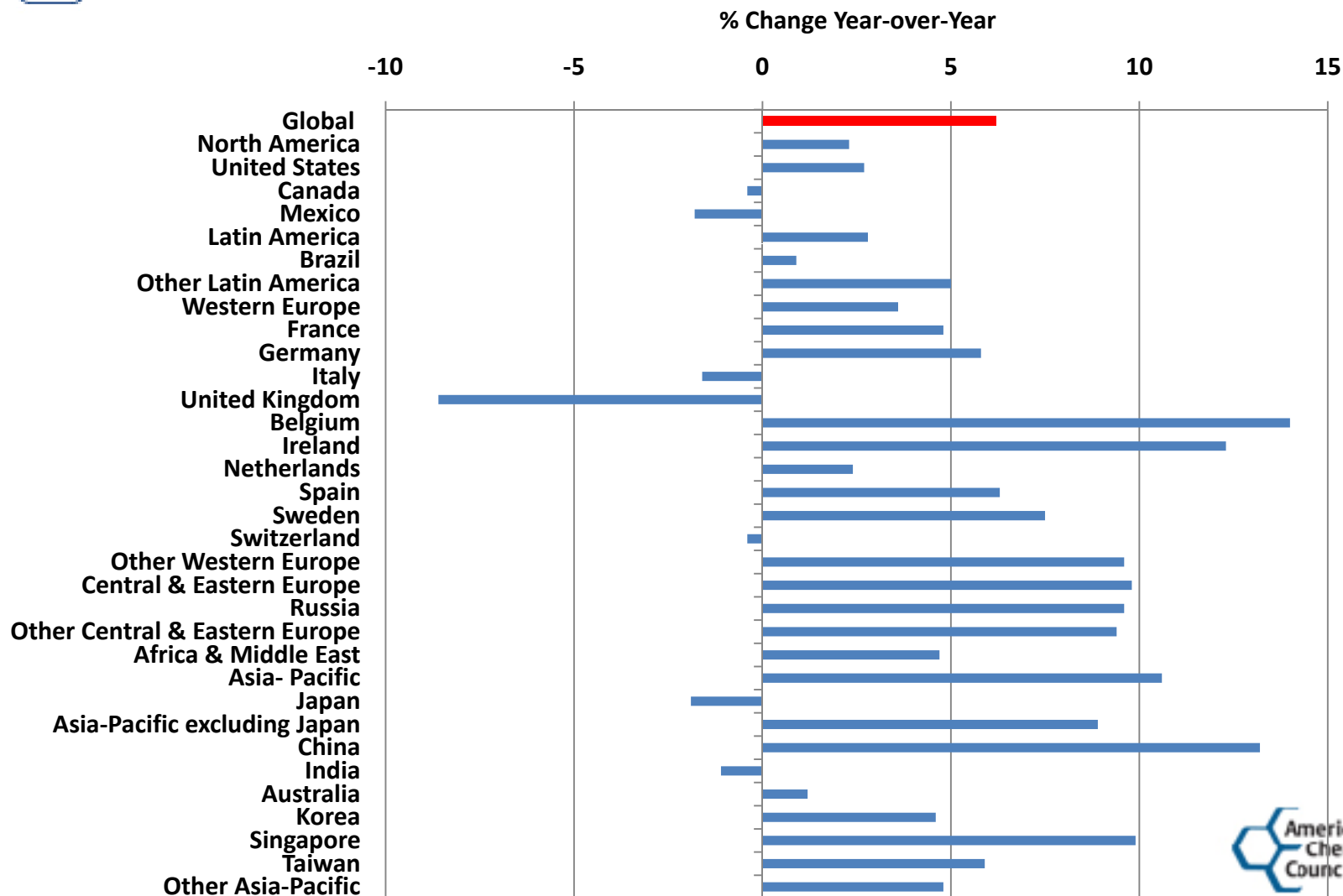
Status of Global Chemistry Production (by Segment)

% Change Year-over-Year



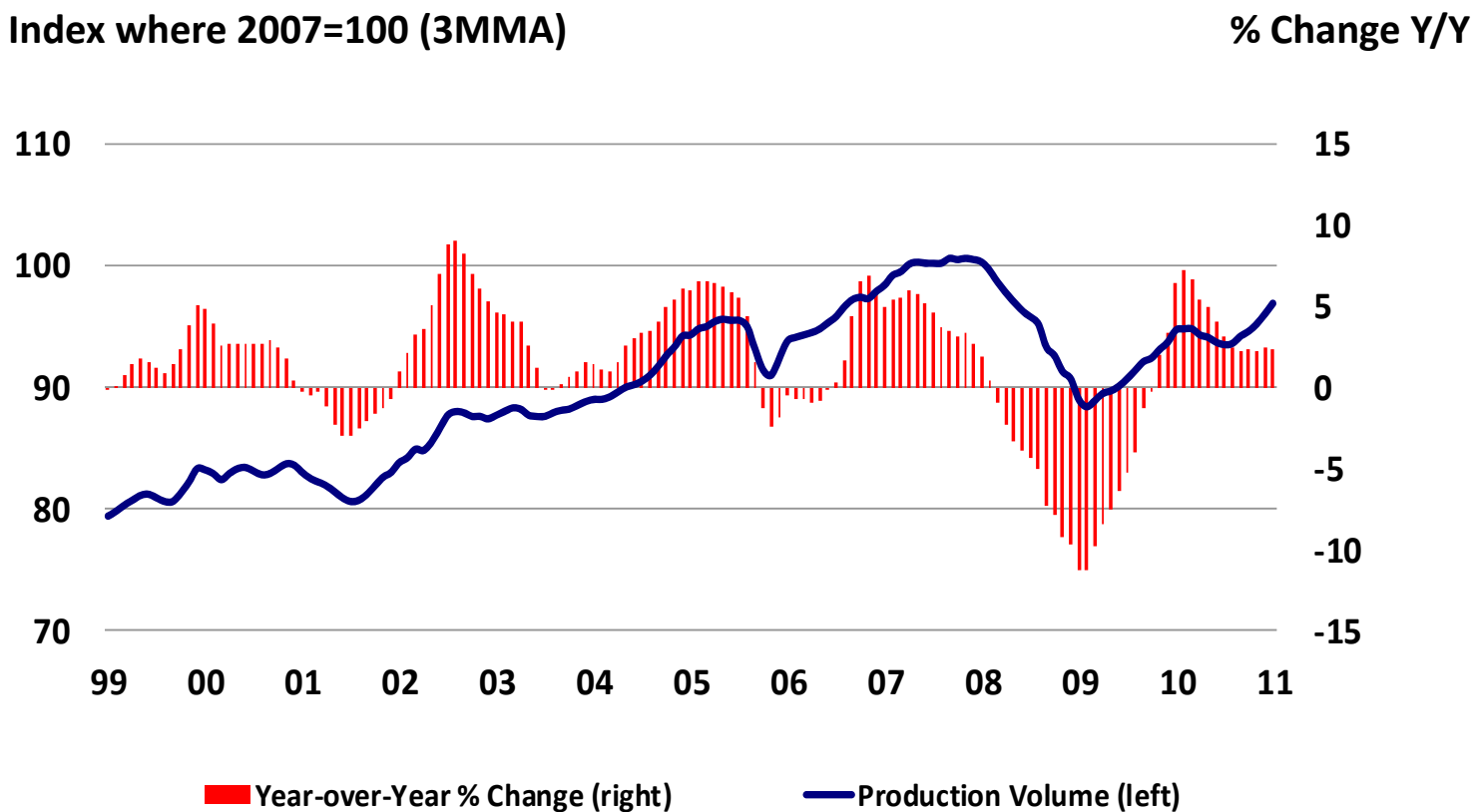


Status of Global Chemistry Production (by Country/Region)





