




**GARDNER  
RESEARCH**



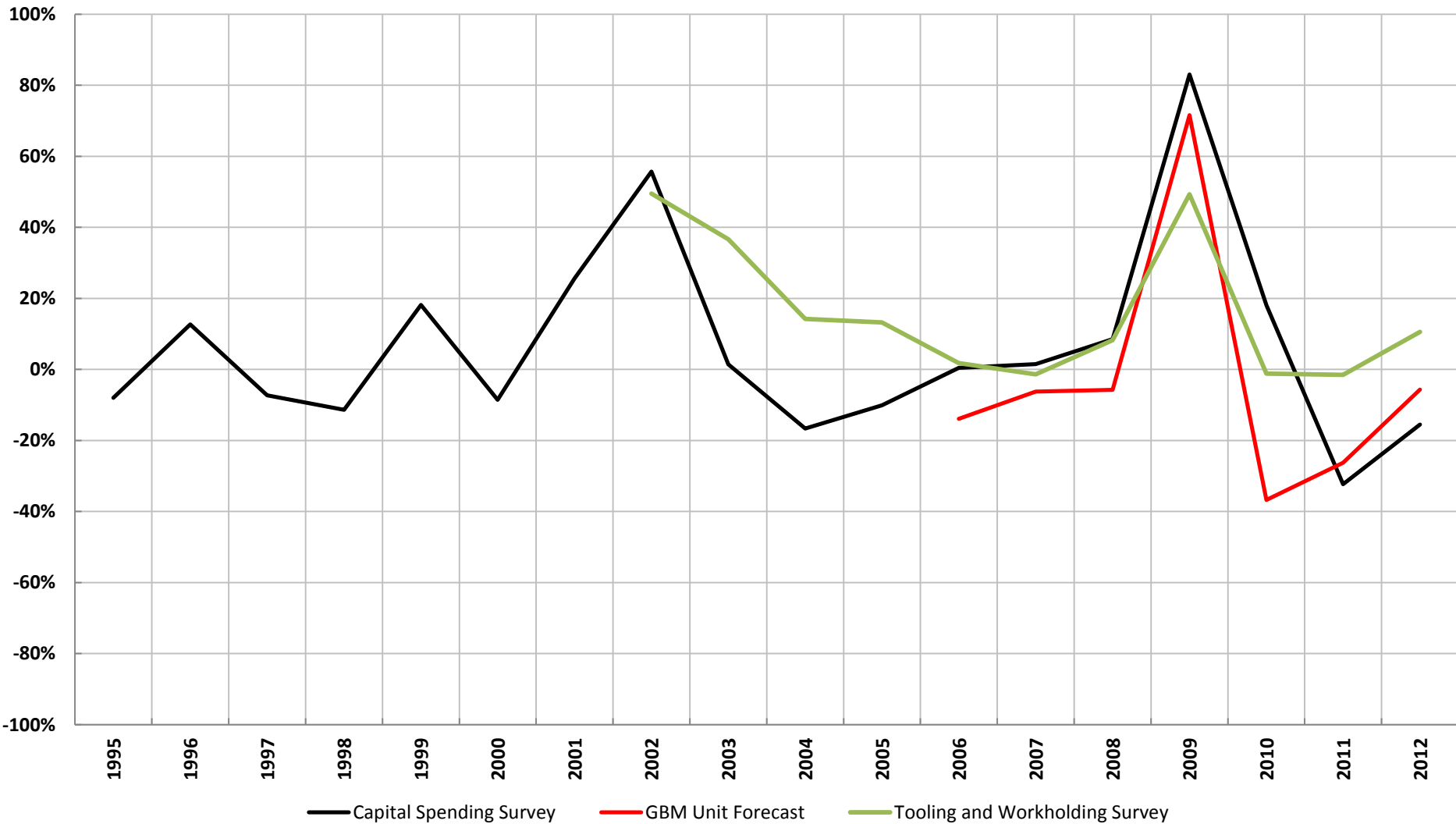
**2013  
CAPITAL EQUIPMENT,  
TOOLING, AND  
WORKHOLDING  
SURVEY AND FORECAST**

**PRESENTED BY: Steve Kline**

- Worked with University of Cincinnati to develop a more rigorous statistical process
  - Spending highly correlated with plant size
  - True statistical sampling of plants
  - +/- \$10,000 with 95% confidence at the total metalcutting level
- Tested new practices to boost response rate
- Created a relational database that allows for more dynamic data analysis
- Trend reports instead of demographic reports

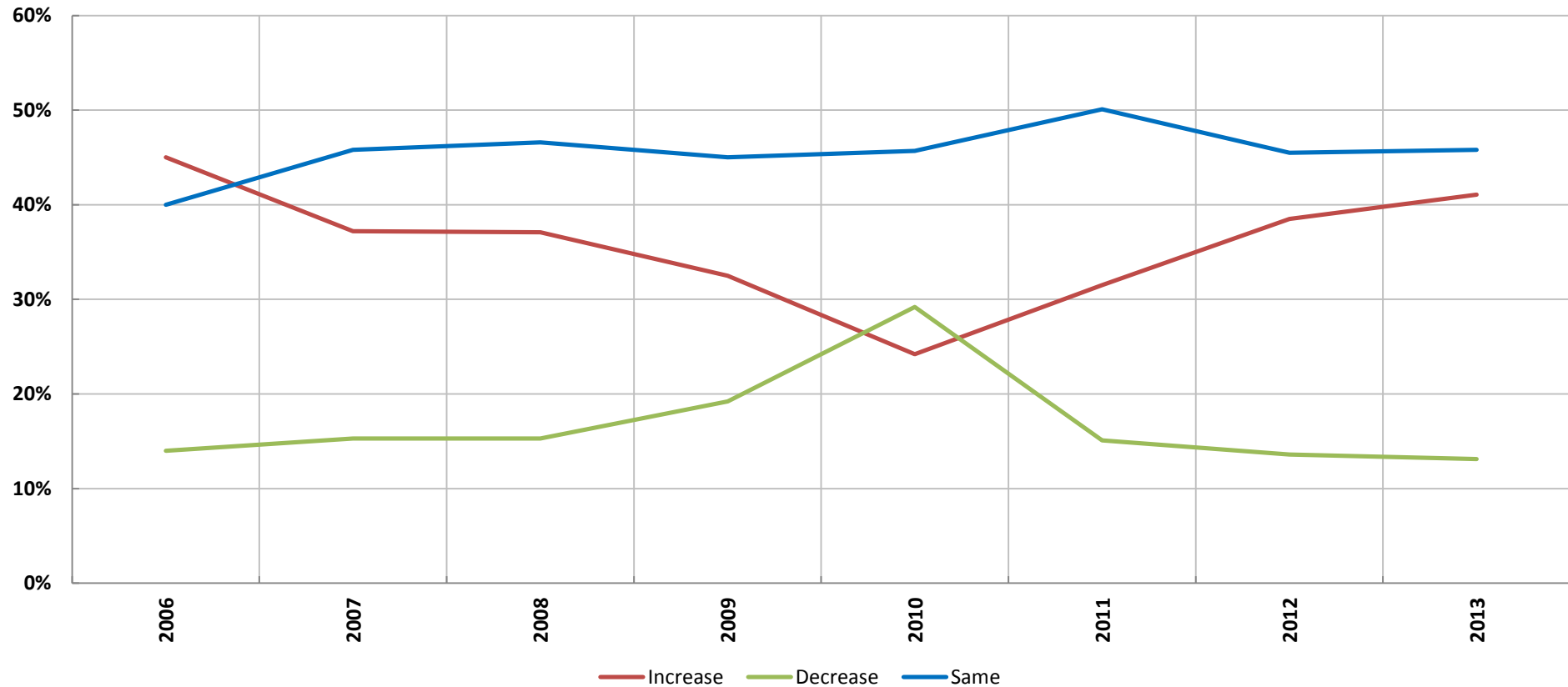


### Forecast Accuracy



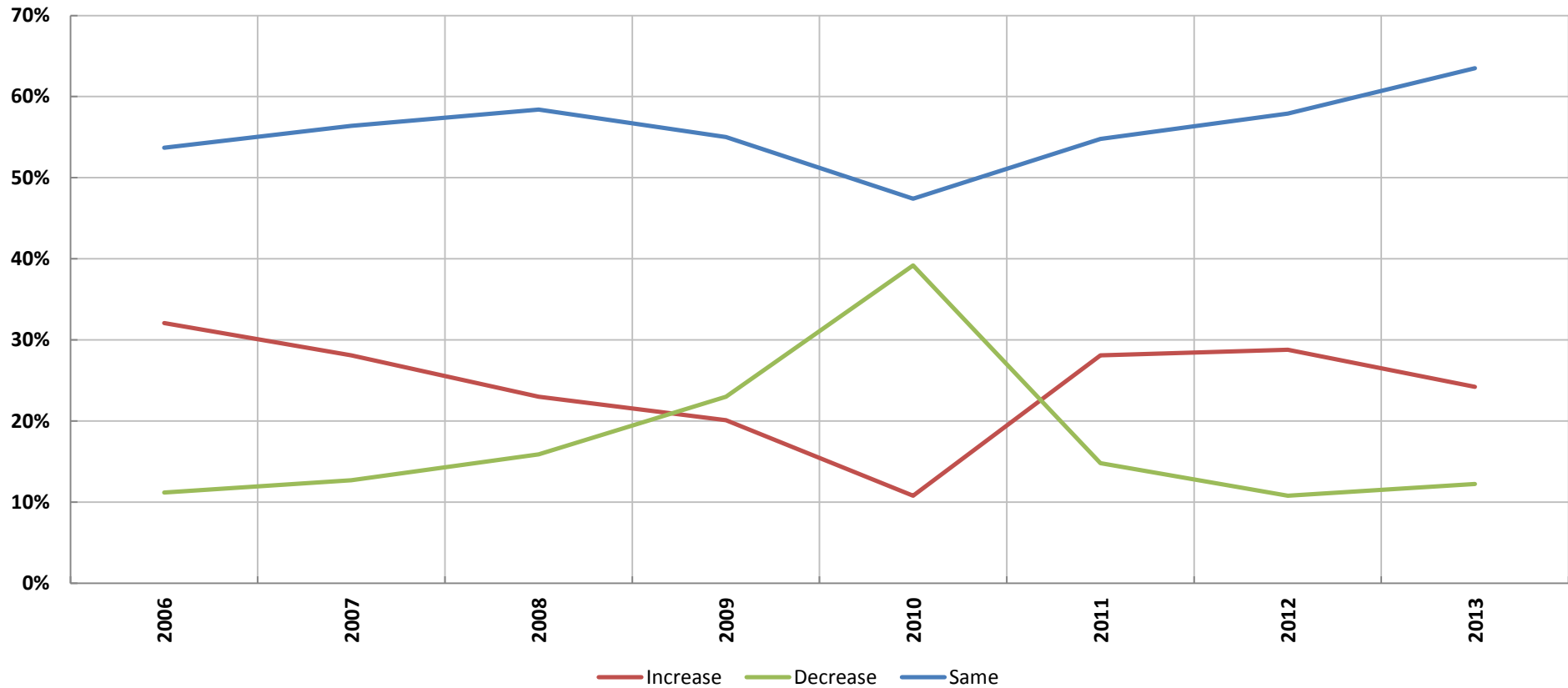


# WILL YOUR PLANT'S SPENDING ON CAPITAL EQUIPMENT...



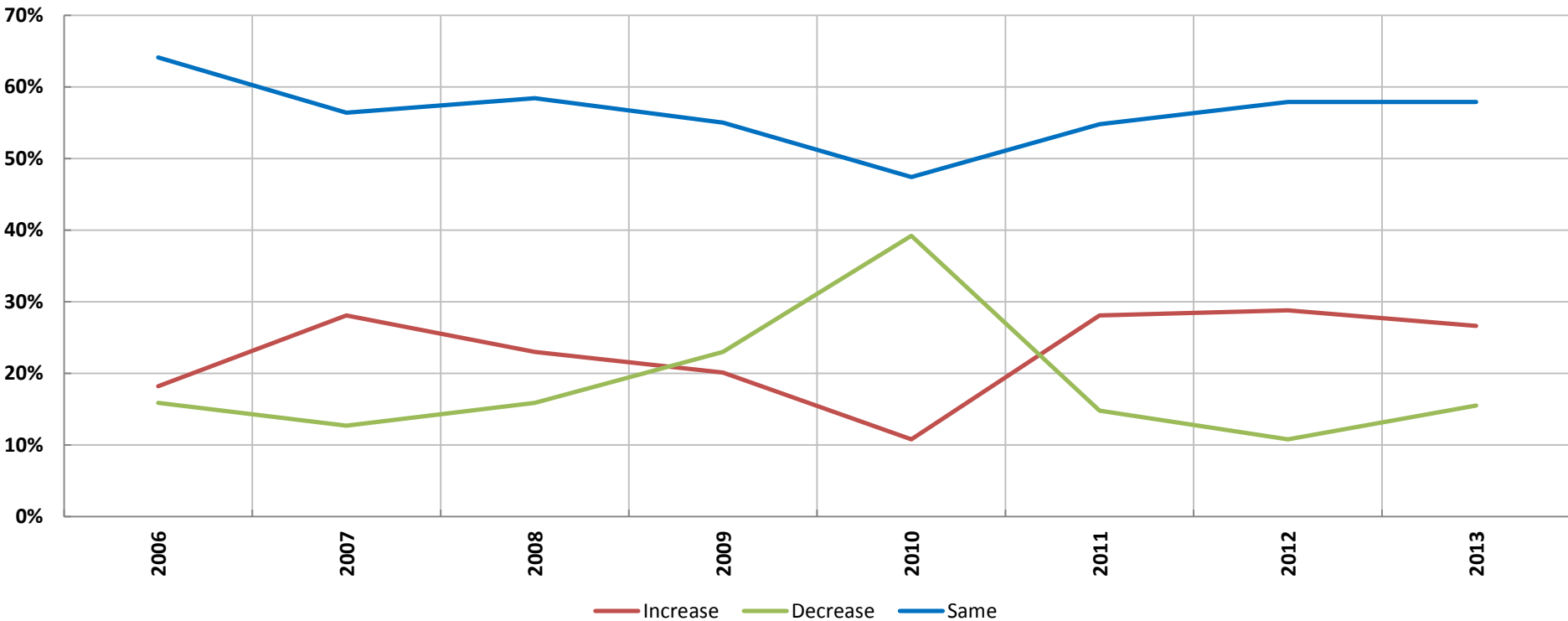
- More plants expect to increase their spending on capital equipment for the third straight year
- Highest percentage of respondents plan to increase their spending since 2006

# WILL YOUR PLANT'S SPENDING ON TOOLING...

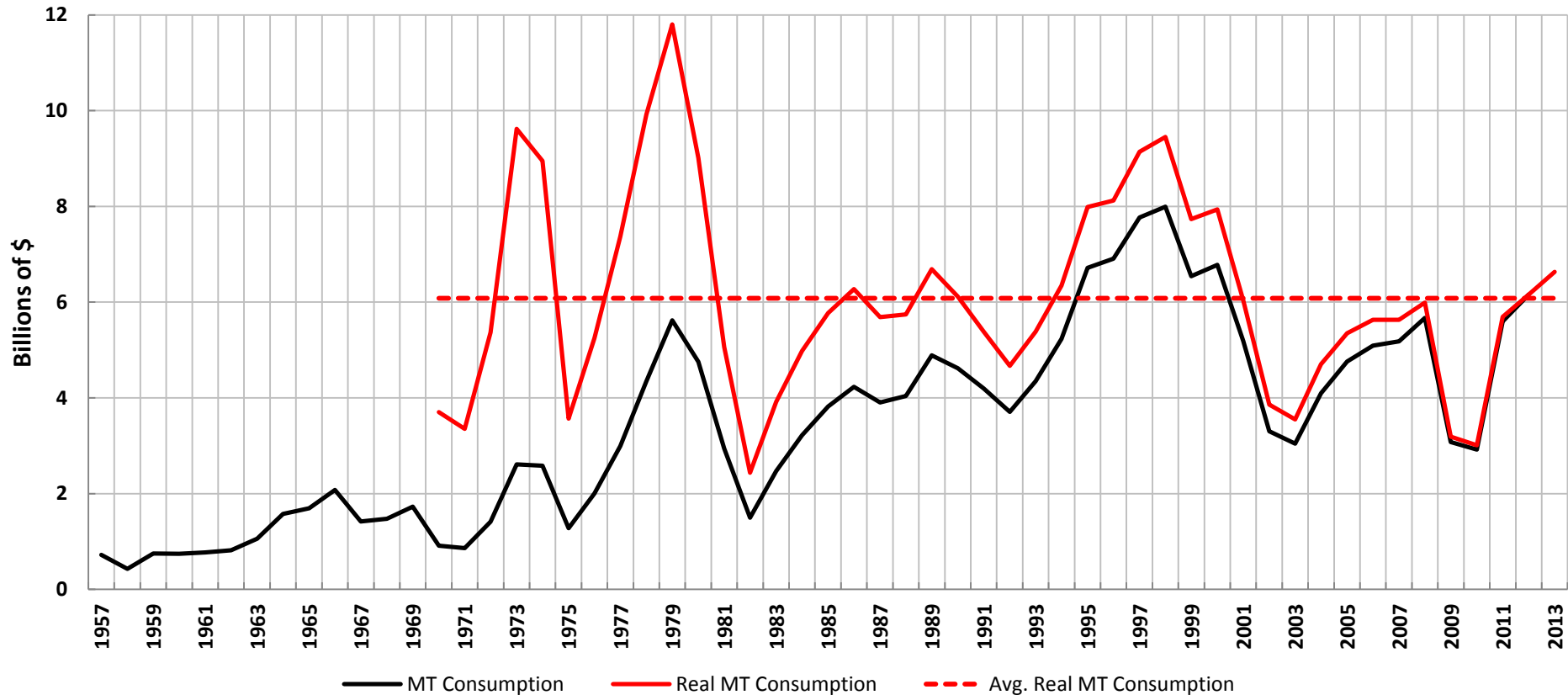


- Plants planning to increase or keep spending the same is the highest percentage since at least 2006