Recent Trends in North American Chemistry Production

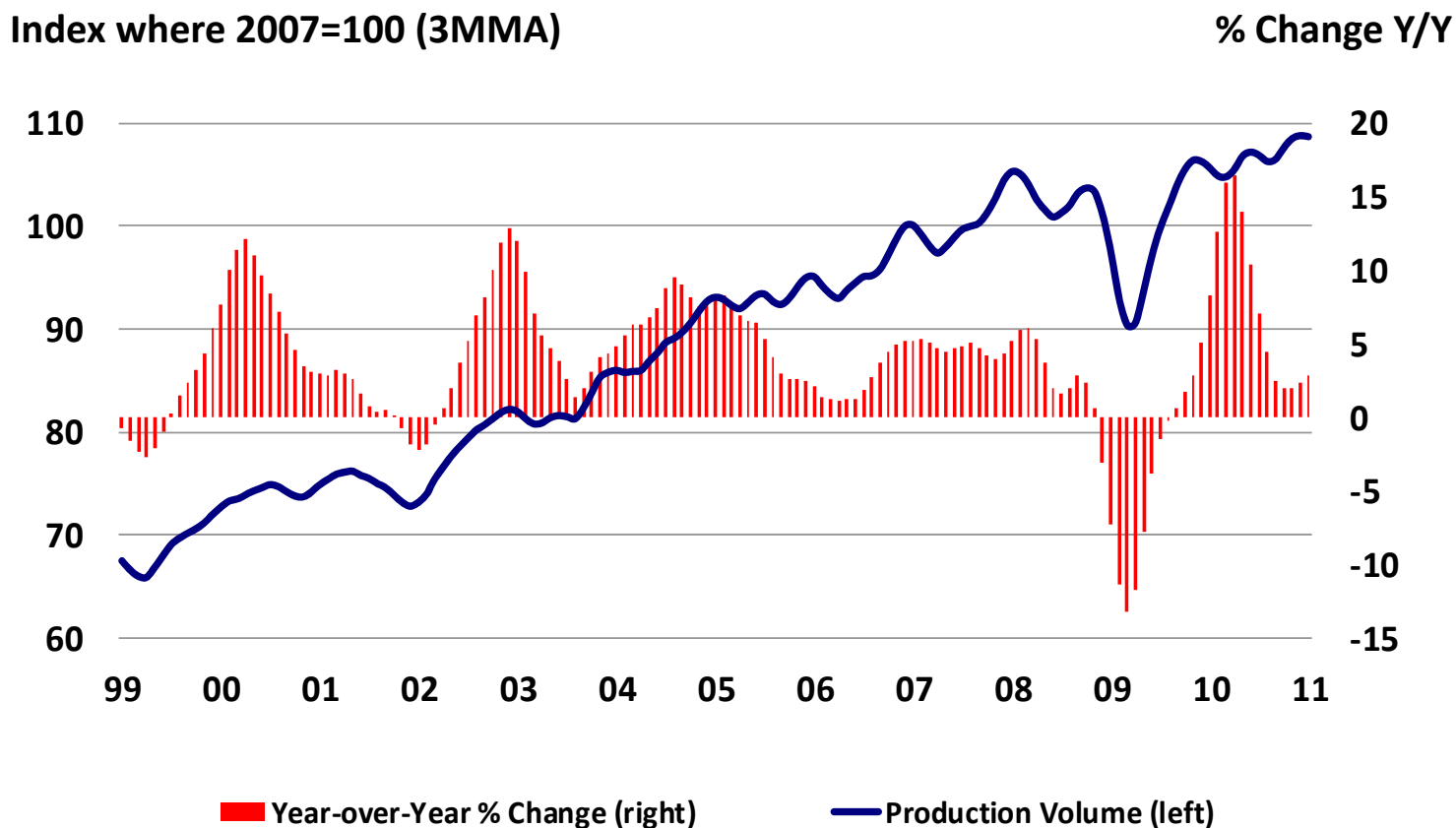


Source: ACC





Recent Trends in Latin American Chemistry Production

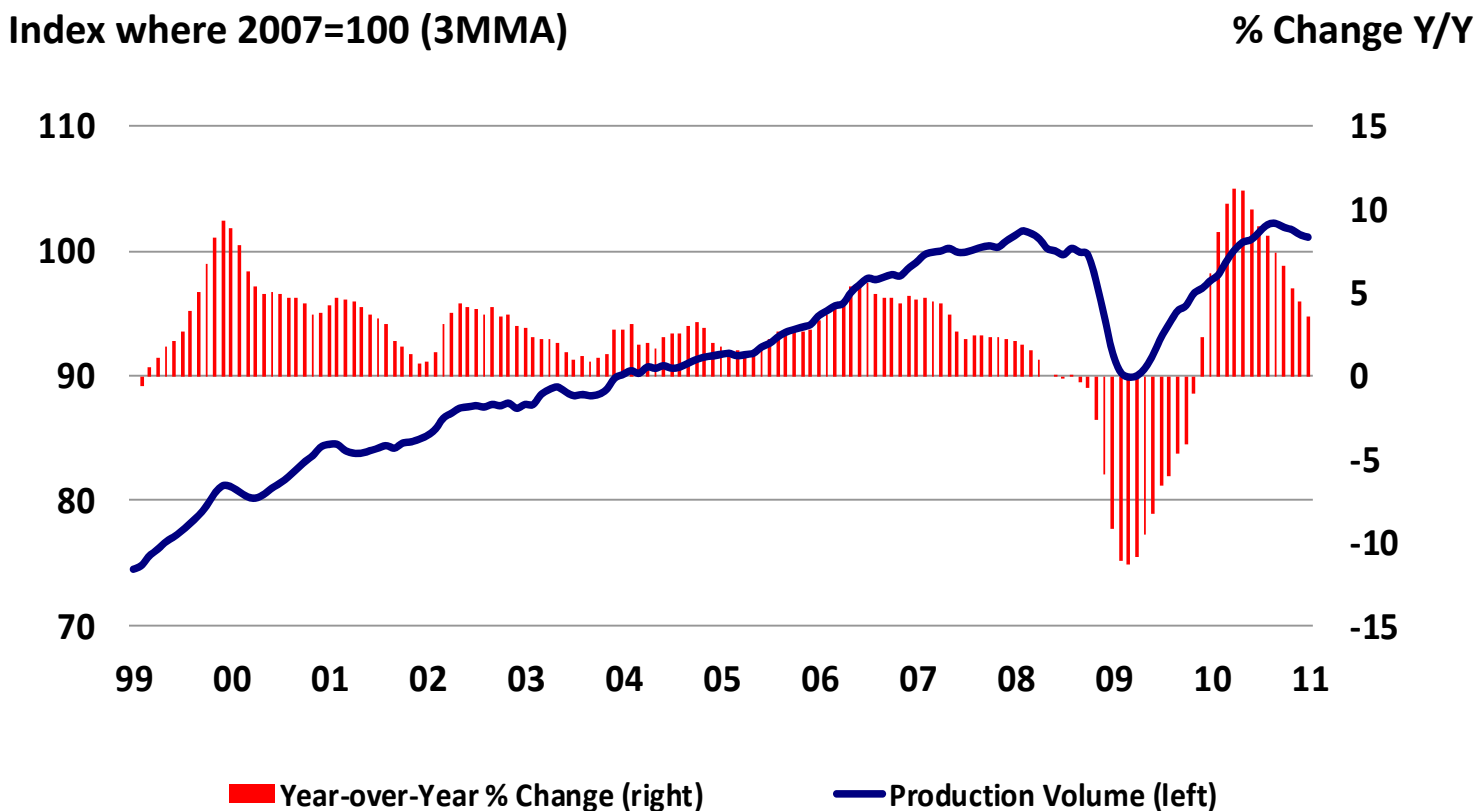


Source: ACC





Recent Trends in Western European Chemistry Production



Source: ACC

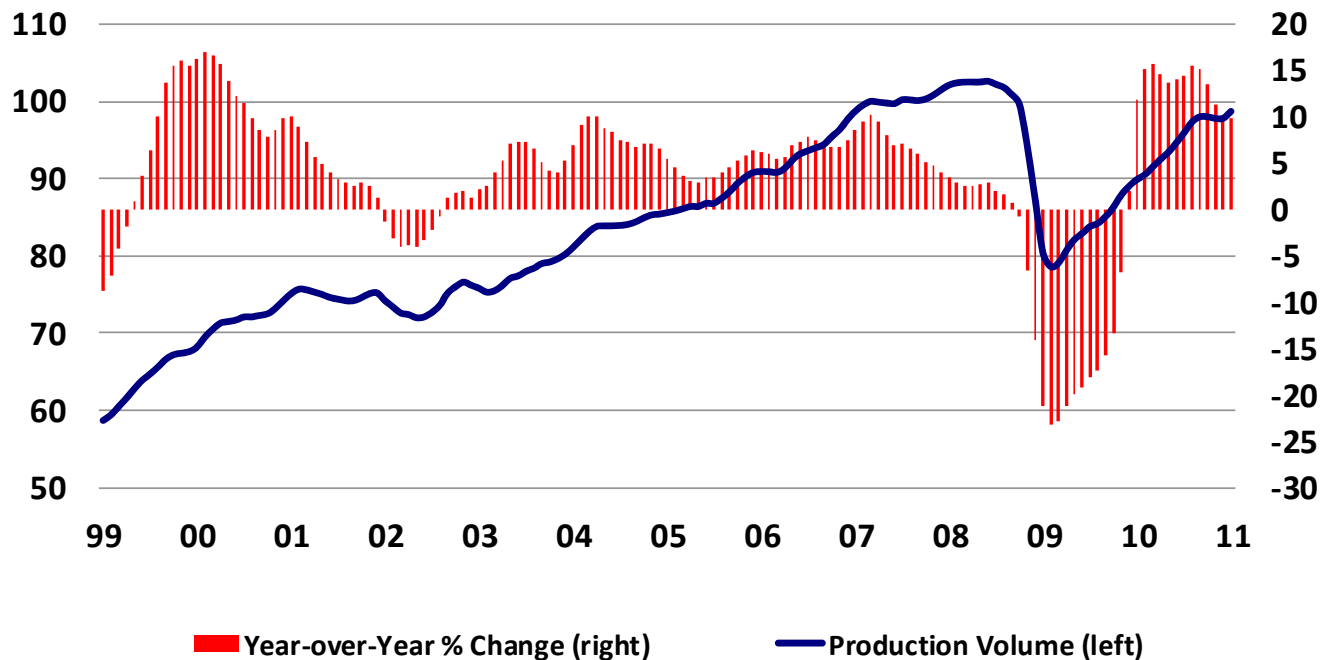




Recent Trends in Central & Eastern European Chemistry Production

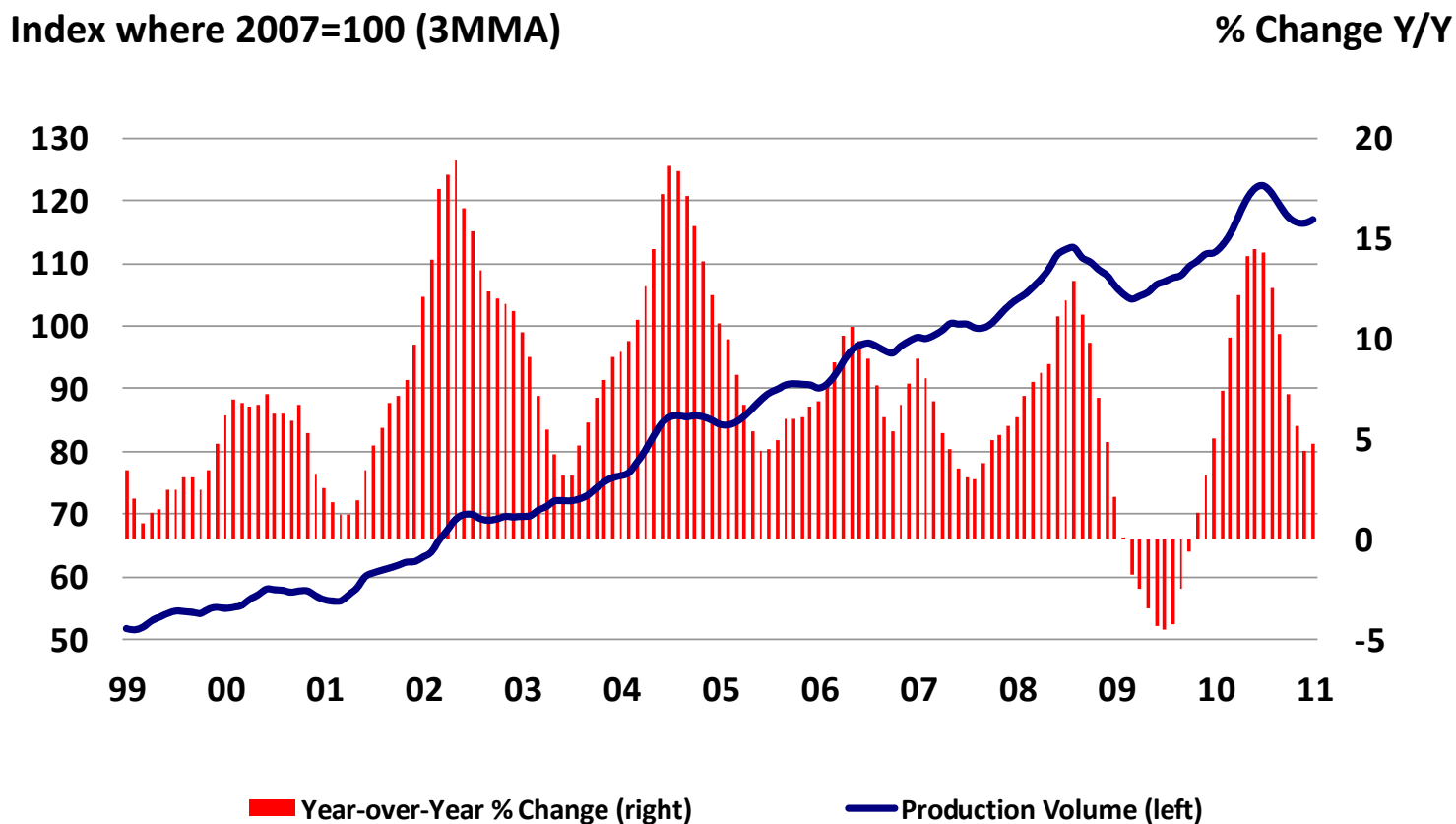
Index where 2007=100 (3MMA)