**Will Your Plant's Workholding Spending...**

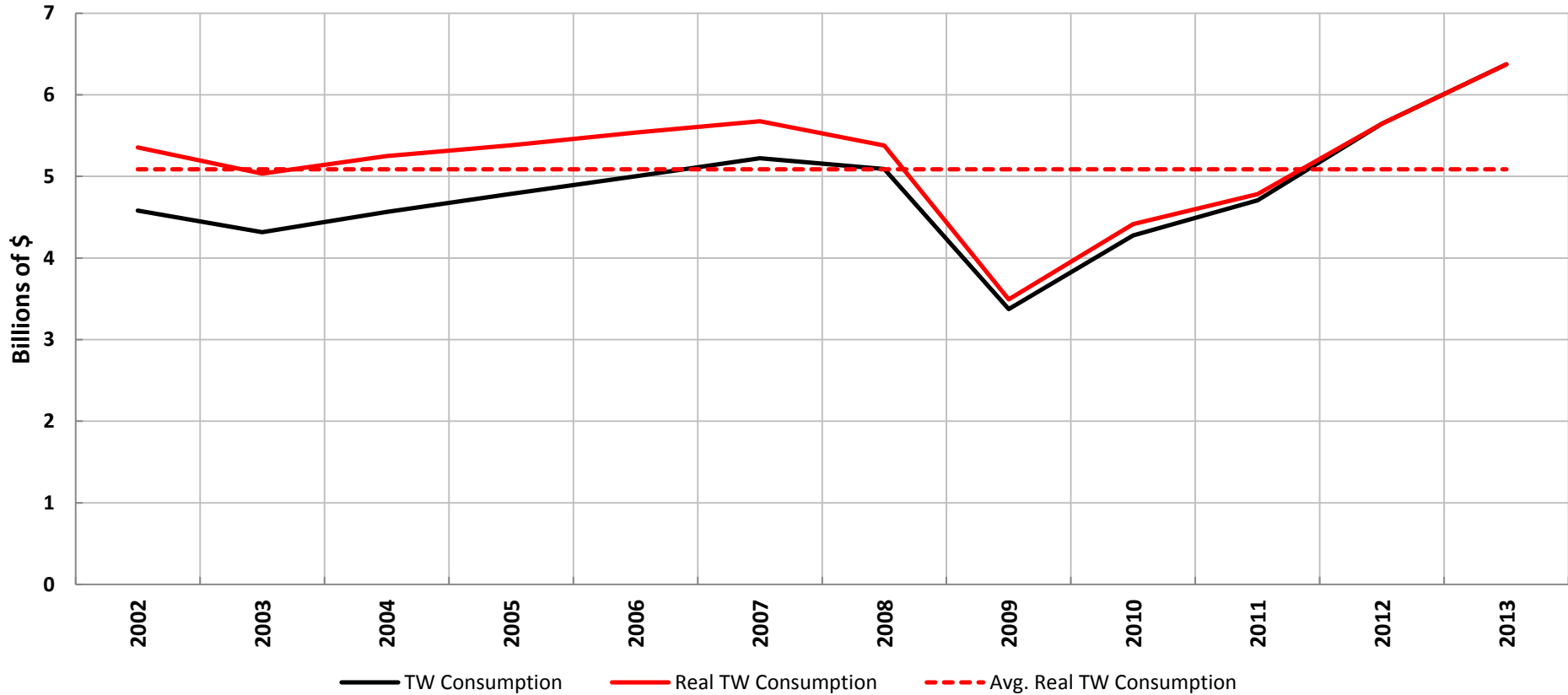


- Plants planning to increase or keep spending the same is near the all-time high



- 2013 projection is \$6.634 billion, which is up 8% from 2012 estimate and roughly 10% more than the historical average market
- Currently in the strongest machine tool market in 15 years
- Economic trends supporting this market should last several years

# HISTORIC COMBINED TOOLING & WORKHOLDING CONSUMPTION

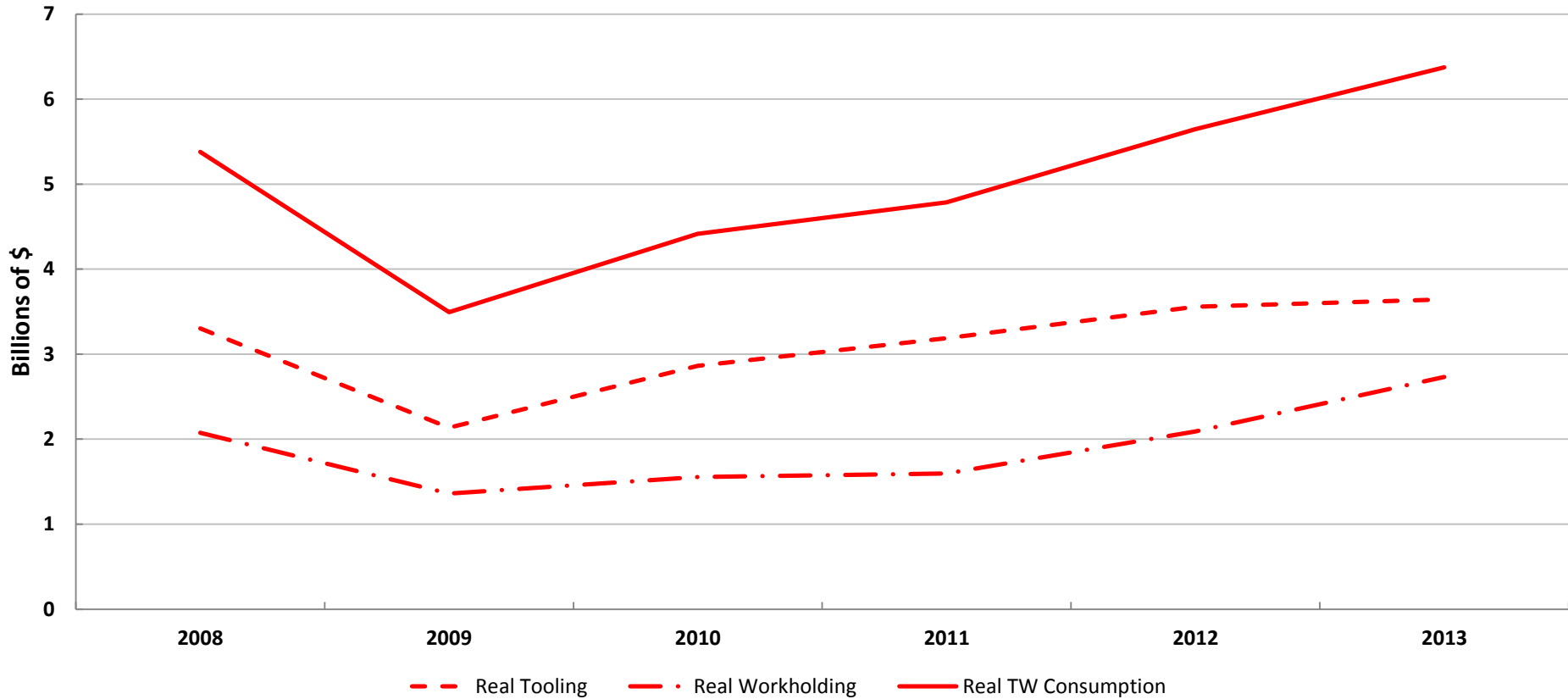


- 2013 projection is \$6.374 billion, which is up 13% from 2012 estimate and significantly above the historical average
- Likely the strongest tooling and workholding market in a generation
- Economic trends supporting this market should last several years





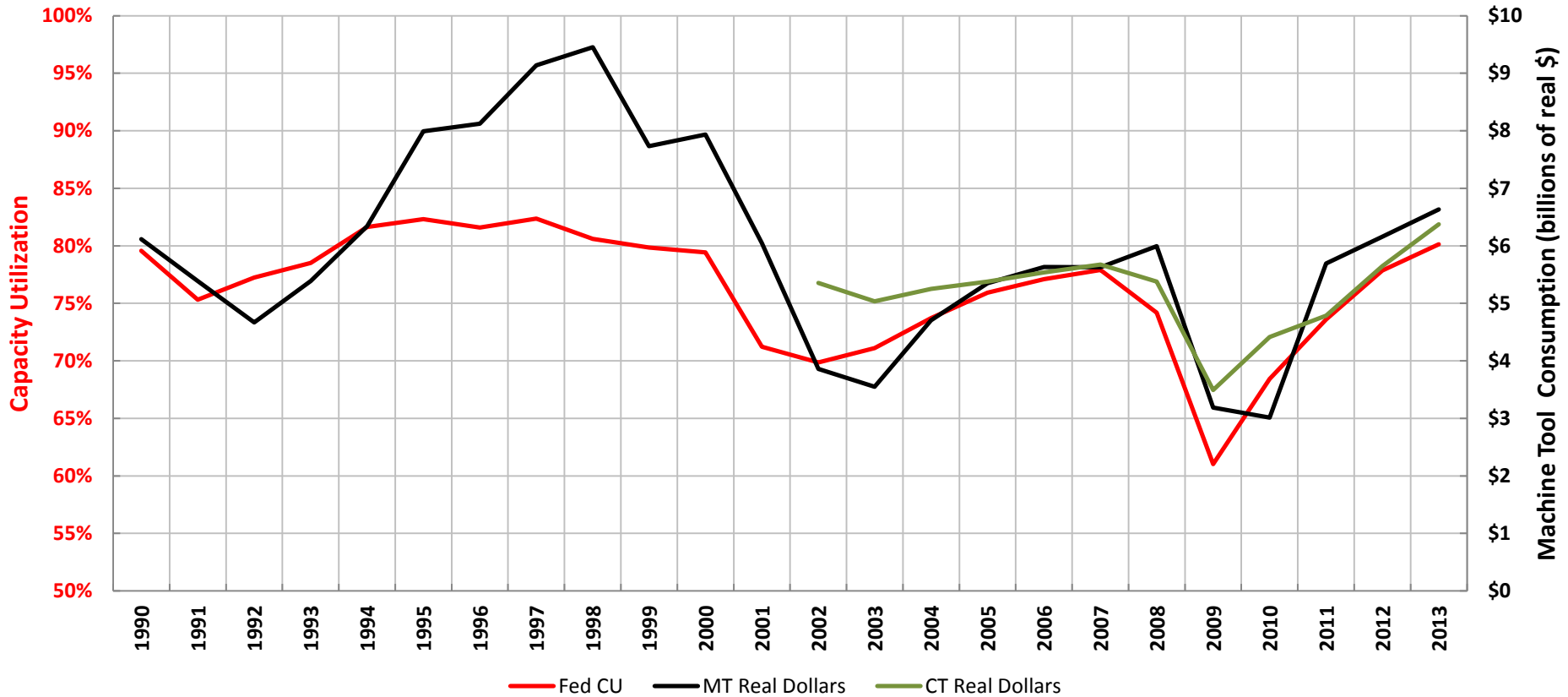
# HISTORIC TOOLING & WORKHOLDING CONSUMPTION



- Tooling spending is forecast to be 2% higher than 2012
- Most tooling spending since at least 2008
- Workholding spending is forecast to be 31% higher
- Dramatic increase in machine tool sales is driving workholding spending



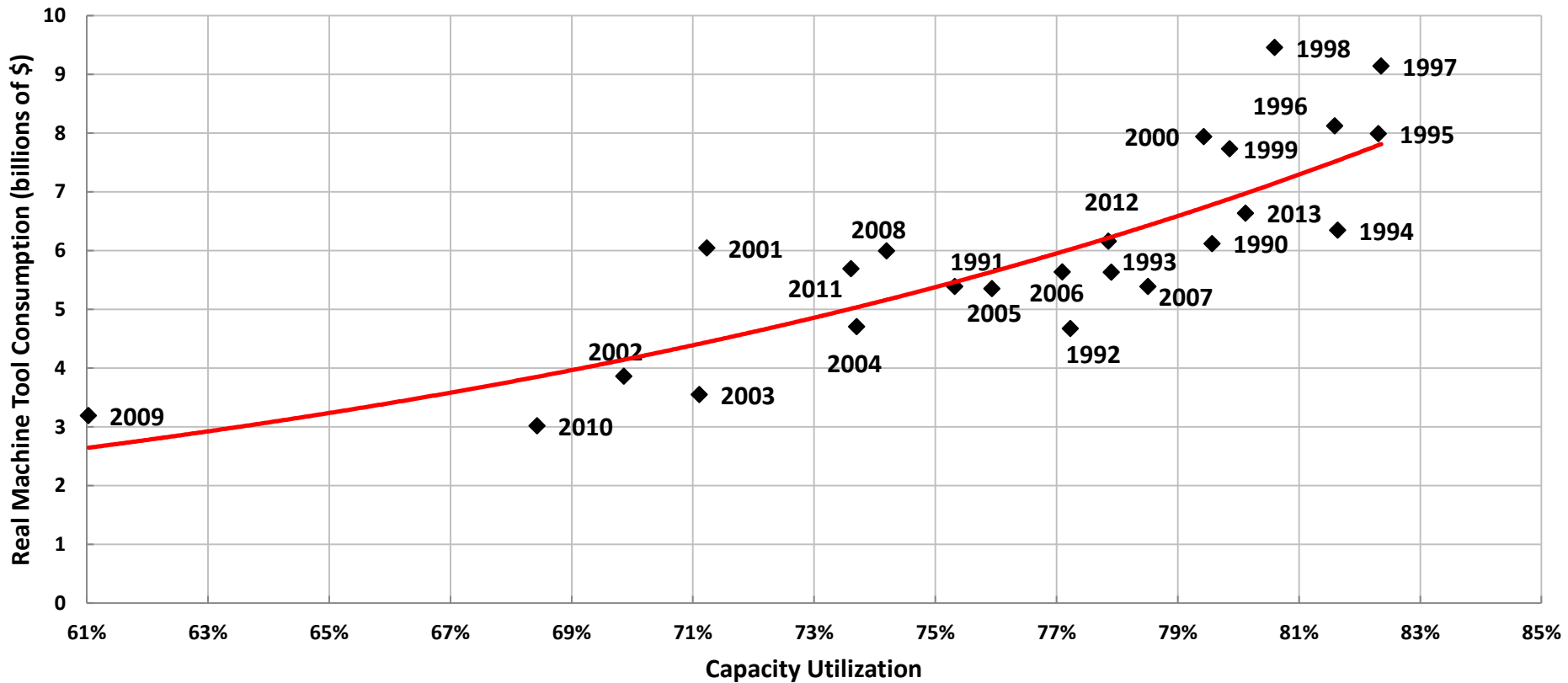
# CAPACITY UTILIZATION VS. CONSUMPTION



- Capacity utilization leads machine tool consumption by about one year while it is coincident with tooling and workholding spending
- Current capacity utilization is 80.1% - the highest since 1999
- Growth in capacity utilization since 2009 is historic