% Change Y/Y





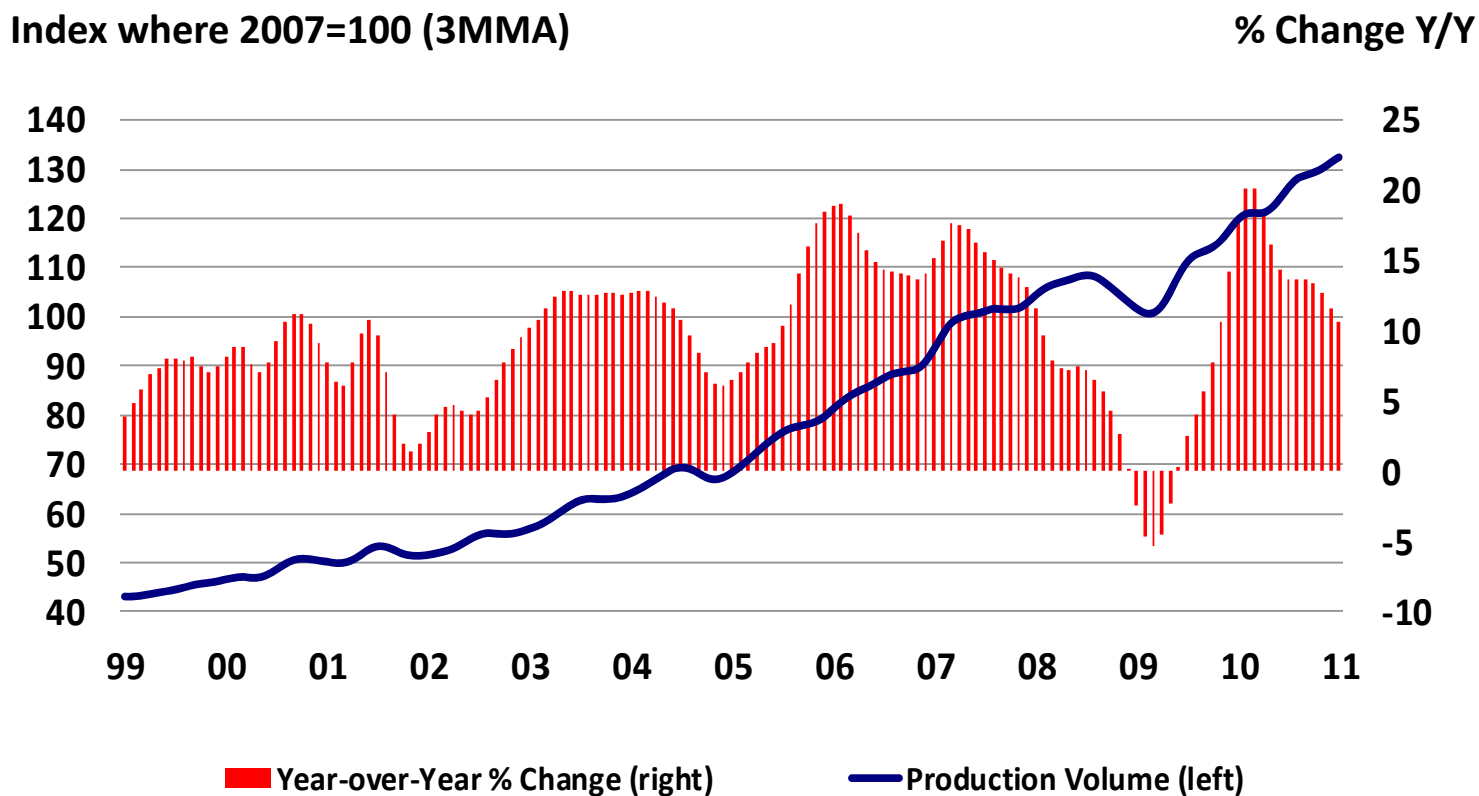
Recent Trends in Africa & Middle East Chemistry Production



Source: ACC



Recent Trends in Asia-Pacific Chemistry Production



Source: ACC



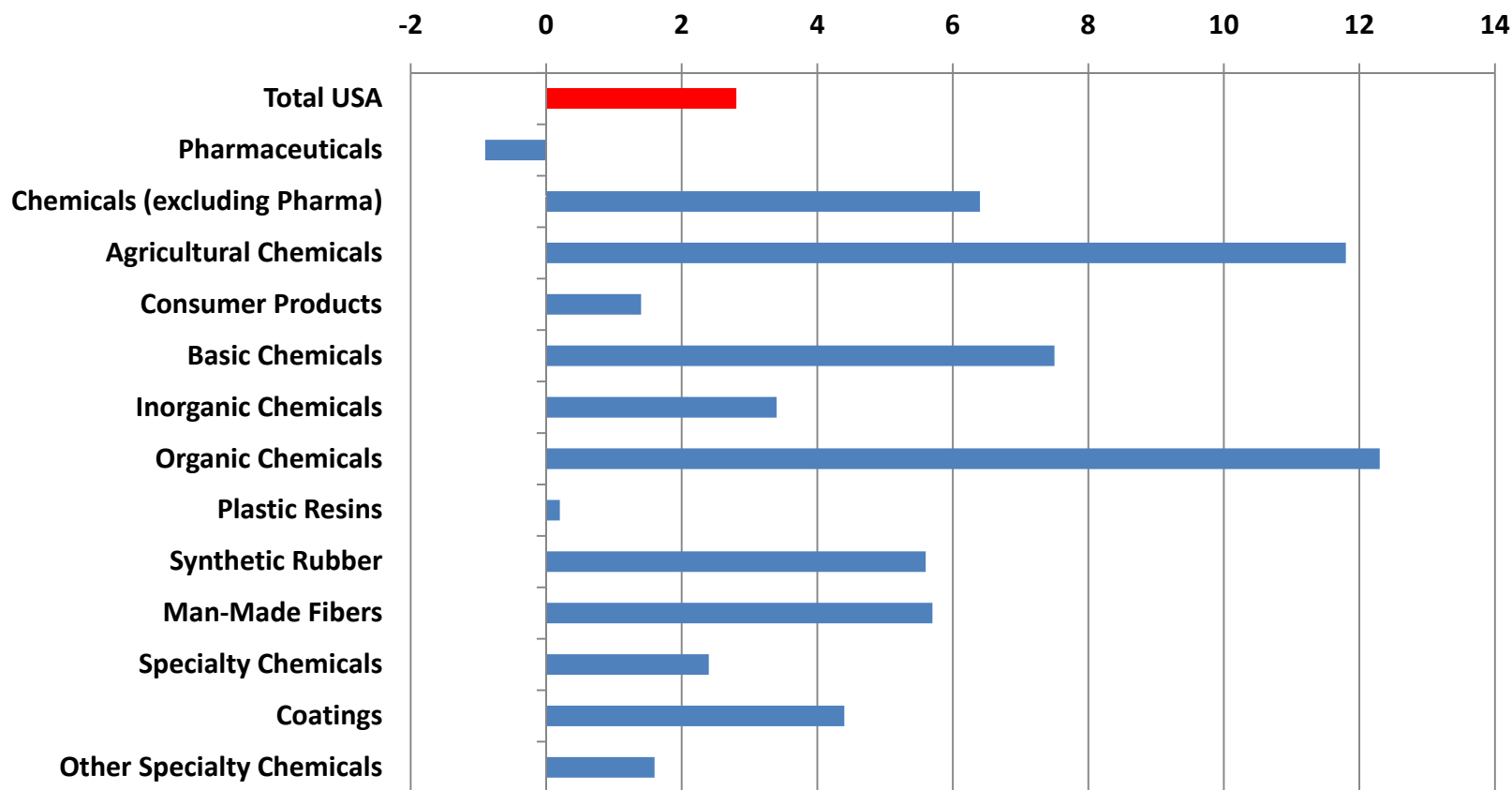


US Chemistry



Status of US Chemistry Production (by Segment)