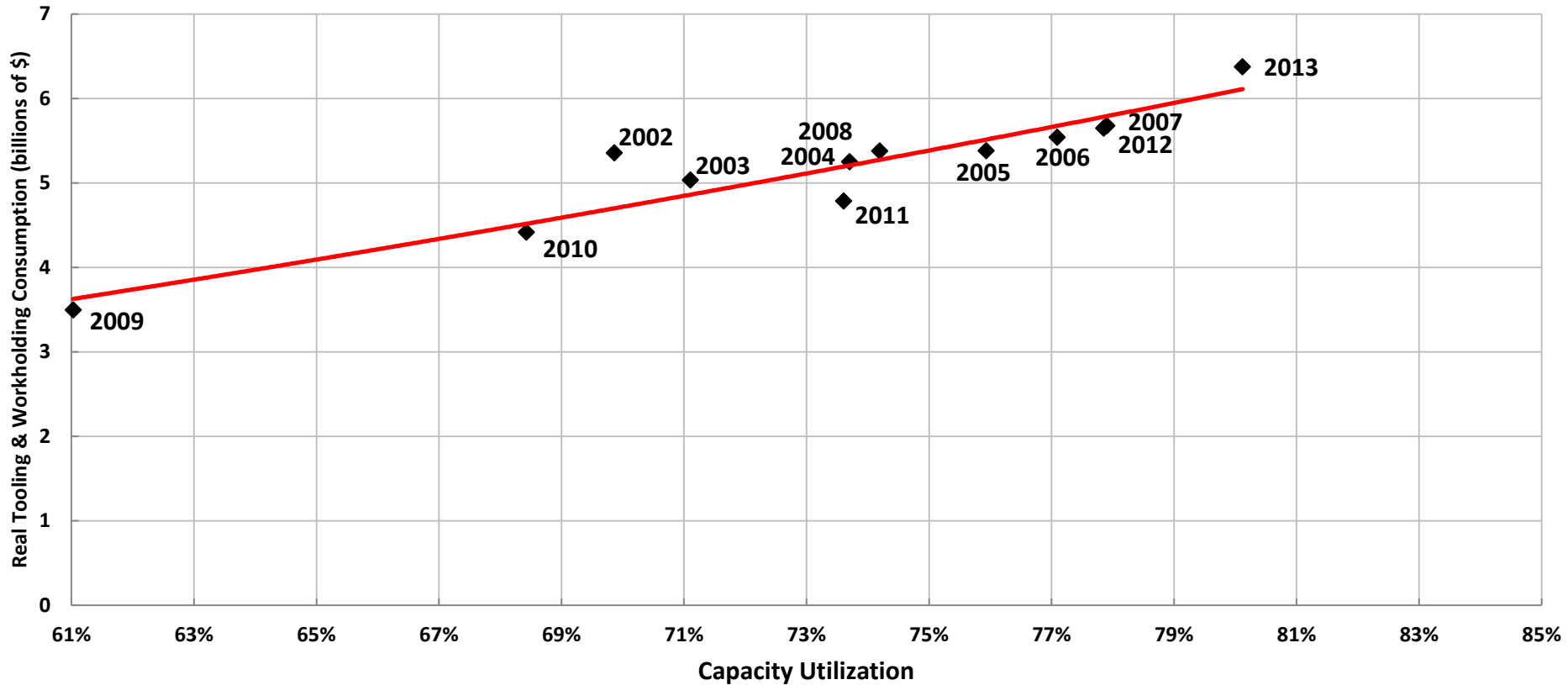
# MACHINE TOOL DEMAND CURVE



- 2013 capacity utilization of 80.1%
- Capacity utilization has increased dramatically since 2009 and is the highest since 1998
- Shops tend to under buy or over buy optimal demand in 3-5 year cycles
- Should be entering a period of over buying relative to optimal demand



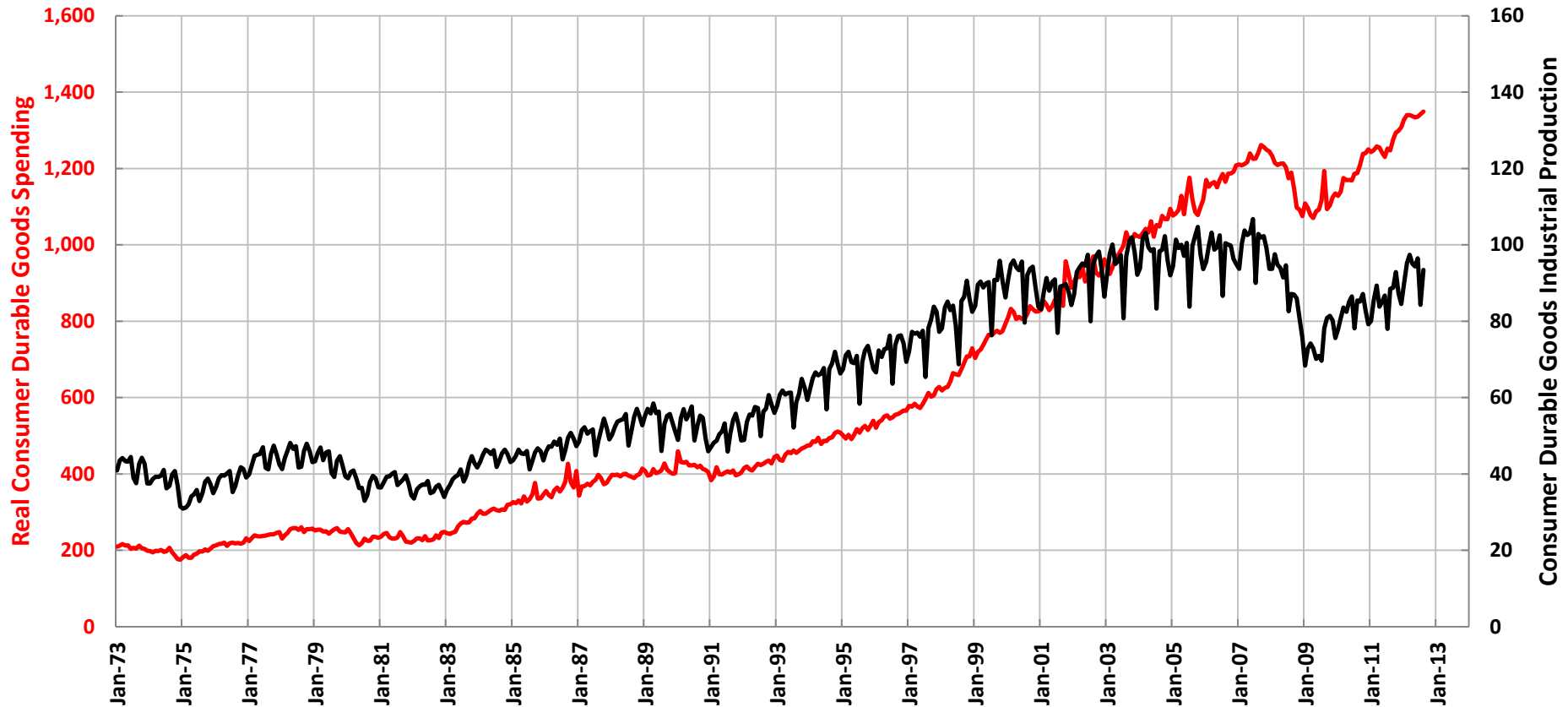
# TOOLING & WORKHOLDING DEMAND CURVE



- Very high correlation between capacity utilization and tooling and workholding spending
- Spending can deviate significantly from optimum demand (see 2002 and 2011), but 2013 forecast might be slightly too high



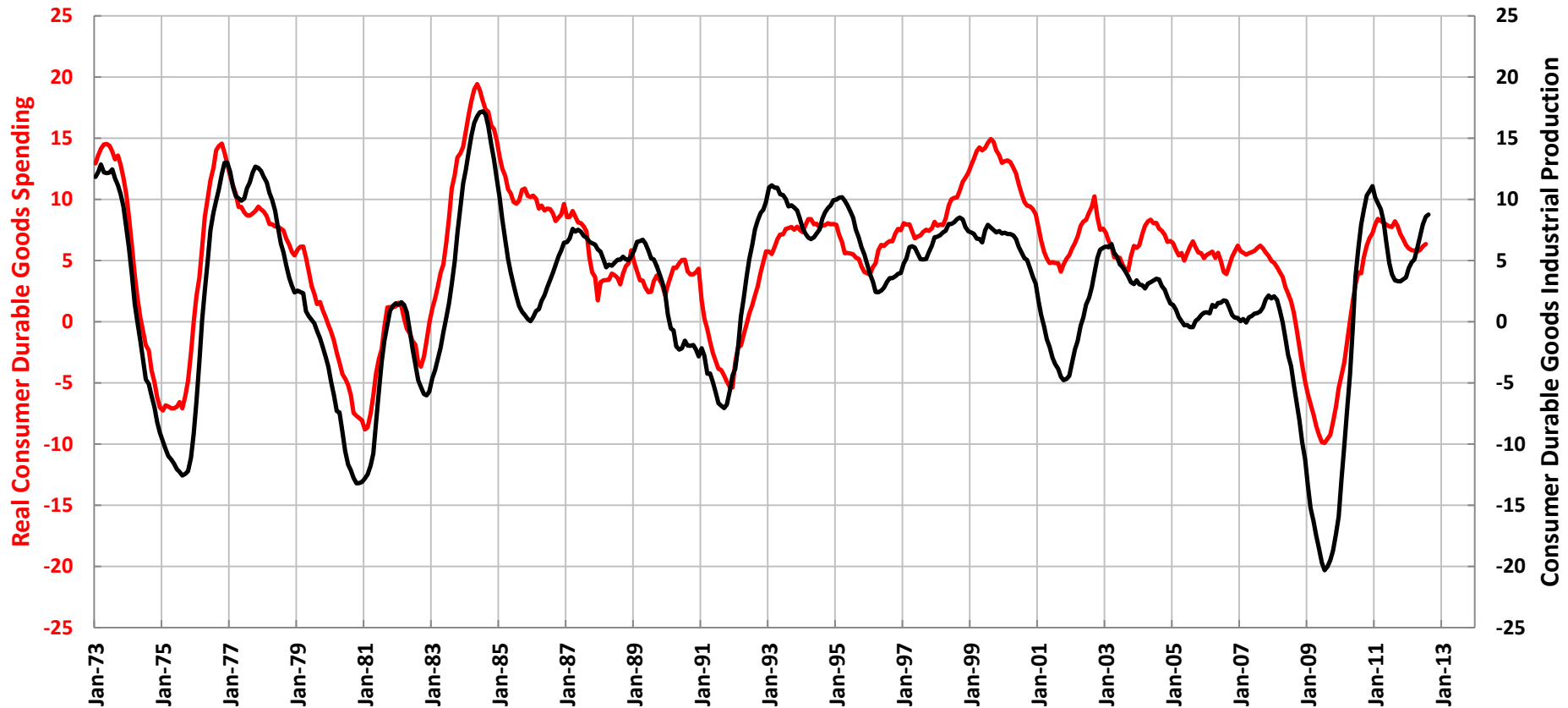
# CONSUMER DURABLE GOODS SPENDING VS. PRODUCTION



- Consumer durable goods spending is at an all-time high
- Production has increased significantly since early 2009 but is still below its peak levels of late 2007
- Has production returned to its historic relationship with spending?



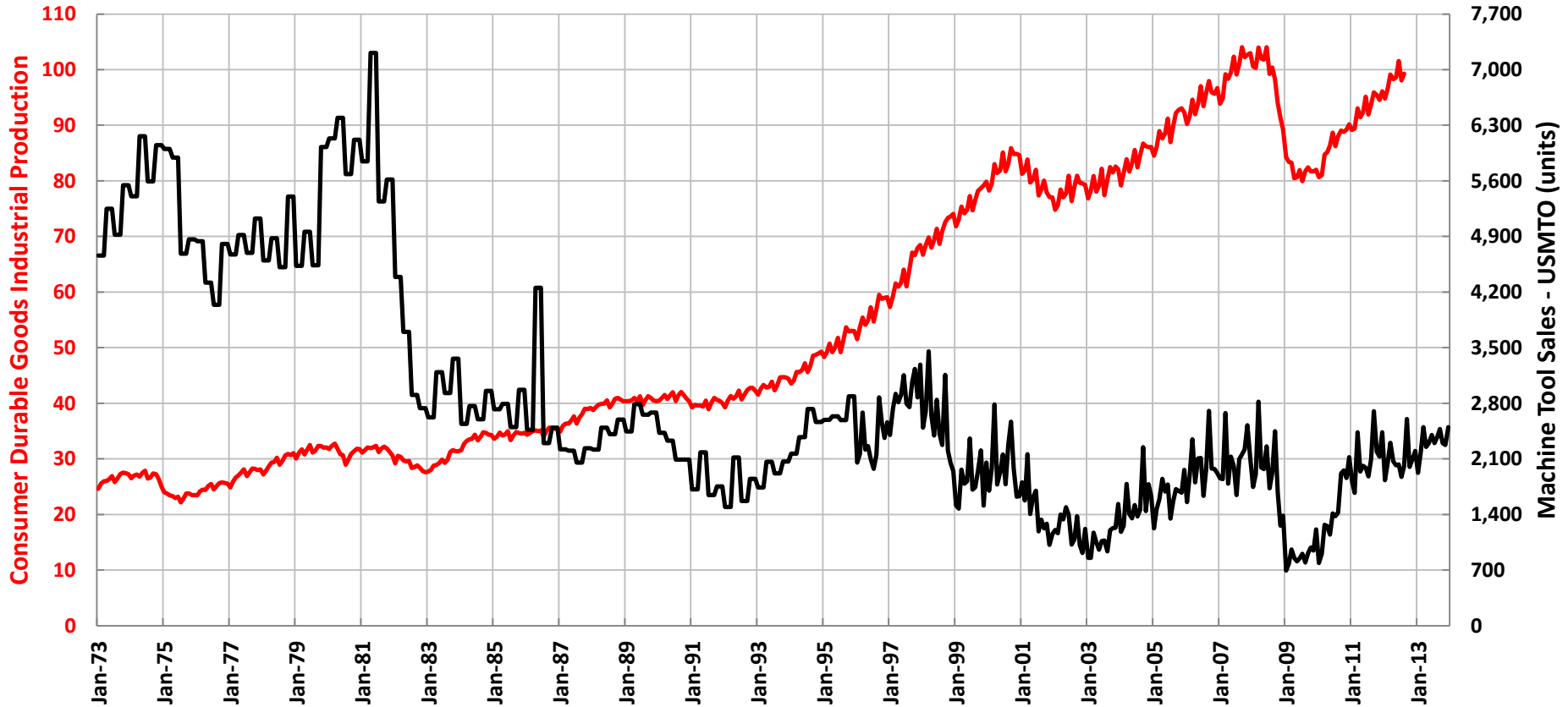
# CONSUMER DURABLE GOODS SPENDING LEADS PRODUCTION



- For most of the last two years production has been growing faster than spending
- This lends credence to the reshoring story
- Based on continued accelerating growth in spending, industrial production should remain robust



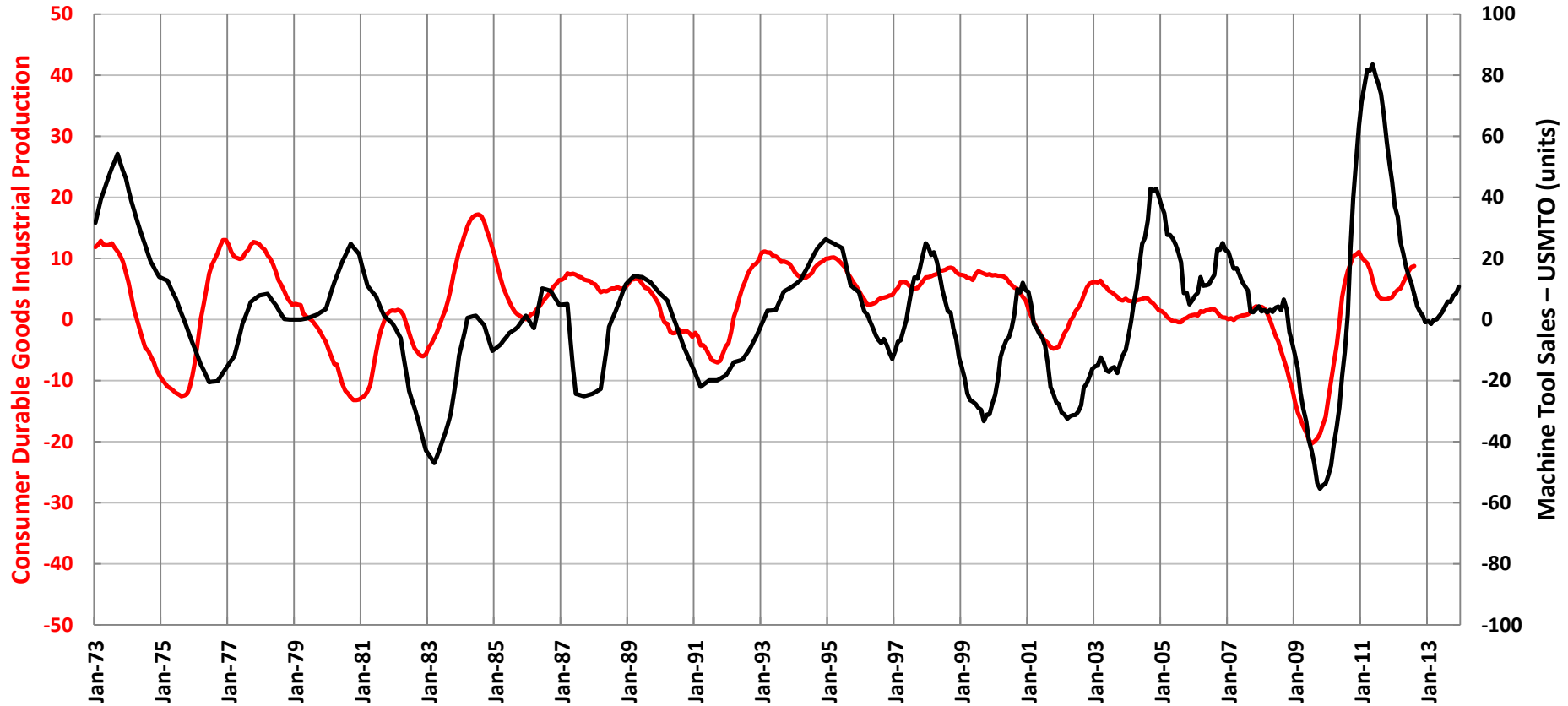
# INDUSTRIAL PRODUCTION VS. MACHINE TOOL ORDERS