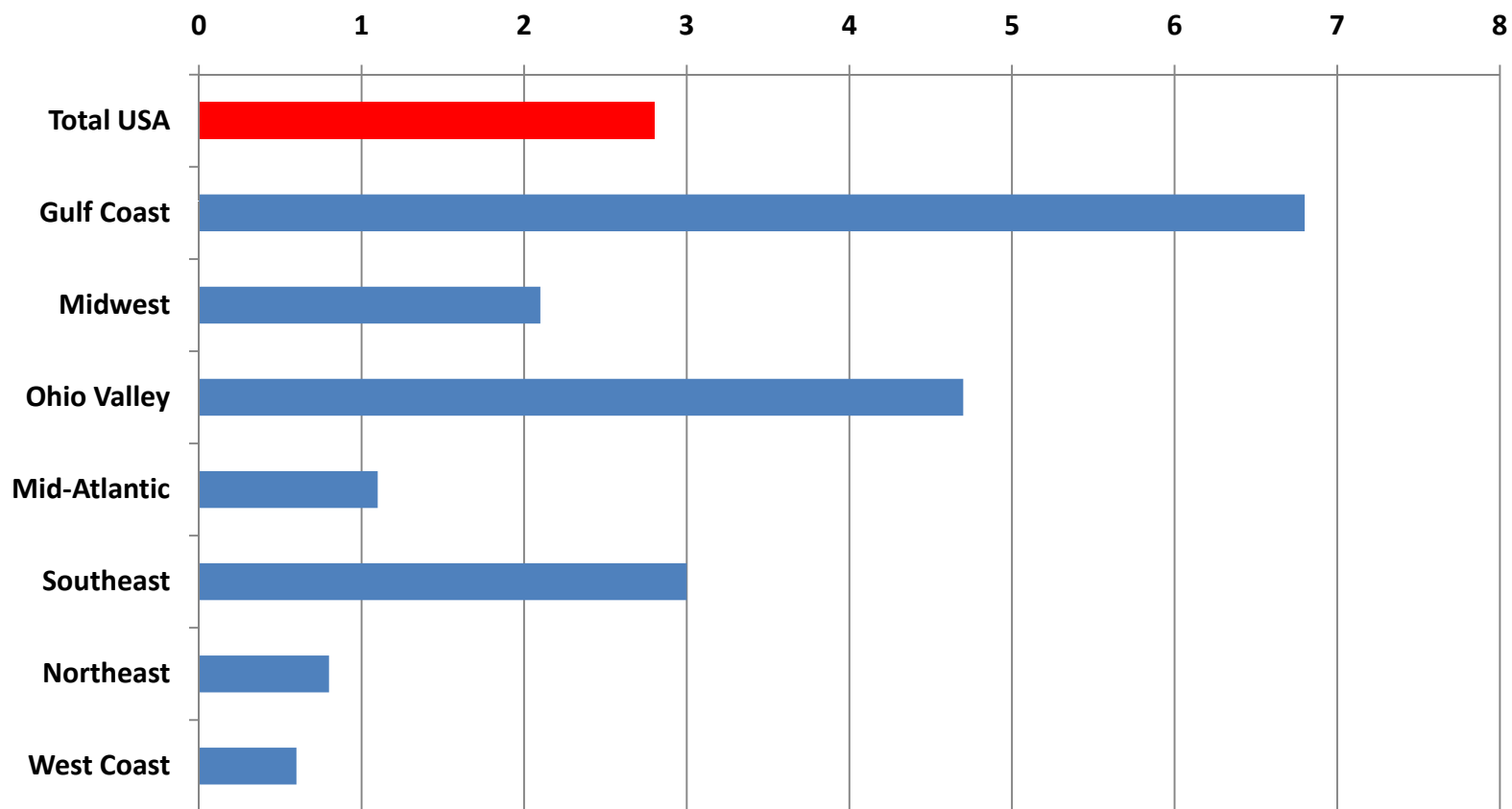
% Change Year-over-Year





Status of US Chemistry Production (by Region)

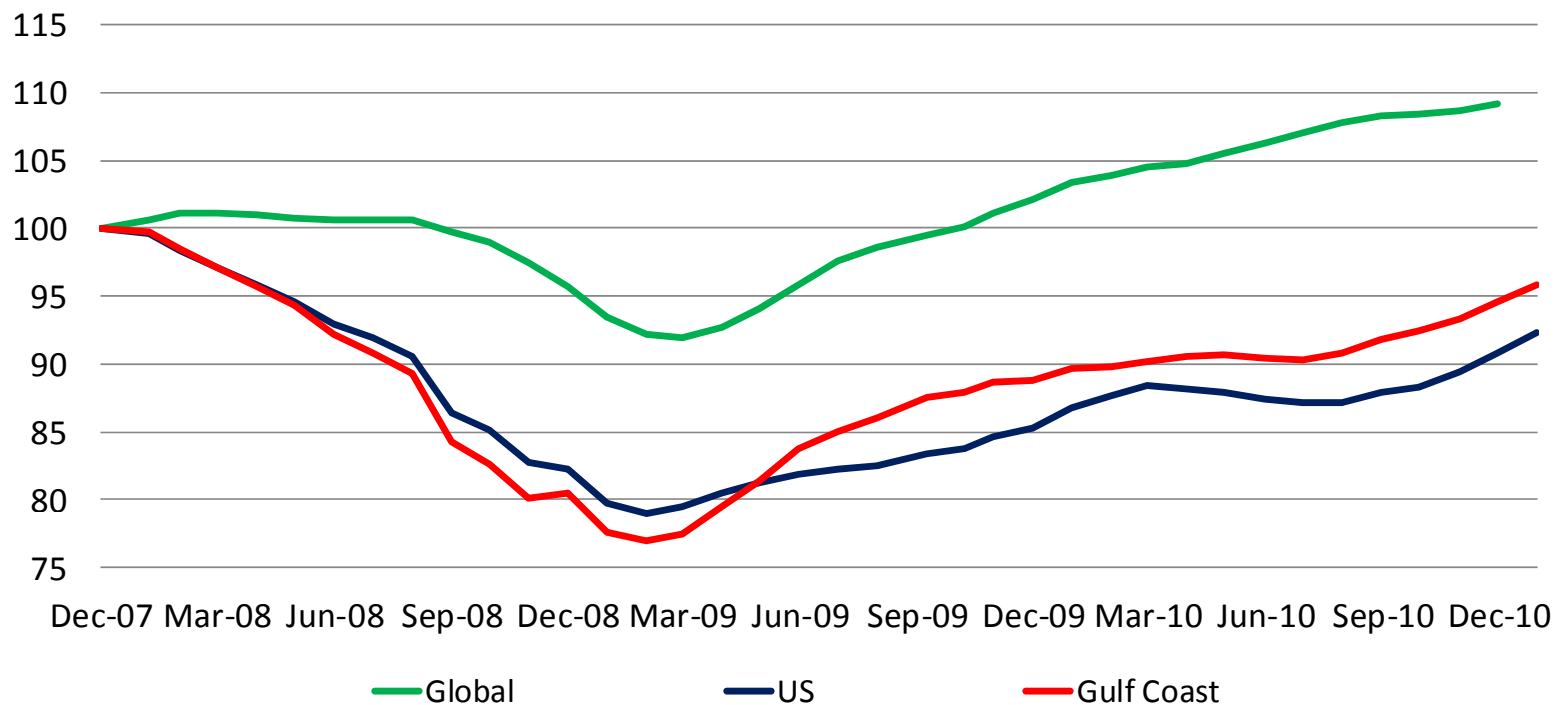
% Change Year-over-Year





Despite Export Gains the US and Gulf Coast Lag Global Volumes *

Index (100=December 2007)