- 2012 machine tool unit sales have returned to pre-financial crisis levels
- Industrial production near peak levels



# INDUSTRIAL PRODUCTION LEADS MACHINE TOOL ORDERS

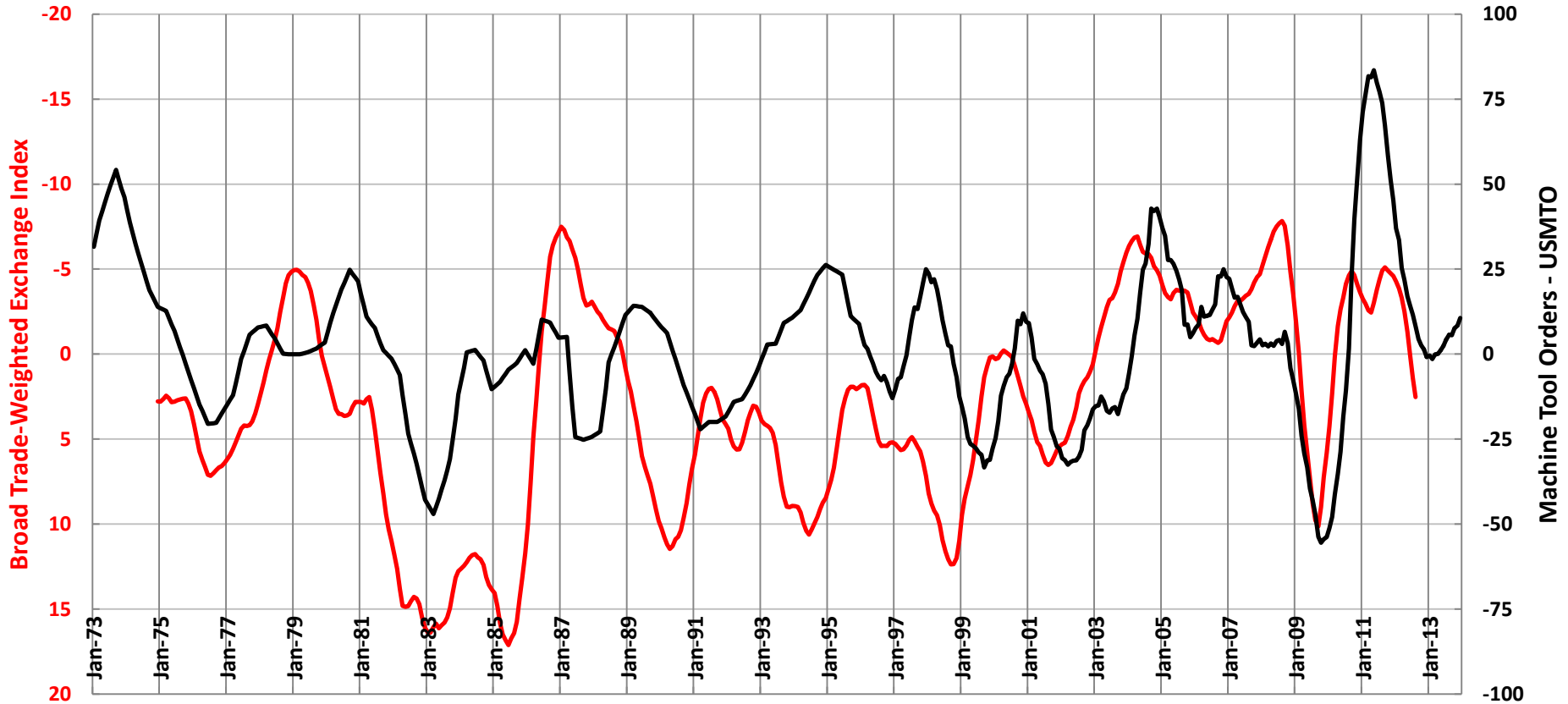


- Annually, industrial production has grown faster for nine consecutive months
- Historically fast rate of growth in industrial production
- Month over month rate of growth is decelerating

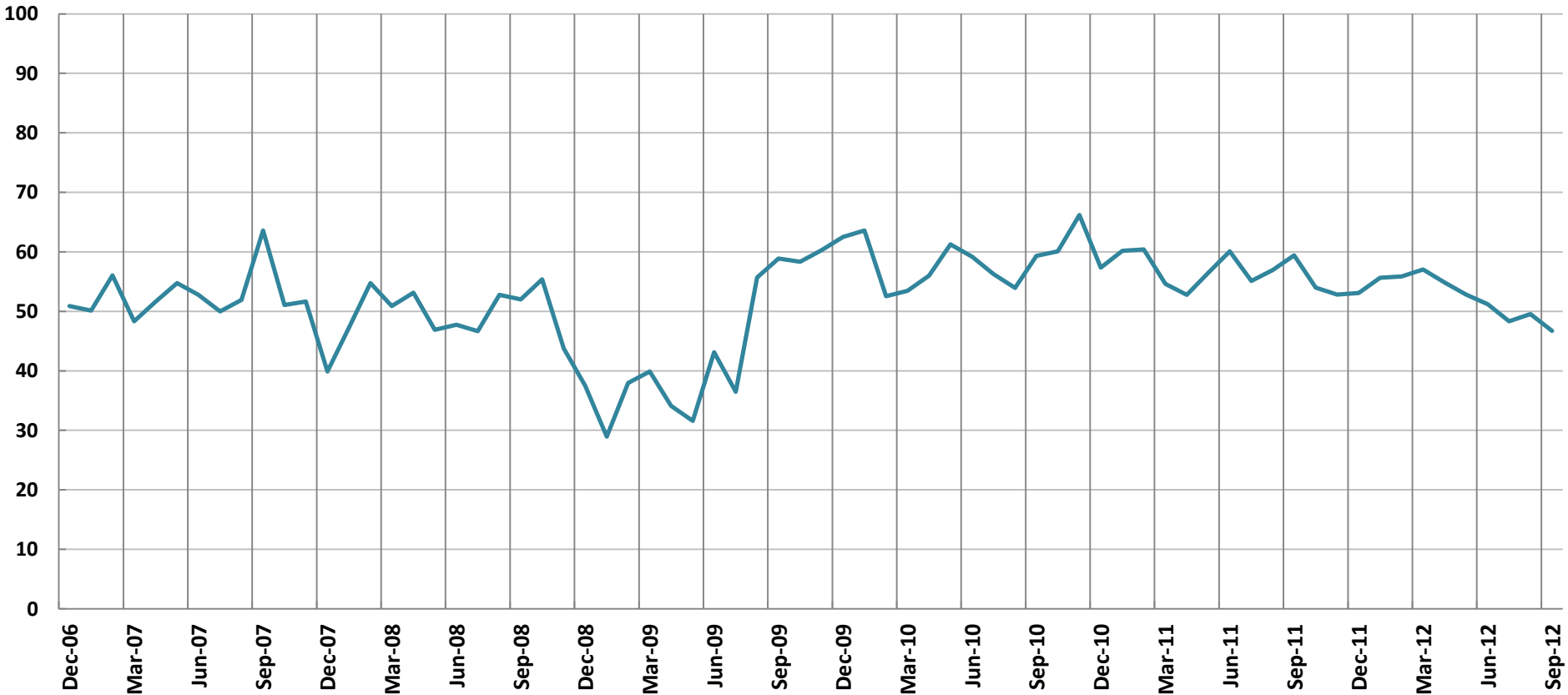




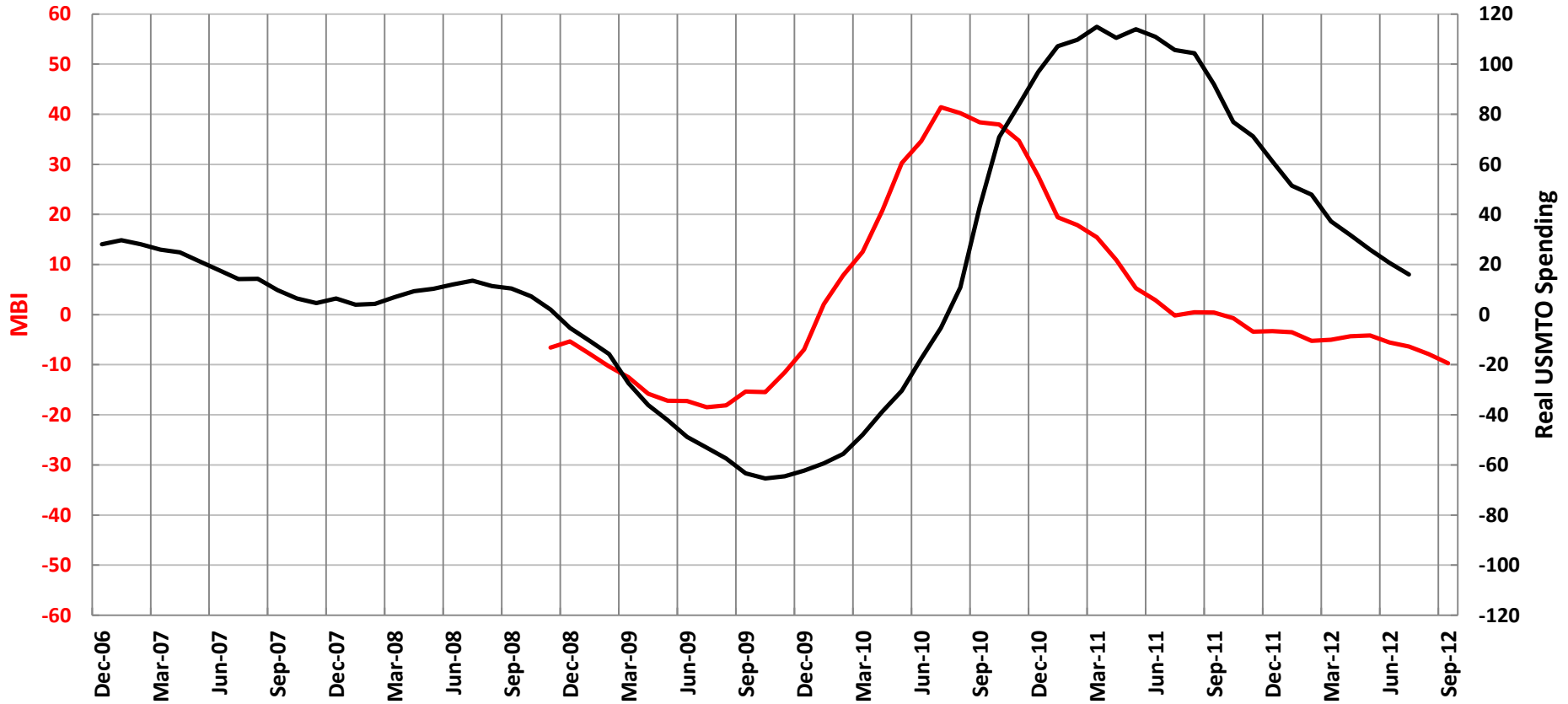
# EXCHANGE RATE LEADS MACHINE TOOL ORDERS



- Annually, the U.S. dollar has been appreciating relative to world currencies for three months
- The Fed's recent announcement of QE should reverse the trend in the dollar
- Currently, this leading indicator is negative for machine tool sales, but the trend appears to be turning in favor of increased machine tool sales



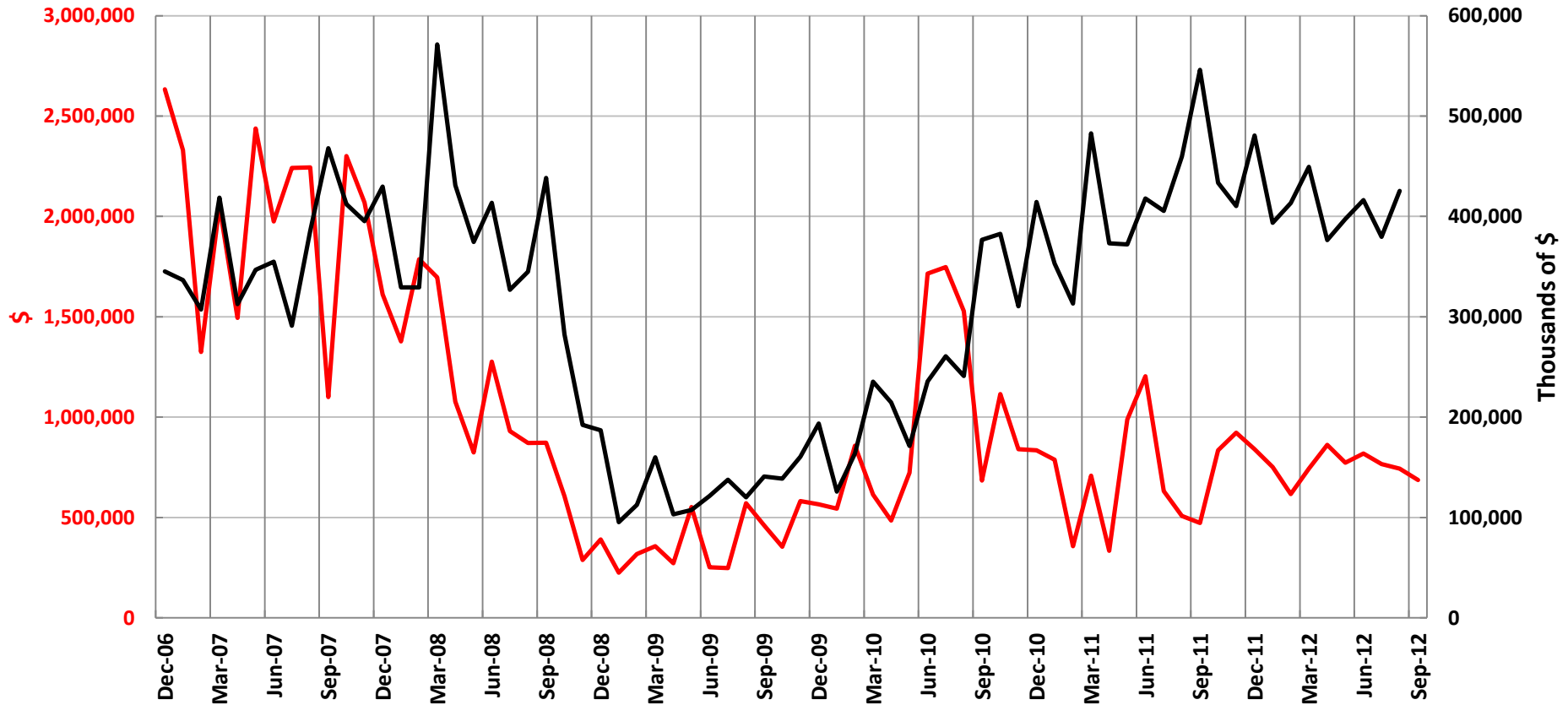
- Metalworking industry has contracted the last three months
- A steady downward trend in the metalworking industry since April 2012
- Downward trend in the index appears to have been broken



- Using rate of change curves, the MBI leads USMTO spending by about four to five months
- The annual rate of contraction in the MBI is accelerating, which points to slower growth in USMTO spending
- But...



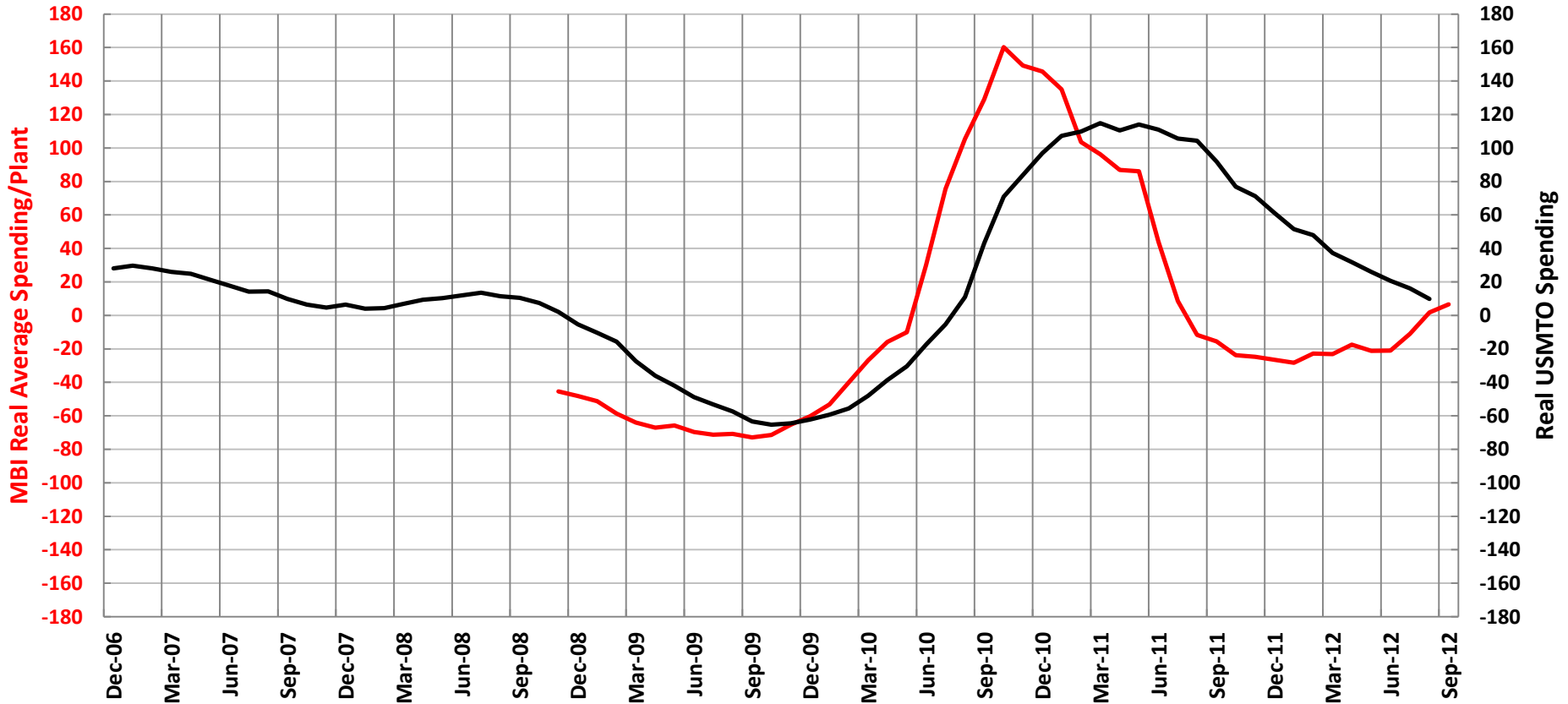
# MBI FUTURE SPENDING/PLANT VS. USMTO SPENDING



- MBI future spending plans leads USMTO spending
- According to the MBI, future spending plans have seen a slight pull back since mid 2011 but have been fairly flat in 2012

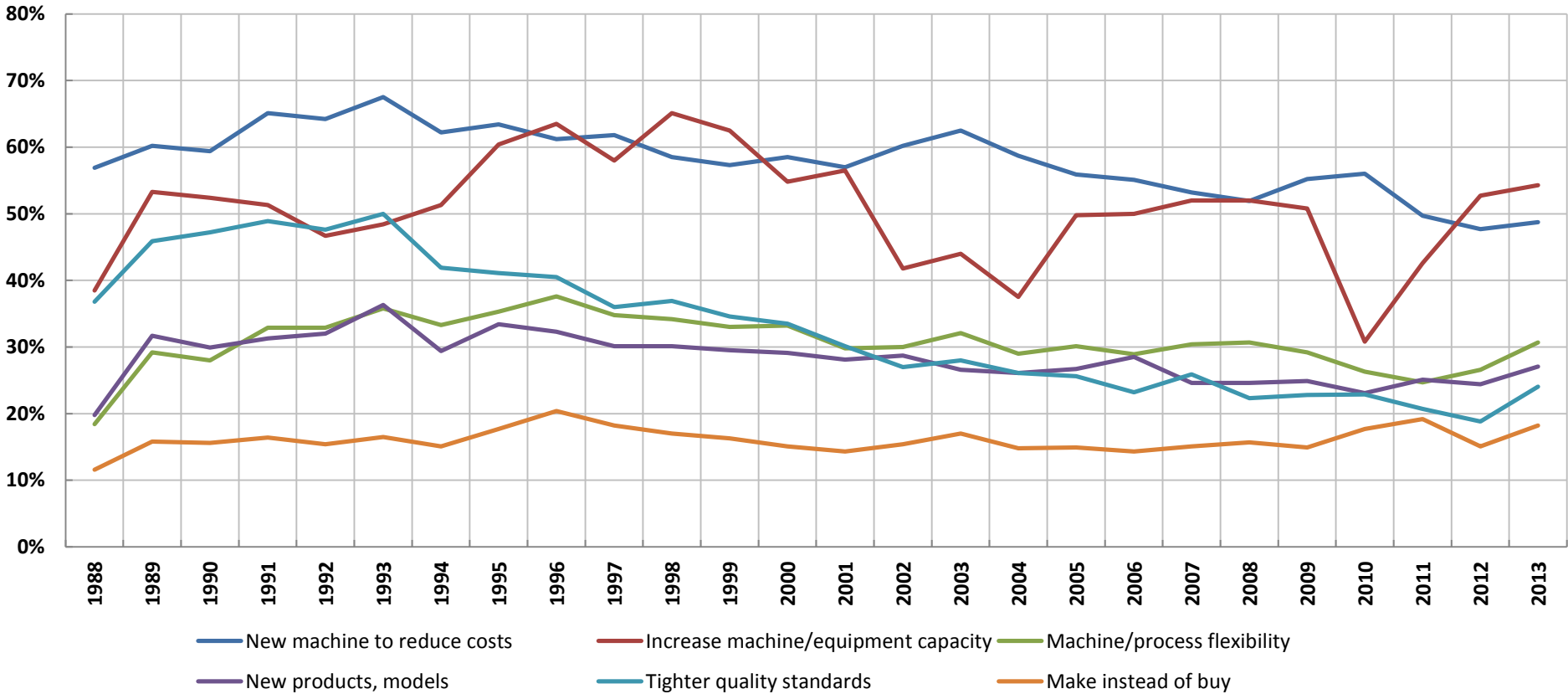


# MBI FUTURE SPENDING/PLANT LEADS USMTO SPENDING



- Using rate of change, future spending plans lead actual orders by about six months
- While the MBI is contracting year over year, future spending plans are growing
- This points to accelerating growth in machine tool orders

- Reshoring
  - 18% of Top Shops respondents reported new work from reshoring initiatives
  - High cost of shipping, supply chain challenges, poor quality, and a trend to manufacture locally continue to drive reshoring
  - Chinese labor rates are forecast to double in the next six years
  - Chinese PMI has contracted 11 consecutive months
- Employment challenges
  - Still a shortage of skilled labor
  - Total cost of a machine is less than the total cost of employees
  - Requiring increased automation and machine/process flexibility



- New products and models are more important as many shops did not buy in 2009-10
- Labor shortage is causing an increased focus on greater machine/process flexibility
- Change in tighter quality standards and making instead of buying could point to reshoring

# MAJOR CAPITAL EQUIPMENT TYPES

<b><u>Equipment Type</u></b>	<b><u>2008</u></b>	<b><u>2009</u></b>	<b><u>2010</u></b>	<b><u>2011</u></b>	<b><u>2012</u></b>	<b><u>2013</u></b>
Additive Manufacturing	0	0	0	0	119,333,396	144,122,246
Assembly	1,427,087,875	880,232,623	732,956,147	1,833,613,609	1,616,091,266	1,352,172,343
Other Equipment	484,177,211	334,691,451	294,000,928	736,776,363	788,167,068	606,540,855
Finishing Equipment	506,198,928	274,266,595	318,319,292	662,800,445	740,215,098	661,197,879
Heat Processing	122,693,537	163,920,967	54,809,775	229,343,057	265,178,041	294,241,438
Gaging/Inspection/Testing	818,987,078	372,297,905	499,714,726	693,624,224	785,532,807	959,864,090
Metalcutting	5,987,502,065	3,187,716,713	3,013,218,944	5,691,403,831	6,158,329,733	6,633,755,952
Metal Forming	1,178,903,908	675,515,228	472,653,555	871,385,544	1,318,465,719	913,859,309
Material Handling	572,568,514	316,107,168	321,915,737	551,000,611	713,166,881	449,566,139
Plastic Molding	446,136,088	186,328,711	160,176,000	582,092,153	542,721,450	483,603,428
Welding/Riveting/Brazing	504,471,006	347,703,153	288,533,926	420,616,215	578,756,952	697,644,528
<b>Total Capital Equipment</b>	<b>12,048,726,209</b>	<b>6,738,780,516</b>	<b>6,156,299,030</b>	<b>12,272,656,054</b>	<b>13,625,958,412</b>	<b>13,196,568,206</b>

- Additive manufacturing is now as large as many metalcutting categories and is forecast to be purchased by a wider array of industries in 2013
- The strong increase in gaging/inspection/testing is probably due to tighter quality standards with the largest increases in testing equipment and vision systems



# MAJOR METALCUTTING EQUIPMENT TYPES

<b>Equipment Type</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
EDM	172,209,571	86,786,676	99,077,195	118,922,072	192,114,483	233,343,079
Grinding	536,056,847	353,211,247	202,060,710	548,509,420	583,946,554	775,385,488
Other Metalcutting	408,587,404	241,477,497	197,084,867	412,689,076	457,865,575	616,773,106
Machining Centers	2,420,252,208	1,104,700,042	1,144,478,348	1,998,564,650	1,881,757,888	2,287,603,296
Milling	590,726,016	243,395,507	346,818,788	431,009,683	802,129,923	682,980,147
Turning	1,859,670,019	1,158,145,745	1,023,699,037	2,181,708,930	2,240,515,310	2,037,670,835
<b>Total Metalcutting</b>	<b>5,987,502,065</b>	<b>3,187,716,713</b>	<b>3,013,218,944</b>	<b>5,691,403,831</b>	<b>6,158,329,733</b>	<b>6,633,755,952</b>

- There is a greater preference for horizontals over verticals in 2013
- Horizontal machines are more easily automated and provide greater process flexibility, which is more important to buyers in 2013
- Also, horizontals tend to be preferred in better business environments due to higher cost



# MAJOR WORKHOLDING PROCESSES

<u>Workholding Process</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>
Grinding Processes	191,990,789	177,772,473	187,827,799	161,235,007	180,711,463	275,988,734
Milling/Drilling Processes	1,033,529,255	710,591,236	778,115,174	796,933,460	1,109,920,541	1,244,889,697
Other Workholding	261,716,936	116,191,201	193,083,058	132,672,054	245,766,402	448,743,343
Turning Processes	587,063,541	355,370,060	394,609,403	505,599,965	553,655,486	760,143,300
<b>Total Workholding</b>	<b>2,074,300,520</b>	<b>1,359,924,970</b>	<b>1,553,635,434</b>	<b>1,596,440,485</b>	<b>2,090,053,892</b>	<b>2,729,765,074</b>

- More projected to be spent on all workholding process than at any time since at least 2008
- The dramatic increase in machine tool sales the last two years is pushing workholding spending higher
- Workholding spending is also being boosted by a need for greater process flexibility

<b>Tooling Type</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Boring Heads	83,911,095	76,155,260	88,453,601	122,473,853	105,883,716	196,972,400
Broaches	20,822,218	15,179,165	27,770,775	37,963,732	45,380,823	59,925,579
Drills	449,731,799	266,906,414	282,929,121	347,465,200	449,565,256	409,347,787
Gear Cutters	36,926,682	24,197,815	14,558,538	45,860,616	19,780,733	38,343,287
Grinding Wheels and Other Abrasives	221,204,574	108,548,836	336,427,455	231,894,012	171,976,211	254,785,071
Milling Tools (ex. inserts)	476,108,675	321,263,950	376,636,058	474,731,422	546,636,667	493,234,289
Milling Toolholders	244,379,315	173,969,641	152,531,579	213,852,555	261,297,570	300,627,483
Other Cutting Tools	36,651,806	35,073,121	30,887,245	36,657,734	29,865,432	60,444,098
Rotary Tool Inserts	550,925,043	374,017,059	583,241,603	629,616,258	611,968,319	550,341,219
Saw Blades	88,286,576	54,435,231	73,069,683	68,054,141	115,908,235	135,795,953
Stationary Tool Inserts	672,198,241	424,338,439	597,469,823	666,128,258	805,637,132	697,107,612
Taps	218,193,713	105,392,758	129,154,555	128,407,086	205,840,344	129,211,904
Tool Presetters	0	0	0	0	0	49,523,103
Turning Tools (ex. inserts)	201,388,011	154,990,859	168,128,507	186,204,307	187,037,813	268,609,940
<b>Total Tooling</b>	<b>3,300,727,750</b>	<b>2,134,468,549</b>	<b>2,861,258,542</b>	<b>3,189,309,175</b>	<b>3,556,778,252</b>	<b>3,644,269,727</b>

- A significant increase in grinding and gearcutting machines is leading to a corresponding increase in tools for those processes
- While insert spending will be down from 2012, other smaller categories are notably increasing

<b><u>Equipment Type</u></b>	<b><u>2008</u></b>	<b><u>2009</u></b>	<b><u>2010</u></b>	<b><u>2011</u></b>	<b><u>2012</u></b>	<b><u>2013</u></b>
HMCs, <400 mm pallet	346,821,972	271,041,705	245,662,753	267,353,265	376,386,284	390,143,609
HMCs, 400-800 mm pallet	1,198,545,240	407,431,615	342,137,911	718,424,045	546,167,026	841,638,141
HMCs, >800 mm pallet	0	0	0	0	0	193,492,688
<b>Total HMCs</b>	<b>1,545,367,212</b>	<b>678,473,320</b>	<b>587,800,665</b>	<b>985,777,310</b>	<b>922,553,309</b>	<b>1,425,274,439</b>

- **HMCs, 400-800 mm pallet**
  - Significant increases in job shops, forming & fabricating and automotive
  - Continued strength in pumps, valves & plumbing; aerospace is up but almost on an every other year cycle
  - Notable increases in East North Central, Middle Atlantic, and Pacific regions
  - Even distribution across plant sizes
- **HMCs <400 mm pallet**
  - Big increase in automotive and aerospace; job shops, forming & fabricating, and electronics remain solid markets
  - South Atlantic (biggest market) and Middle Atlantic up big; East North Central should see good growth but still below 2008
  - 35% of sales to be in 100-249 employee facilities, which is more than double any year since 2008; shops with 20-49 employees also strong

<b><u>Equipment Type</u></b>	<b><u>2008</u></b>	<b><u>2009</u></b>	<b><u>2010</u></b>	<b><u>2011</u></b>	<b><u>2012</u></b>	<b><u>2013</u></b>
VMCs, <20 in Y	344,150,515	177,138,157	212,066,502	358,080,737	326,125,223	362,839,403
VMCs, >20 in Y	477,968,777	226,799,985	278,285,754	565,044,396	490,320,830	443,433,054
<b>Total VMCs</b>	<b>822,119,292</b>	<b>403,938,142</b>	<b>490,352,255</b>	<b>923,125,133</b>	<b>816,446,052</b>	<b>806,272,458</b>

- **VMCs, >20 in Y**
  - Job shops are the biggest market but will spend less than the last couple of years; aerospace about an average level of buying; machinery & equipment mfg trending and forming & fabricating down; significant response from other mfg and non-manufacturing
  - Significant increases in Mountain, West North Central, South Atlantic, and Pacific; West North Central remains strong; East North Central and New England down
  - Plants with fewer than 50 employees is the sweet spot with more than half of all projected spending
- **VMCs, <20 in Y**
  - Job shops, automotive, hardware, and military improving markets
  - Aerospace, machinery & equipment mfg, and off-road & construction remain strong
  - Pacific region seeing major growth while East North Central is down but still significant
  - Shops with fewer than 19 employees projected to be 40% of the spending, which is significantly more than any year since 2008