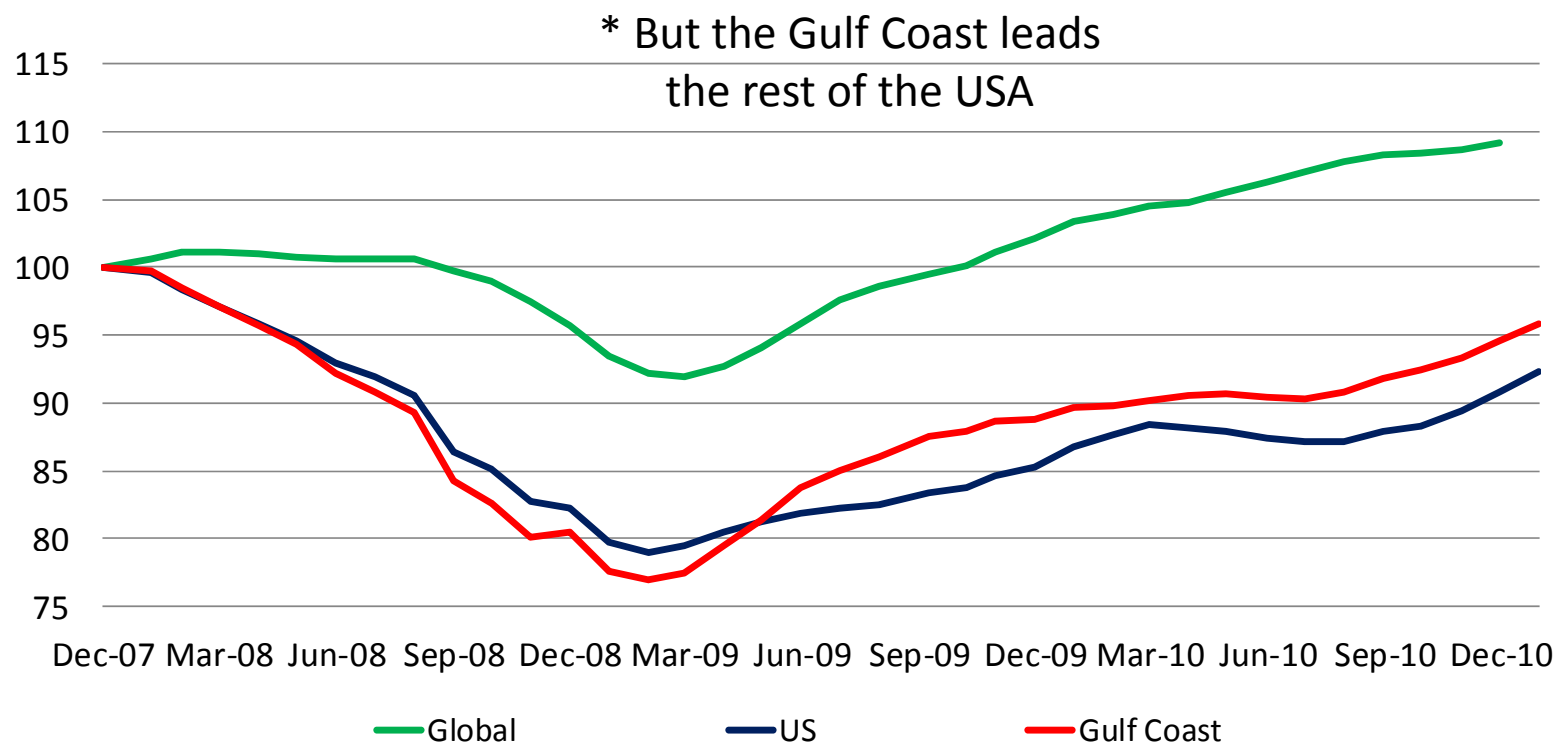
Sources: Federal Reserve, ACC





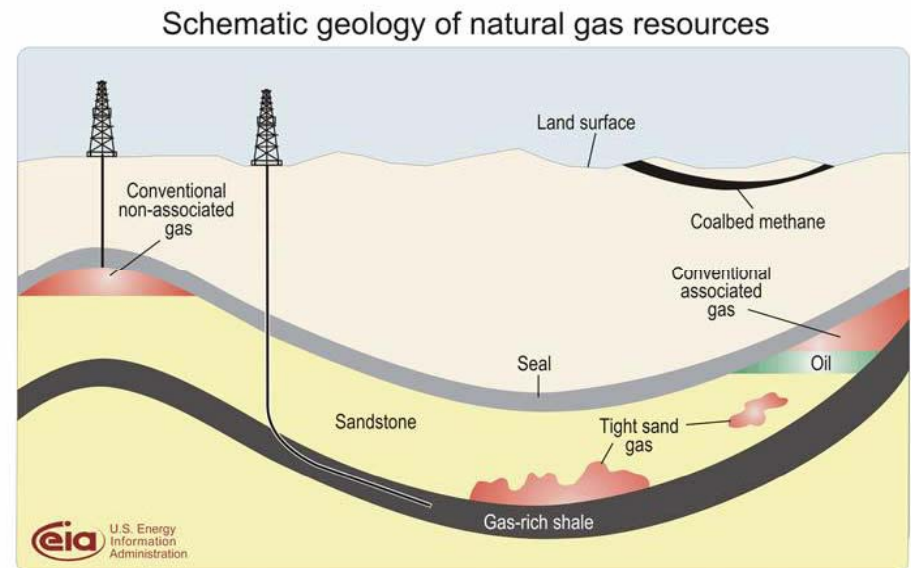
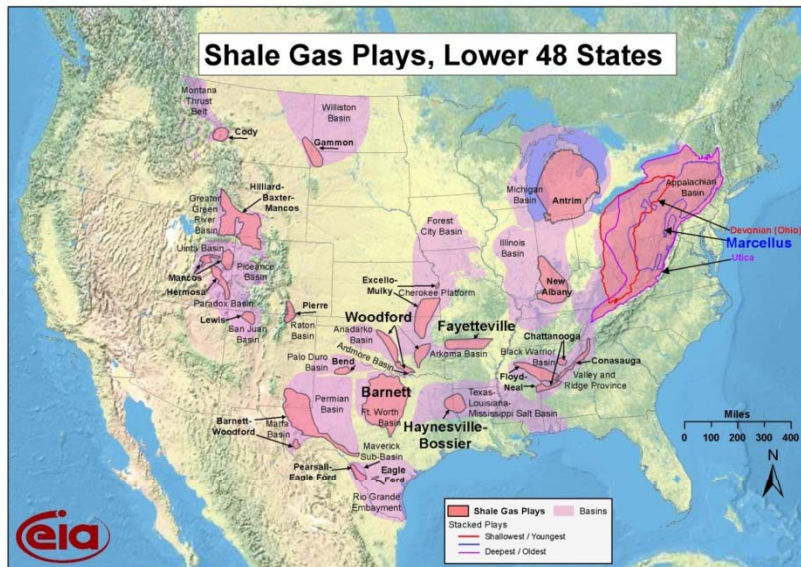
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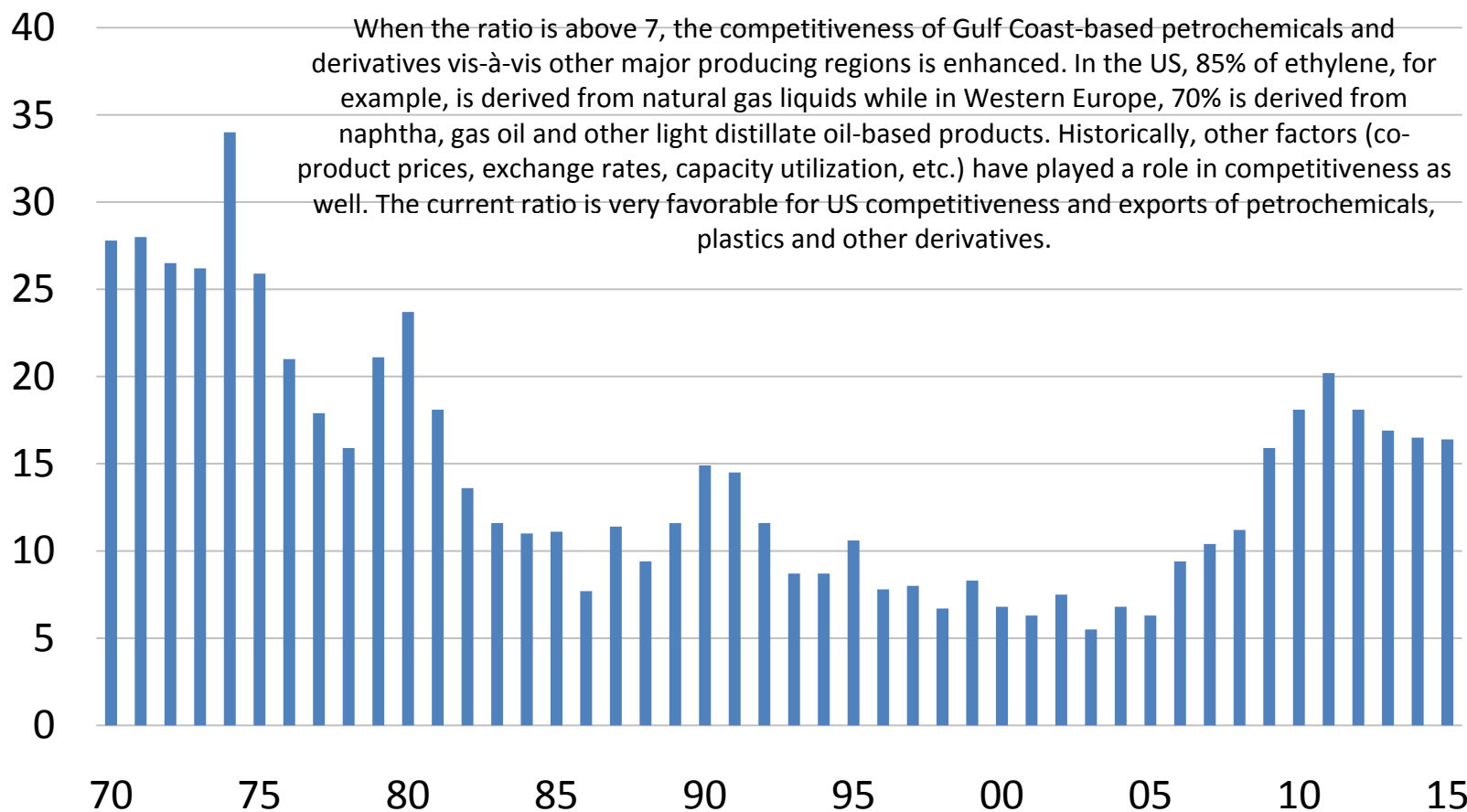
Shale Gas: A Game Changer