<b><u>Equipment Type</u></b>	<b><u>2008</u></b>	<b><u>2009</u></b>	<b><u>2010</u></b>	<b><u>2011</u></b>	<b><u>2012</u></b>	<b><u>2013</u></b>
Milling, boring, horizontal	291,470,779	151,305,315	237,478,493	155,871,343	220,126,580	294,966,133
Milling, vertical	299,255,238	92,090,192	109,340,295	275,138,340	582,003,344	388,014,014
<b>Total Milling</b>	<b>590,726,016</b>	<b>243,395,507</b>	<b>346,818,788</b>	<b>431,009,683</b>	<b>802,129,923</b>	<b>682,980,147</b>

- Milling, vertical
  - Dramatic increase in job shops, which account for 74% of the projected spending
  - Also significant are machinery & equipment mfg, automotive, and medical
  - Pacific, East North Central, West South Central, and New England are showing notable increases
  - Strong spending across all plant sizes
- Milling, boring, horizontal
  - Majority of spending in job shops, machinery & equipment mfg, and automotive
  - Other noteworthy industries include: military, forming & fabricating, primary metals, and aerospace
  - Regions to focus on include East North Central, Pacific, West North Central, and Middle Atlantic
  - Significant spending across all plant sizes



<b><u>Workholding Process</u></b>	<b><u>2008</u></b>	<b><u>2009</u></b>	<b><u>2010</u></b>	<b><u>2011</u></b>	<b><u>2012</u></b>	<b><u>2013</u></b>
Automated Systems and Transfer Lines	82,875,476	67,692,195	55,504,397	55,961,073	62,024,609	79,267,342
Dedicated Fixtures	445,543,152	299,123,663	426,655,362	382,706,025	442,128,924	522,529,521
Flexible Fixtures	180,154,483	136,876,006	114,102,661	153,811,987	185,158,224	299,454,095
Indexing Devices	81,808,300	91,639,182	81,032,820	75,130,095	107,523,245	111,924,030
Other Milling/Drilling Processes (in. robots)	134,532,901	57,733,457	61,813,573	73,681,990	260,683,281	138,664,591
Pallets and Pallet-Handling Devices	108,614,941	57,526,732	39,006,361	55,642,290	52,402,258	93,050,120
<b>Total Milling/Drilling</b>	<b>1,033,529,255</b>	<b>710,591,236</b>	<b>778,115,174</b>	<b>796,933,460</b>	<b>1,109,920,541</b>	<b>1,244,889,697</b>

- Largest percent increases since 2011 are in processes that improve machine/process flexibility
- Dedicated Fixtures
  - Significant growth in job shops, electronics, computers & telecommunications, pumps, valves & plumbing products, forming & fabricating, and power generation
  - Machinery & equipment, aerospace, and automotive are down
  - South Atlantic, New England, and Mountain regions are up sharply
  - Almost all of the increase is in shops with fewer than 99 employees
- Flexible Fixtures
  - Significant growth in job shops, electronics, computers & telecommunications, pumps, valves & plumbing products, and machinery & equipment
  - East North Central remains strong; strong growth in South Atlantic and Mountain
  - All plant sizes buying a significant amount

<b><u>Tooling Type</u></b>	<b><u>2008</u></b>	<b><u>2009</u></b>	<b><u>2010</u></b>	<b><u>2011</u></b>	<b><u>2012</u></b>	<b><u>2013</u></b>
HSK Toolholders	21,970,847	18,174,229	13,935,880	30,248,395	44,287,999	41,695,747
Other Milling Toolholders	16,304,310	20,377,567	11,722,360	22,940,465	12,194,750	31,855,064
Traditional V-Flange Toolholders	206,104,158	135,417,845	126,873,340	160,663,696	204,814,822	227,076,672
<b>Total Milling Toolholders</b>	<b>244,379,315</b>	<b>173,969,641</b>	<b>152,531,579</b>	<b>213,852,555</b>	<b>261,297,570</b>	<b>300,627,483</b>

- **Traditional V-Flange Toolholders**

- Job shops continue to increase spending and account for almost 33% of 2013 projection
- Other growth areas include electronics, computers & telecommunications, pumps, valves & plumbing products, forming & fabricating, medical, and automotive
- Significant growth in Mountain and South Atlantic regions
- Spending evenly spread across plant sizes

- **HSK Toolholders**

- Industries to focus on include electronics, computers & telecommunications, industrial motors, hydraulic & mechanical components, job shops, and machinery & equipment
- Noteworthy growth in West North Central; also focus on South Atlantic and East North Central
- More than half of spending in facilities with more than 250 employees



<b>Tooling Type</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
High-Speed Steel Cutters	74,663,420	57,989,750	62,110,541	77,960,705	113,293,644	75,166,890
Indexable Cutters	173,364,071	109,419,423	101,425,815	158,698,387	146,539,067	174,070,338
Other Milling Tools	10,031,589	5,673,088	14,712,330	16,452,242	10,187,398	21,448,350
Solid Carbide Cutters	218,049,595	148,181,690	198,387,372	221,620,088	276,616,558	222,548,711
<b>Total Milling Tools (ex. Inserts)</b>	<b>476,108,675</b>	<b>321,263,950</b>	<b>376,636,058</b>	<b>474,731,422</b>	<b>546,636,667</b>	<b>493,234,289</b>

- **Solid Carbide Cutters**
  - Job shops will account for 40% of spending
  - Growing markets include medical, pumps, valves & plumbing products, industrial motors, hydraulic & mechanical components, and electronics, computers & telecommunications
  - East North Central strong; significant growth in South Atlantic and Middle Atlantic
  - Spending relatively evenly spread out across plant sizes
- **Indexable Cutters**
  - Growth in job shops, machinery & equipment, industrial motors, hydraulic & mechanical components, and pumps, valves & plumbing products – will account for 70% of projected spending
  - Growth in almost all regions, most notably Mountain and Middle Atlantic
  - Spending relatively evenly spread out across plant sizes

<b><u>Tooling Type</u></b>	<b><u>2008</u></b>	<b><u>2009</u></b>	<b><u>2010</u></b>	<b><u>2011</u></b>	<b><u>2012</u></b>	<b><u>2013</u></b>
Rotary Tool Inserts, carbide	424,262,382	312,292,427	495,136,873	534,475,894	526,383,706	442,498,611
Rotary Tool Inserts, CBN or diamond film	97,093,891	12,105,581	27,229,294	39,912,817	31,256,795	25,626,727
Rotary Tool Inserts, ceramic	12,480,867	30,223,799	26,357,568	24,468,913	28,112,984	36,536,229
Rotary Tool Inserts, cermet	8,245,858	7,558,880	16,217,011	8,057,095	11,992,219	19,670,513
Rotary Tool Inserts, other	8,842,045	11,836,372	18,300,857	22,701,539	14,222,615	26,009,139
<b>Total Rotary Tool Inserts</b>	<b>550,925,043</b>	<b>374,017,059</b>	<b>583,241,603</b>	<b>629,616,258</b>	<b>611,968,319</b>	<b>550,341,219</b>

- Rotary Tool Inserts, carbide
  - The three largest industries, job shops, machinery & equipment manufacturing and aerospace, are all down
  - Significantly growing markets include industrial motors, hydraulic & mechanical components, forming & fabricating, electronics, computers & telecom, and petrochemical processors
  - East North Central strong but lower than last three years; Middle Atlantic, Mountain, and East South Central growing
  - Shops with more than 250 employees only category projected to be more than 2012
- Rotary Tool Inserts, cermet
  - Almost half of spending in electronics, computers & telecom and job shops
  - Job shops and aerospace down from last two years
  - Biggest increases in South Atlantic, West North Central, West South Central, and Mountain
  - More than half the spending will be in shops with more than 250 employees

<b><u>Tooling Type</u></b>	<b><u>2008</u></b>	<b><u>2009</u></b>	<b><u>2010</u></b>	<b><u>2011</u></b>	<b><u>2012</u></b>	<b><u>2013</u></b>
Boring Heads	83,911,095	76,155,260	88,453,601	122,473,853	105,883,716	196,972,400
High-Speed Steel Drills	147,553,307	89,444,770	111,616,365	120,963,683	151,170,164	117,026,076
Indexable Drills	77,035,569	36,591,142	33,723,170	58,761,293	59,580,451	73,139,582
Other Drills	11,878,613	4,693,613	8,913,293	10,987,998	26,364,280	13,199,488
Solid Carbide Drills	182,793,680	120,461,044	106,659,862	134,090,864	189,888,275	175,620,271
Spade Drills (in. blades)	30,470,630	15,715,845	22,016,431	22,661,362	22,562,086	30,362,370
<b>Total Drills</b>	<b>449,731,799</b>	<b>266,906,414</b>	<b>282,929,121</b>	<b>347,465,200</b>	<b>449,565,256</b>	<b>409,347,787</b>

- **Boring Heads**

- Job shops, machinery & equipment, and electronics, computers & telecommunications will account for almost 60% of projection
- Also good growth in medical, pumps, valves & plumbing products, and industrial motors, hydraulic & mechanical components
- Almost 80% of spending will be in East North Central, South Atlantic, West North Central, and Mountain
- Good growth across all plant sizes

- **Solid Carbide Drills**

- Machinery & equipment, automotive, and job shops account for more than half the spending
- Industrial motors, hydraulic & mechanical components and electronics, computers & telecommunications up big
- East North Central and West North Central will be almost 67% of projected spending; West North Central up substantially
- Spending by plant size similar to previous years – more than half of spending in shops with more than 100 employees

<b>Equipment Type</b>	<b><u>2008</u></b>	<b><u>2009</u></b>	<b><u>2010</u></b>	<b><u>2011</u></b>	<b><u>2012</u></b>	<b><u>2013</u></b>
Lathes, horizontal, CNC, <10 in chuck	409,098,161	213,139,511	185,082,931	424,635,951	441,607,730	520,593,189
Lathes, horizontal, CNC, >10 in chuck	363,700,441	226,337,108	79,176,532	346,938,137	326,607,573	352,290,799
Lathes, manual	99,494,118	45,270,545	42,289,695	84,830,270	72,598,399	55,958,527
Lathes, vertical, CNC	56,559,954	122,703,882	43,273,267	170,539,130	198,299,270	34,289,482
<b>Total Lathes</b>	<b>928,852,674</b>	<b>607,451,047</b>	<b>349,822,424</b>	<b>1,026,943,488</b>	<b>1,039,112,972</b>	<b>963,131,996</b>

- Lathes, horizontal, CNC, <10 in chuck
  - Major increase in automotive and continued strength in job shops; by far the two biggest markets
  - Oil and gas market is ramping up again; military and primary metals also up significantly
  - Medical industry down from last two years
  - East North Central is the largest market and seeing a noteworthy increase; New England remains strong
  - Focus on shops with 100-249 or fewer than 19 employees
- Lathes, horizontal, CNC, <10 in chuck
  - Automotive, electronics, off-road & construction, and primary metals showing good growth
  - Job shops and pumps, valves & plumbing relatively soft
  - West North Central, Mountain, and Middle Atlantic particularly strong growth
- Lathes, vertical, CNC
  - Pumps, valves & plumbing, machinery & equipment mfg off sharply

<b><u>Equipment Type</u></b>	<b><u>2008</u></b>	<b><u>2009</u></b>	<b><u>2010</u></b>	<b><u>2011</u></b>	<b><u>2012</u></b>	<b><u>2013</u></b>
TCs, horizontal, CNC, <10 in chuck	332,544,190	185,150,090	256,660,796	552,935,261	442,081,264	401,457,218
TCs, horizontal, CNC, >10 in chuck	360,887,259	131,197,303	100,762,039	275,009,633	400,783,624	216,231,876
TCs, vertical, CNC	51,360,706	67,702,134	118,517,542	150,695,975	80,313,250	54,211,619
<b>Total Turning Centers</b>	<b>744,792,154</b>	<b>384,049,528</b>	<b>475,940,378</b>	<b>978,640,869</b>	<b>923,178,138</b>	<b>671,900,713</b>

- TCs, horizontal, CNC, <10 in chuck
  - Huge jumps in automotive and aerospace;
  - Growth in oil & gas, primary metals, and pumps, valves & plumbing
  - Job shop market has cooled but still significant amount of spending
  - Major growth in West North Central and Pacific regions; two regions account for more than 50% of projection
  - Focus on shops with more than 50 employees
- TCs, horizontal, CNC, >10 in chuck
  - Continued strength in job shops with dramatic growth in forming & fabricating, oil & gas, and off-road & construction
  - Big decreases in industrial motors, power generation, pumps, valves & plumbing, and automotive
  - Focus should be on East North Central, West South Central, and Pacific
  - Shops with 20-49 employees are the sweet spot

<b><u>Equipment Type</u></b>	<b><u>2008</u></b>	<b><u>2009</u></b>	<b><u>2010</u></b>	<b><u>2011</u></b>	<b><u>2012</u></b>	<b><u>2013</u></b>
Screw machine, automatic	39,806,423	43,203,420	44,979,165	30,237,513	127,789,539	104,442,394
Screw machine, CNC	146,218,768	123,441,750	152,957,069	145,887,060	150,434,660	298,195,732
<b>Total Screw Machines</b>	<b>186,025,190</b>	<b>166,645,170</b>	<b>197,936,235</b>	<b>176,124,573</b>	<b>278,224,199</b>	<b>402,638,126</b>

- Screw machine, CNC
  - Very large increases in job shops, machinery & equipment mfg, and aerospace
  - Medical remains strong and good response from plastics and rubber
  - New England and Pacific regions account for 78% of the projection; big increases in these regions
  - Focus should be on shops with 20-99 employees, which represent 81% of the spending
- Screw machine, automatic
  - Significant rotation in industries buying: in are job shops, medical, and military; out are pumps, valves & plumbing and forming & fabricating
  - New England and West South Central to see big gains and East North Central is still significant
  - Widespread purchasing in plants with more than 20 employees

<b><u>Workholding Process</u></b>	<b><u>2008</u></b>	<b><u>2009</u></b>	<b><u>2010</u></b>	<b><u>2011</u></b>	<b><u>2012</u></b>	<b><u>2013</u></b>
Bar Feeders	66,220,841	42,845,389	49,309,259	44,748,536	72,242,798	110,982,783
Chucks	204,538,038	126,889,675	153,374,339	196,245,358	203,473,763	270,556,243
Other Turning Work Load/Unload Devices (in. robots)	129,976,840	59,008,622	67,017,655	93,191,346	71,667,305	133,982,074
Other Turning Workholding	186,327,822	126,626,374	124,908,150	171,414,725	206,271,621	244,622,201
<b>Total Turning</b>	<b>587,063,541</b>	<b>355,370,060</b>	<b>394,609,403</b>	<b>505,599,965</b>	<b>553,655,486</b>	<b>760,143,300</b>

- **Chucks**
  - Huge increase by job shops – almost 50% of projected spending
  - Also growing are electronics, computers & telecommunications and forming & fabricating,
  - East North Central slow while South Atlantic, Mountain, and New England are hot
  - Plants with more than 250 employees will be about 33% of projected spending
- **Other Turning Work Load/Unload Devices (in. robots)**
  - About 75% of the projected spending will be in job shops, machinery & equipment, and electronics, computers & telecommunications; each are up significantly
  - Good spending in all regions and plant sizes
- **Bar Feeders**
  - Electronics, computers & telecommunications and job shops will be almost 75% of total spending
  - Bulk of spending in South Atlantic, Mountain, East North Central, and Pacific
  - About 50% of spending in shops with more than 250 employees



<b><u>Tooling Type</u></b>	<b><u>2008</u></b>	<b><u>2009</u></b>	<b><u>2010</u></b>	<b><u>2011</u></b>	<b><u>2012</u></b>	<b><u>2013</u></b>
Boring Tools	70,017,823	45,402,525	49,709,090	71,656,213	64,380,461	81,926,689
Form/Special Tools	28,377,785	38,452,457	42,625,925	28,170,901	40,695,991	42,216,734
OD/Facing Tools	102,992,403	71,135,877	75,793,492	86,377,193	81,961,361	144,466,518
<b>Total Turning Tools (ex. Inserts)</b>	<b>201,388,011</b>	<b>154,990,859</b>	<b>168,128,507</b>	<b>186,204,307</b>	<b>187,037,813</b>	<b>268,609,940</b>

- **OD/Facing Tools**
  - Huge increase in job shops, which account for almost 50% of projected spending
  - Electronics, computers & telecommunications also up notably
  - Middle Atlantic up big and East North Central remains strong; two regions make up about 50% of projection
  - Majority of spending in shops with more than 100 employees
- **Boring Tools**
  - Job shops and electronics, computers & telecommunications up and account for more than 50% of spending
  - Regions to focus on are South Atlantic and East North Central
  - More than 33% of spending in facilities with more than 250 employees; all other plant sizes are similar