- Shale gas has been a game changer in US natural gas markets
- Shale gas has improved the competitiveness of the US petrochemical sector
 - Boosting exports
 - Capital investment in US being reconsidered
 - Location of shale gas may foster new greenfield investment (Tonawanda as an export-platform?)
- But challenges remain...
 - Environmental concerns over hydraulic fracturing
 - Pending regulations force utilities to replace coal-fired power plants with natural gas
 - Rising US economy will also promote US natural gas demand
 - Other trade, tax, and policy issues

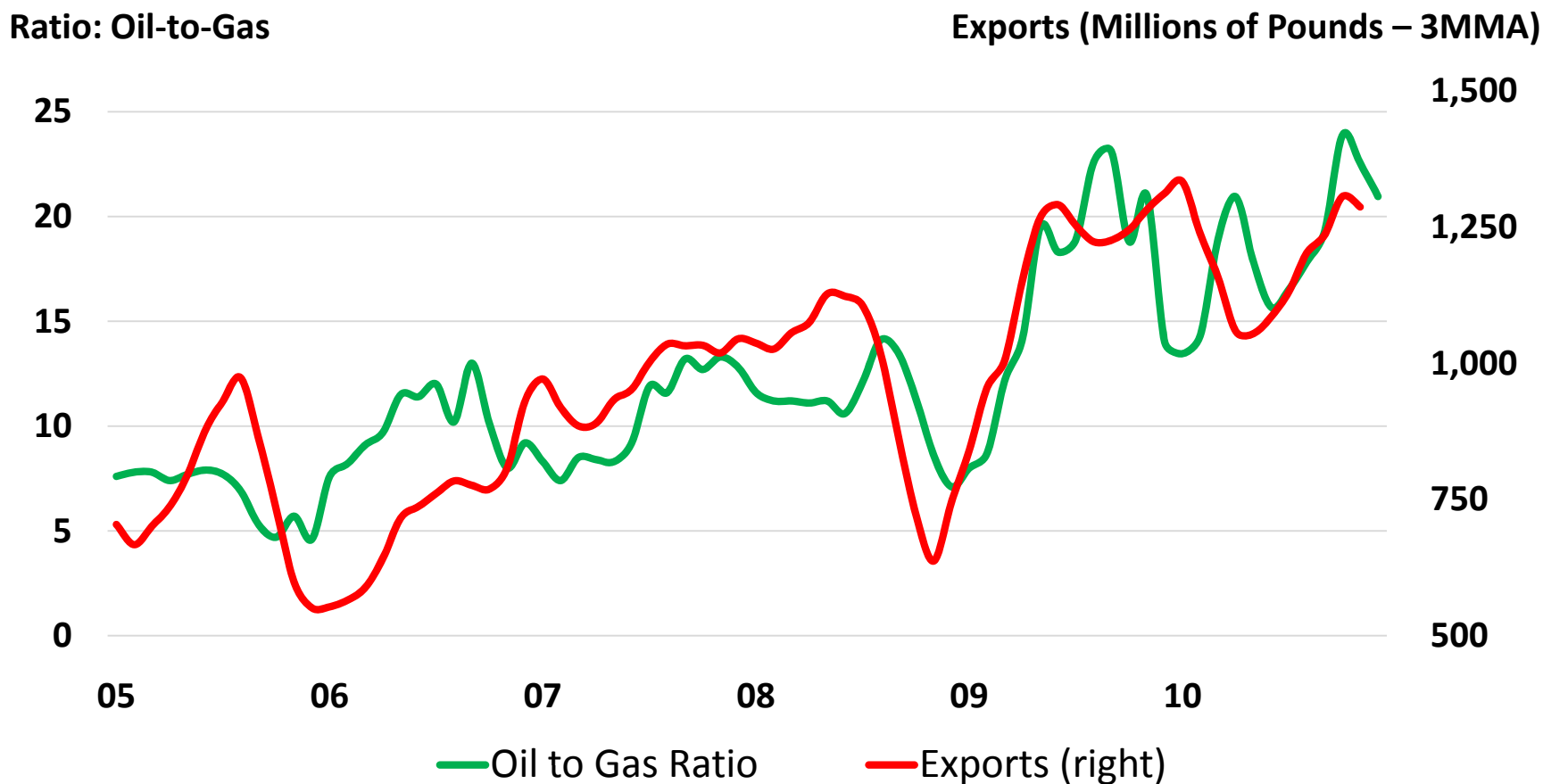


Oil-to-Gas Ratio: A Proxy for US Gulf Coast Competitiveness





NA Plastics Exports and Oil-to-Gas Ratio are Highly-Correlated

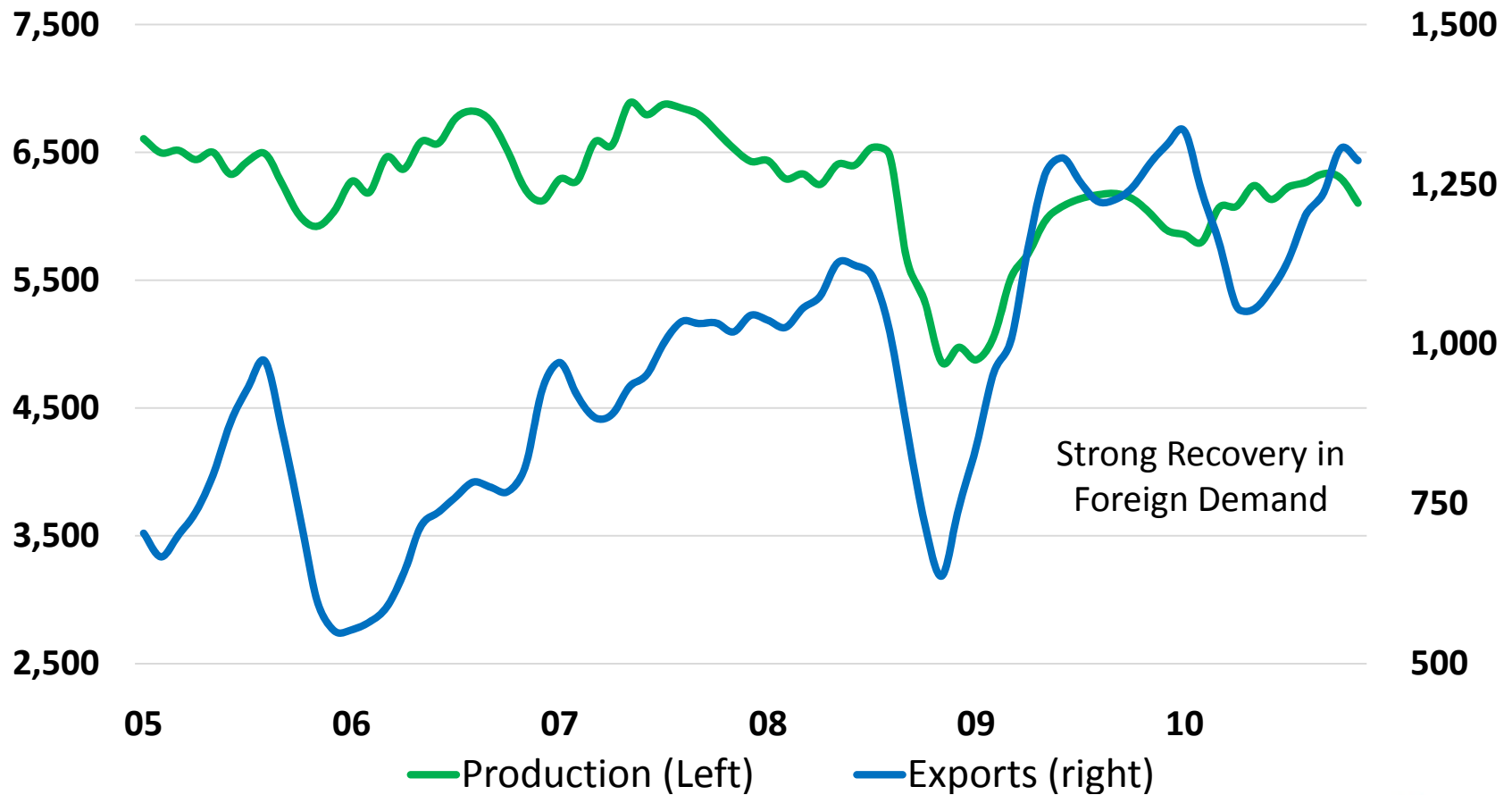


Note: Thermoplastics includes LDPE, LLDPE, HDPE, PP, PS, and PVC



NA Thermoplastics Exports and Production

(Millions of Pounds – 3MMA)