<u>Tooling Type</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>
Stationary Tool Inserts, carbide	532,736,329	331,193,828	464,120,481	521,808,691	654,369,672	499,296,403
Stationary Tool Inserts, CBN or diamond film	56,617,032	25,225,575	49,100,237	66,106,968	57,803,946	71,985,898
Stationary Tool Inserts, ceramic	44,313,307	45,242,044	44,974,993	44,788,623	52,196,266	60,182,309
Stationary Tool Inserts, cermet	26,234,734	10,823,263	24,576,328	14,542,616	30,447,800	27,209,569
Stationary Tool Inserts, other	12,296,839	11,853,728	14,697,784	18,881,361	10,819,448	38,433,433
<b>Total Stationary Tool Inserts</b>	<b>672,198,241</b>	<b>424,338,439</b>	<b>597,469,823</b>	<b>666,128,258</b>	<b>805,637,132</b>	<b>697,107,612</b>

- **Stationary Tool Inserts, carbide**
  - The three largest industries, job shops, machinery & equipment manufacturing and aerospace, are all down
  - Significantly growing markets include off-road & construction machinery, oil & gas field machinery, petrochemical processors, HVAC, and military
  - East North Central strong but lower than 2012; South Atlantic, Middle Atlantic, Mountain, and East South Central growing
  - Spending by smallest shops will be down while spending by largest shops will be up
- **Stationary Tool Inserts, CBN or diamond film**
  - Automotive and medical much more than past years, accounting for 75% of projected spending
  - Job shops and aerospace down from last two years
  - Majority of spending will be in East South Central and East North Central
  - Spending in shops with more than 250 employees up dramatically while spending in shops with less than 19 employees remains strong

<b>Equipment Type</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Grinding, centerless	33,908,652	23,638,142	23,177,842	33,094,880	86,215,357	58,290,283
Grinding, creep feed	16,559,838	2,996,871	0	2,254,877	98,823,470	89,563
Grinding, cylindrical/external	76,177,017	74,503,616	18,634,734	36,770,127	85,056,830	230,304,373
Grinding, flat/surface	97,732,352	82,266,855	23,451,033	151,726,977	128,140,402	133,394,389
Grinding, gearcutting	193,198,536	22,759,302	29,362,448	121,183,301	29,705,340	173,893,799
Grinding, ID/OD	59,170,508	78,237,801	55,181,378	144,816,688	77,386,275	120,210,655
Grinding, internal	35,165,274	12,063,641	29,233,101	14,839,951	9,150,266	22,880,815
Grinding, other	24,144,670	56,745,019	23,020,174	43,822,619	69,468,614	36,321,613
<b>Total Grinding</b>	<b>536,056,847</b>	<b>353,211,247</b>	<b>202,060,710</b>	<b>548,509,420</b>	<b>583,946,554</b>	<b>775,385,488</b>

- **Grinding, cylindrical/external**
  - Major increases in automotive, job shops, machinery & equipment mfg, and other mfg (total 96% of the market)
  - West North Central, East North Central, East South Central, and Mountain regions significantly higher
  - Notable buying by all plant sizes
- **Grinding, gearcutting**
  - Automotive: \$134 million and primary metals: \$25
  - Virtually all activity in East North Central
  - Only shops with more than 50 employees buying
- **Grinding, flat/surface**
  - Continued strength in machinery & equipment mfg with significant buying in primary metals (aluminum die-casting foundries)
  - Most buying in East North Central (relatively flat) and New England (major increase)
  - Buying spread throughout all plant sizes

# GRINDING WORKHOLDING AND TOOLING

<u>Workholding Process/Tooling Type</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>
Grinding Work Load/Unload Devices	47,575,690	58,992,349	36,296,367	28,837,617	37,380,218	68,766,622
Other Grinding Workholding	121,883,778	83,010,833	107,659,690	83,106,060	103,443,120	138,606,620
Rotating Chucks	22,531,320	35,769,291	43,871,742	49,291,330	39,888,126	68,615,492
<b>Total Grinding Processes</b>	<b>191,990,789</b>	<b>177,772,473</b>	<b>187,827,799</b>	<b>161,235,007</b>	<b>180,711,463</b>	<b>275,988,734</b>
Grinding Wheels and Other Abrasives	221,204,574	108,548,836	336,427,455	231,894,012	171,976,211	254,785,071

- **Other Grinding Workholding**

- Job shops, electronics, computers & telecommunications, and machinery & equipment make up almost 80% of projected spending
- Top regions are South Atlantic, East North Central, Pacific, and West North Central
- More than 33% of spending will be in plants with more than 250 employees

- **Grinding Work Load/Unload Devices**

- Electronics, computers & telecommunications, job shops, and forming & fabricating are top industries
- About half of spending will be in South Atlantic region and plants with more than 250 employees

- **Grinding Wheels and Other Abrasives**

- Major increase in job shops, aerospace, medical, and electronics, computers & telecommunications
- Strong spending in machinery & equipment and automotive
- Good spending in all regions except West South Central
- About half of spending in shops with fewer than 100 employees



<u>Equipment/Tooling Type</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>
EDM, small hole	25,497,478	23,410,495	19,669,816	9,723,397	10,411,797	80,065,524
EDM, ram type	45,064,955	15,460,159	12,136,327	15,174,484	37,893,143	32,880,490
EDM, wire type	101,647,138	47,916,022	67,271,052	94,024,191	143,809,543	120,397,066
<b>Total EDM</b>	<b>172,209,571</b>	<b>86,786,676</b>	<b>99,077,195</b>	<b>118,922,072</b>	<b>192,114,483</b>	<b>233,343,079</b>
EDM Tooling	55,158,445	44,501,557	45,217,249	51,481,774	67,711,553	174,399,029

- EDM, wire type
  - Automotive, medical and aerospace are up while there is continued strength in job shops and machinery & equipment mfg
  - Two industries buying significant amounts that haven't in the past: primary metals and wood & paper products
  - East North Central represents half of the projection and the South Atlantic another 25%
  - Buying spread equally across all plant sizes
- EDM, small hole
  - Nearly 100% of forecast in job shops in the South Atlantic region in larger facilities
- EDM Tooling
  - Really large increases in electronics, computers & telecommunications and machinery & equipment – almost 65% of projected spending
  - Good spending in job shops, automotive, and forming & fabricating as well
  - Almost all spending in South Atlantic and East North Central
  - Most spending in plants with more than 250 employees; plants with less than 49 employees also strong

# OTHER METALCUTTING EQUIPMENT

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<b><u>Equipment Type</u></b>	<b><u>2008</u></b>	<b><u>2009</u></b>	<b><u>2010</u></b>	<b><u>2011</u></b>	<b><u>2012</u></b>	<b><u>2013</u></b>
Broaching	27,787,904	12,143,542	20,029,840	17,531,198	18,117,745	42,667,021
Drilling/Tapping	130,581,168	54,254,020	72,243,424	70,547,949	68,170,403	85,216,258
Rotary Transfer	70,110,311	4,457,909	8,604,572	117,473,957	56,348,142	134,295,713
Sawing/Cutoff	90,774,266	59,145,609	28,423,315	56,288,767	48,930,320	77,471,182
Transfer & Special Purpose	89,333,755	111,476,417	67,783,717	150,847,205	266,298,965	277,122,932
<b>Total Other Metalcutting</b>	<b>408,587,404</b>	<b>241,477,497</b>	<b>197,084,867</b>	<b>412,689,076</b>	<b>457,865,575</b>	<b>616,773,106</b>

- **Transfer & Special Purpose**
  - Noteworthy increases in automotive, forming & fabricating, and electronics
  - Significant pull back in job shops and off-road & construction
  - Big increase in East North Central and West North Central; still significant spending in South Atlantic
  - Virtually all spending in shops with more than 50 employees; sweet spot is 50-249 employees
- **Rotary Transfer**
  - Bulk of spending is in forming & fabricating, Middle Atlantic, and shops with 100-249 employees
  - Significant investment in the above combination

# METALCUTTING SPENDING – TOP INDUSTRIES

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<b>Industry</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Metalcutting Job Shops	2,279,654,252	945,348,582	921,802,374	1,678,048,123	1,488,984,002	1,903,153,792
Automotive	432,434,382	420,823,366	204,704,234	457,584,241	660,765,709	1,167,778,451
Machinery and Equipment Manufacturing	576,759,610	408,369,089	184,592,214	842,251,289	712,122,905	648,639,051
Aerospace	456,534,055	153,990,216	278,990,718	746,171,181	863,485,758	525,157,011
Forming and Fabricating (non-auto)	151,787,561	155,012,878	342,137,709	468,037,663	398,723,185	516,888,991
Primary Metals	27,594,997	6,524,755	698,593	0	0	279,085,842
Electronics, Computers, and Telecommunications	123,491,570	167,950,490	174,605,593	321,206,987	294,232,808	203,603,013
Pumps, Valves and Plumbing Products	362,011,256	145,143,815	216,142,386	223,937,566	790,891,990	175,500,116
Medical	165,139,927	139,954,194	31,317,140	194,102,216	138,507,189	148,110,264
Military	75,381,982	11,570,796	13,797,757	95,671,196	8,005,511	125,030,179
Oil, Gas Field, and Mining Machinery	353,069,637	95,024,745	184,764,647	31,534,973	25,694,441	96,392,567
Off-Road and Construction Machinery	221,146,725	105,555,085	58,537,359	63,084,873	197,229,888	90,856,629

- **Industrial motors, hydraulics & mechanical components**
  - 2013: \$32 million
  - 2008-2012 average: \$250 million
- **Power Generation**
  - 2013: \$0
  - 2008-2012 average: \$80 million
- **HVAC**
  - 2013: \$11 million
  - 2008-2012 average: \$35 million

# WORKHOLDING SPENDING – TOP INDUSTRIES

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<u>Industry</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>
Metalcutting Job Shops	308,257,484	255,522,539	293,132,838	209,270,704	362,371,946	864,080,331
Electronics, Computers, and Telecommunications	83,315,763	99,446,648	27,745,634	50,401,145	14,963,274	642,125,244
Machinery and Equipment Manufacturing	109,683,301	328,443,479	164,062,167	63,414,291	321,626,314	305,146,474
Automotive	246,504,758	186,095,260	91,433,184	72,672,168	216,865,667	191,030,834
Forming and Fabricating (non-auto)	82,045,118	87,651,039	30,380,112	39,238,452	39,959,665	139,351,317
Aerospace	55,925,420	101,478,350	71,239,208	101,147,019	220,653,325	123,338,588
Pumps, Valves and Plumbing Products	53,913,849	84,929,782	39,794,069	49,759,925	28,294,805	117,198,091
Industrial Motors, Hydraulic and Mechanical Components	9,775,277	29,013,192	74,798,393	62,989,067	48,860,908	71,100,904
Medical	14,756,175	16,795,804	81,094,754	22,969,707	208,845,765	71,085,258
Power Generation	13,797,231	17,265,928	10,722,029	2,884,125	14,592,968	30,352,955
Off-Road and Construction Machinery	29,167,744	32,461,328	26,487,244	55,248,544	39,651,661	29,057,966
Hardware	33,164,061	4,828,240	52,153,657	29,715,359	14,158,479	25,595,619

- **Oil, Gas Field & Mining Machinery**
  - 2013: \$9 million
  - 2008-2012 average: \$40 million
- **Custom Processors**
  - 2013: \$2 million
  - 2008-2012 average: \$35 million
- **Primary Metals**
  - 2013: \$1 million
  - 2008-2012 average: \$23 million

# TOOLING SPENDING – TOP INDUSTRIES

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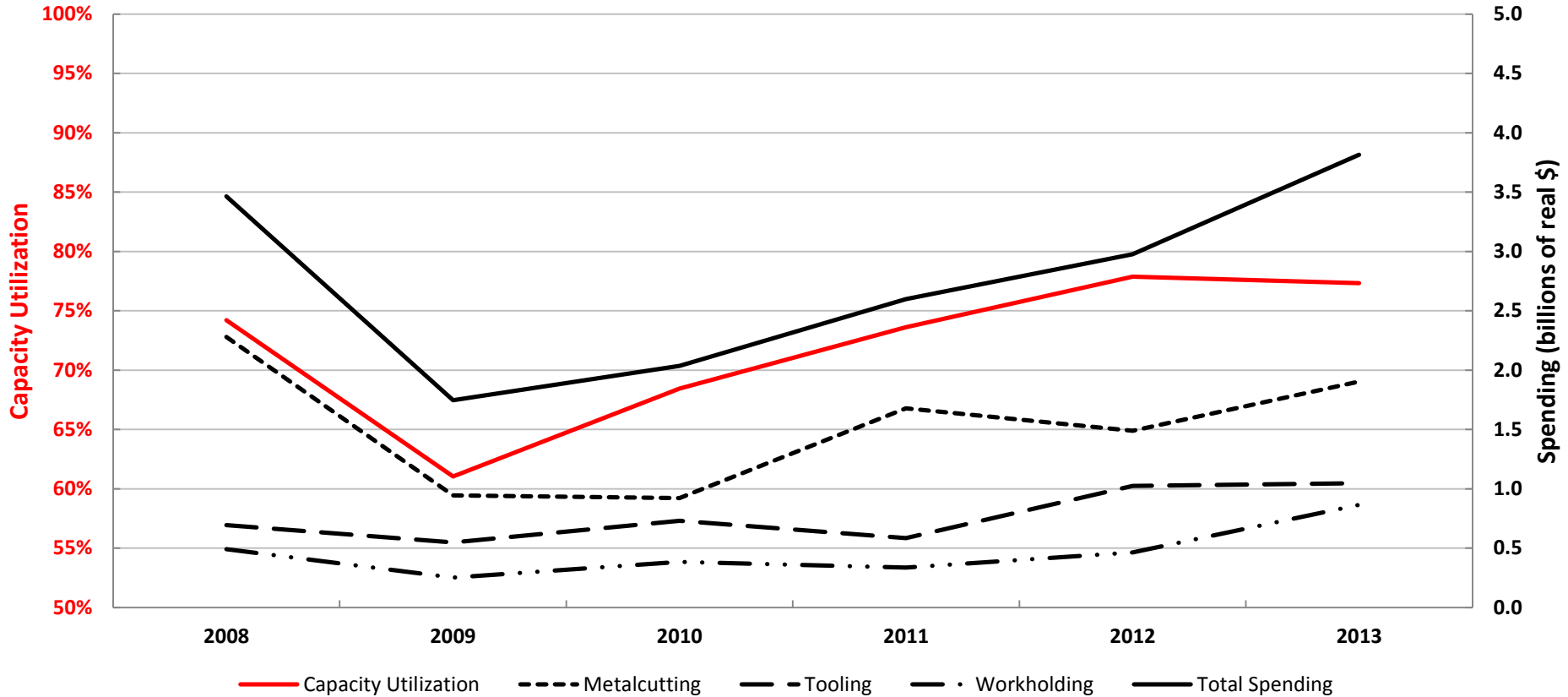
<b>Industry</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Metalcutting Job Shops	436,109,290	558,762,492	556,413,006	365,208,918	801,178,258	1,047,016,390
Machinery and Equipment Manufacturing	201,727,411	206,223,724	307,671,778	190,564,112	447,930,432	529,023,497
Electronics, Computers, and Telecommunications	84,069,353	140,672,722	125,376,111	114,018,820	63,095,495	399,294,879
Automotive	354,776,718	286,479,247	220,768,521	141,534,773	267,806,512	278,316,524
Medical	38,906,213	27,409,731	110,390,527	24,912,673	163,971,942	255,686,771
Aerospace	81,104,072	112,638,122	106,051,251	249,786,252	313,832,397	194,334,872
Industrial Motors, Hydraulic and Mechanical Components	28,439,592	70,295,432	107,452,034	121,443,148	55,592,186	193,639,693
Pumps, Valves and Plumbing Products	101,706,749	182,735,023	85,463,679	197,181,548	139,225,149	172,237,944
Forming and Fabricating (non-auto)	135,523,580	128,417,578	123,282,152	96,414,944	126,760,936	148,090,379
Off-Road and Construction Machinery	39,582,540	15,431,351	71,951,133	84,563,569	60,781,739	99,043,319
Petrochemical Processors	7,828,920	8,105,459	6,997,274	5,630,003	31,083,950	76,105,023
Hardware	104,816,404	13,668,848	86,113,876	73,511,902	17,374,827	41,622,659

- **Oil, Gas Field & Mining Machinery**
  - 2013: \$35 million
  - 2008-2012 average: \$71 million
- **Custom Processors**
  - 2013: \$0
  - 2008-2012 average: \$58 million
- **Primary Metals**
  - 2013: \$38 million
  - 2008-2012 average: \$36 million