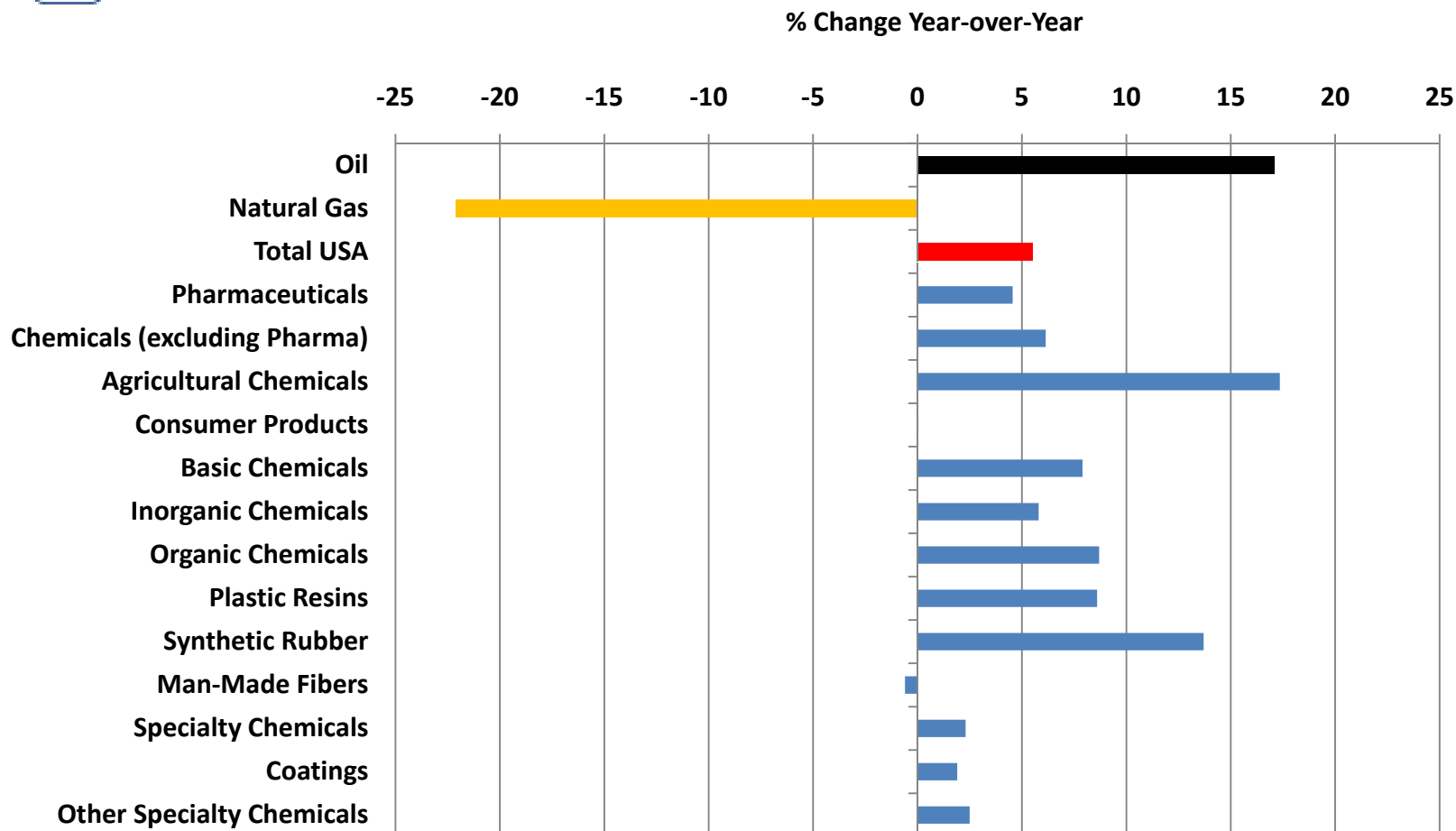


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Status of US Chemistry Prices (by Segment) vs. Inputs





Recent Analysis of Added Petrochemicals Output

- Availability of shale gas leads to:
 - A 25% increase in ethane which generates additional petrochemicals and derivatives output (\$32.8 billion)
 - Which requires a \$16.1 billion private sector capital investment by the chemical industry
- Study uses IMPLAN model
- Study measures:
 - Direct, indirect and induced effects on output, jobs, and tax
 - Includes effects from added petrochemicals and other activity as well as from initial capital investment



Economic Impact of Added Petrochemicals Output

From Expanded Production of Petrochemical and Derivatives from a 25% Increase in Ethane Production

Impact Type	Employment	Payroll (\$ Billion)	Output (\$ Billion)
Direct Effect	17,017	\$2.4	\$32.9
Indirect Effect	79,870	6.6	32.8
Induced Effect	85,563	4.1	13.7
Total Effect	182,450	\$13.1	\$83.4

Economic Impact from New Investment in Plant and Equipment

Impact Type	Employment	Payroll (\$ Billion)	Output (\$ Billion)
Direct Effect	54,094	\$4.3	\$16.2
Indirect Effect	74,479	5.1	16.8
Induced Effect	100,549	4.8	16.1
Total Effect	229,122	\$14.2	\$49.0



Tax Impact of Added Petrochemicals Output

Tax Impact (in billions of dollars) from Expanded Production of Petrochemical and Derivatives from a 25% Increase in Ethane Production:

	Payroll	Households and Proprietors	Corporations and Indirect Business Taxes	Total	Over 10 Years
Federal	\$1.0	\$0.9	\$0.6	\$2.5	\$24.9
State and Local	\$0.02	\$0.30	\$1.57	\$1.9	\$19.0

Tax Impact (in billions of dollars) from New Investment in Plant and Equipment:

	Payroll	Households and Proprietors	Corporations and Indirect Business Taxes	Total
Federal	\$1.4	\$1.2	\$0.5	\$3.1
State and Local	\$0.04	\$0.4	\$1.3	\$1.8



The Gulf Coast in Relation to the Global Chemistry Outlook

(from *Year-End Situation & Outlook*)

% production volume change on previous year	2009	2010	2011	2012	2013	2014	2015
World	-3.3	10.1	5.4	5.1	4.8	4.5	4.2
North America	-5.2	4.1	3.1	3.4	3.2	3.0	3.1
United States	-5.1	4.3	3.0	3.4	3.1	3.0	3.0
Of which US Gulf Coast	-7.8	9.5	3.0	2.5	1.8	1.7	1.8
Gulf Coast with New Investment					2.5	3.8	4.3

Sources: IHS Global Insight, Oxford Economics, other forecasters, ACC analysis





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Conclusions – Chemical Industry

- North American chemical industry recovery firmed in 2nd quarter 2009 and is underway across nearly all end-use customer industries segments, driven by business investment/exports
- North American chemical recovery driven by:
 - Recovery of end-use markets
 - Depleted inventories with restocking occurring, but customers are managing inventories well
 - Stronger exports due to feedstock cost advantages and dynamic emerging market economies
 - Strength has been centered in basic chemicals, with specialty recovery now emerging
- Now up three-fifths from trough but recovery in 2011 and beyond depends on strength of demand from end-use industries:
 - Recovery in manufacturing slowed in mid-2010 but now re-accelerating
 - Will dollar aid favorable export dynamics?
- Shale gas is a game changer - A new wave of investment?
- The recovery is fragile – multiple risks remain and wrong trade, tax and other policy initiatives could derail activity



Questions?

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