# JOB SHOPS – CAPACITY UTILIZATION VS. SPENDING

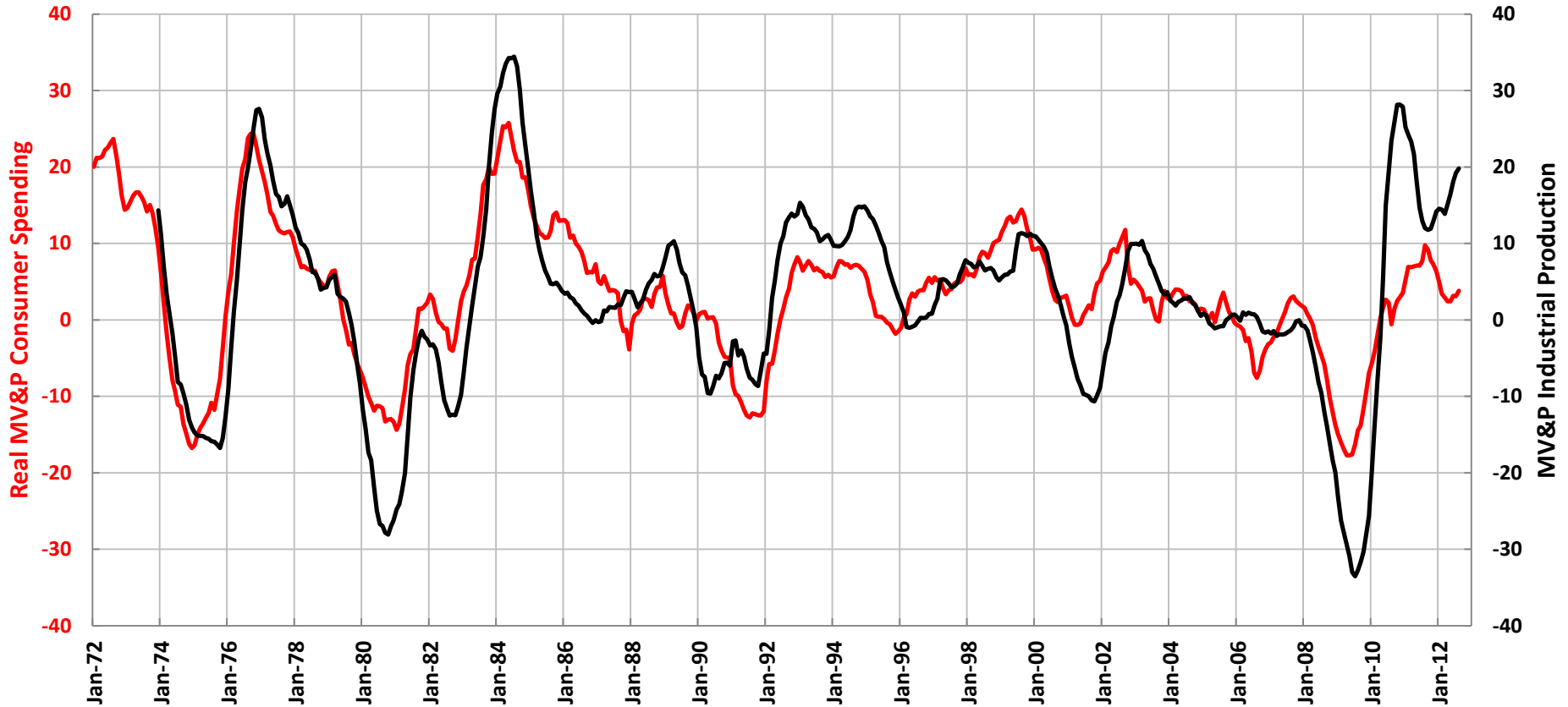


- General machine shops make up more than 80% of spending
- Spending by mold shops will be almost 100% more than any year since at least 2008
- 60% of spending will be in shops with fewer than 50 employees

- **Equipment**
  - HMCs (particularly 400-800 mm pallet) are showing significant growth and account for almost 20% of projected spending
  - Screw machines are almost 100% from the last two years
  - Horizontal CNC lathes with less than a 10 in chuck are showing good growth
  - Both horizontal and vertical milling machines will be very strong
  - EDM is on a noticeable uptrend – emphasis on small hole EDM in 2013
- **Workholding**
  - Big increases in both dedicated and flexible fixtures for milling/drilling
  - Very good growth in all workholding for turning
  - Workholding for grinding almost three times any year since 2008
- **Tooling**
  - Stationary and rotary tool insert spending remains strong
  - Milling tools (ex. inserts) will be the highest since at least 2008
  - Turning tools (ex. inserts) will be up 100% over any year since 2008



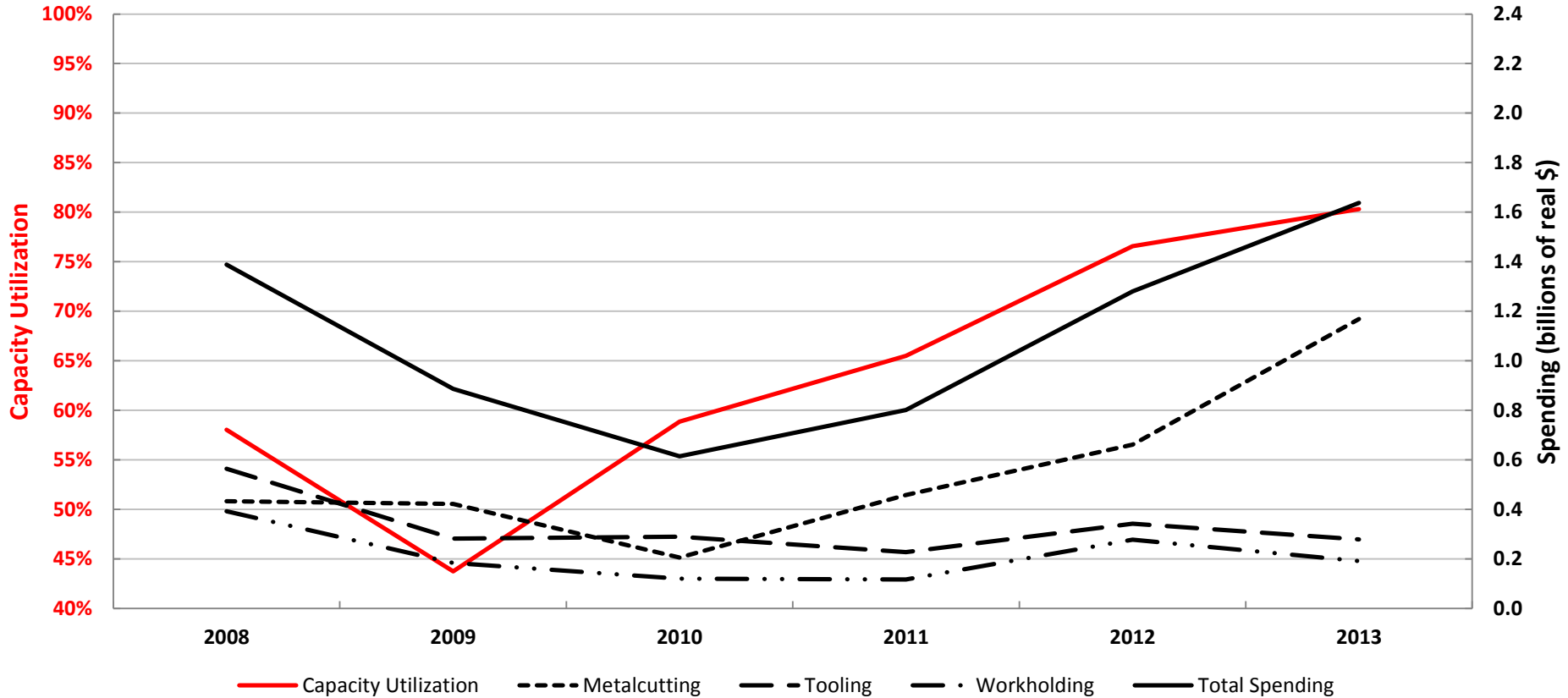
# AUTOMOTIVE VEHICLE & PARTS SPENDING LEADS PRODUCTION



- Production growing faster than at any time since the mid '80s
- Rapid growth in production and need for greater fuel efficiency are boosting spending
- While spending has improved, the industry could be building up inventory at dealers



# AUTOMOTIVE – CAPACITY UTILIZATION VS. SPENDING



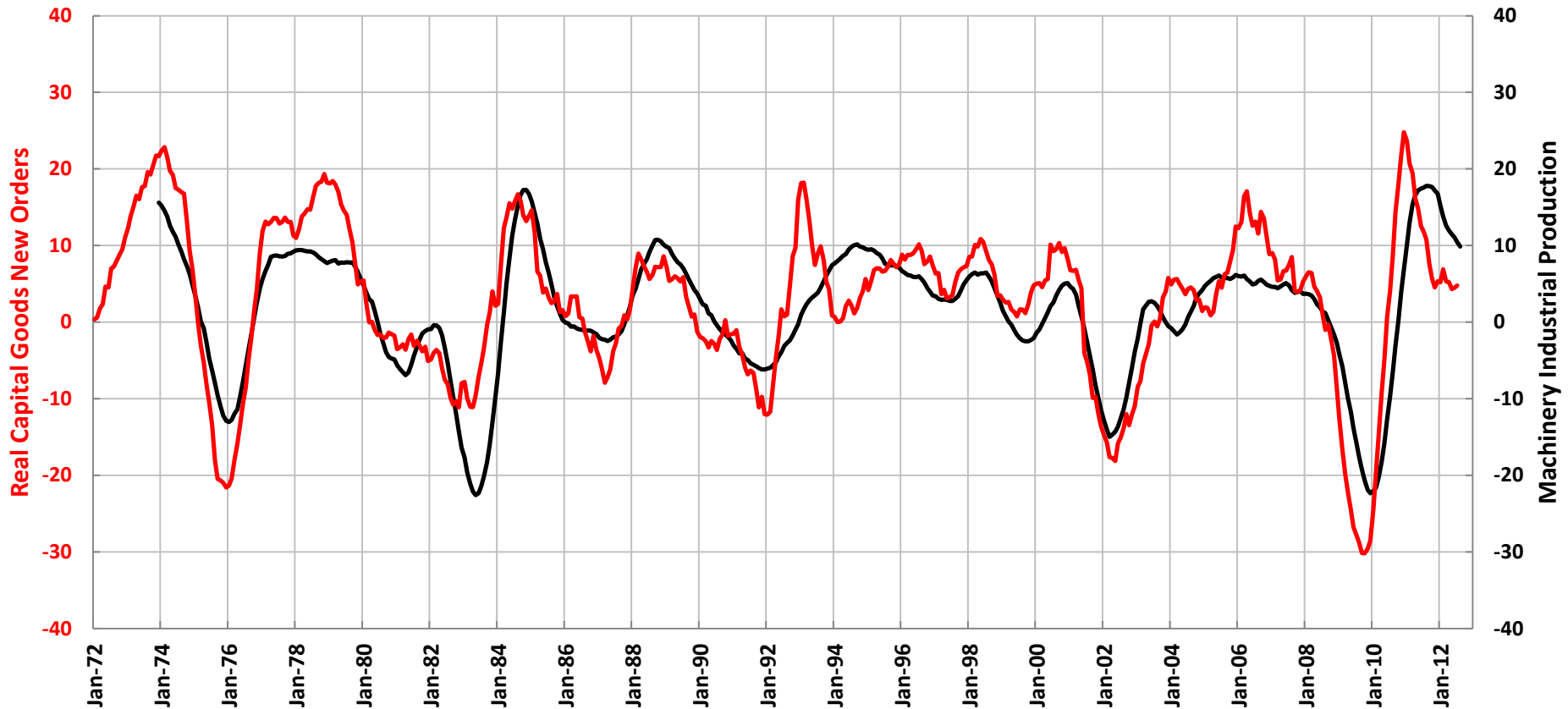
- Equipment spending will have a particular emphasis on transmission and power train parts and gasoline engine and engine parts
- Tooling and workholding will see significant spending in brake systems
- The majority of spending will be in plants with more than 50 employees



- **Equipment**
  - Most equipment types are seeing large increases over all previous years
  - Turning equipment will account for more than 30% of projected spending
  - Turning spending will focus on horizontal CNC lathes of all sizes
  - Turning centers remain strong but the emphasis is on those with a less than 10 in chuck
  - Grinding machines are up big; spending will be focused on gearcutters and cylindrical/external and ID/OD grinders
  - Transfer and other special purpose machines continue to show very strong growth
- **Workholding**
  - Turning spending remains consistent with the last four years
  - Very good growth in all workholding for turning
  - Noticeable increase in flexible fixtures for milling/drilling
- **Tooling**
  - Stationary tool inserts will more than double compared to the last two years
  - All other spending remains fairly consistent with previous years



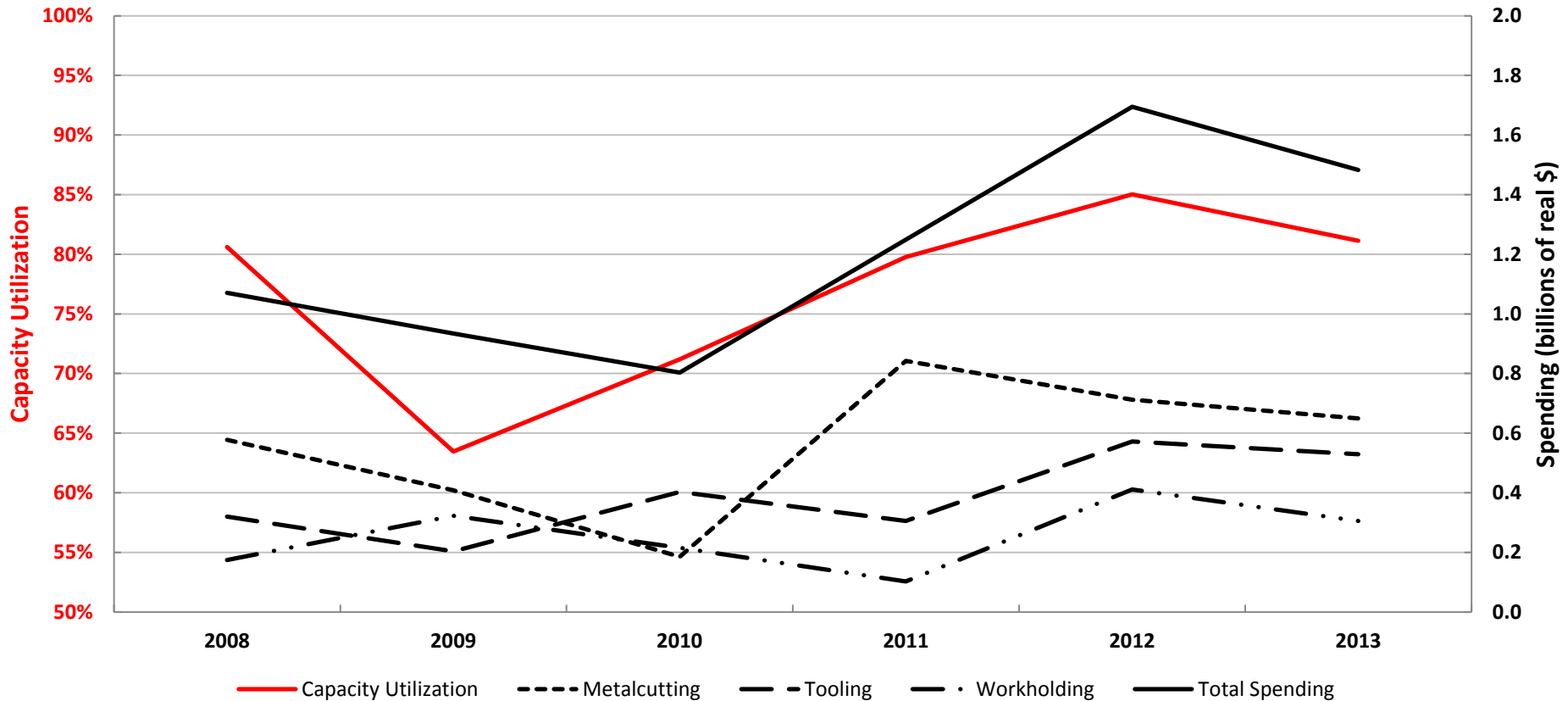
# CAPITAL GOODS NEW ORDERS LEADS MACHINERY PRODUCTION



- Capital goods new orders have only returned to late '90s/early '00s levels
- But, machinery production is at its highest level in the last 40 years (probably ever)
- The strongest rate of growth in the last 40 years in capital goods new orders has led to a boom in machinery and equipment industrial production



# MACHINERY & EQUIPMENT – CAPACITY UTILIZATION VS. SPENDING



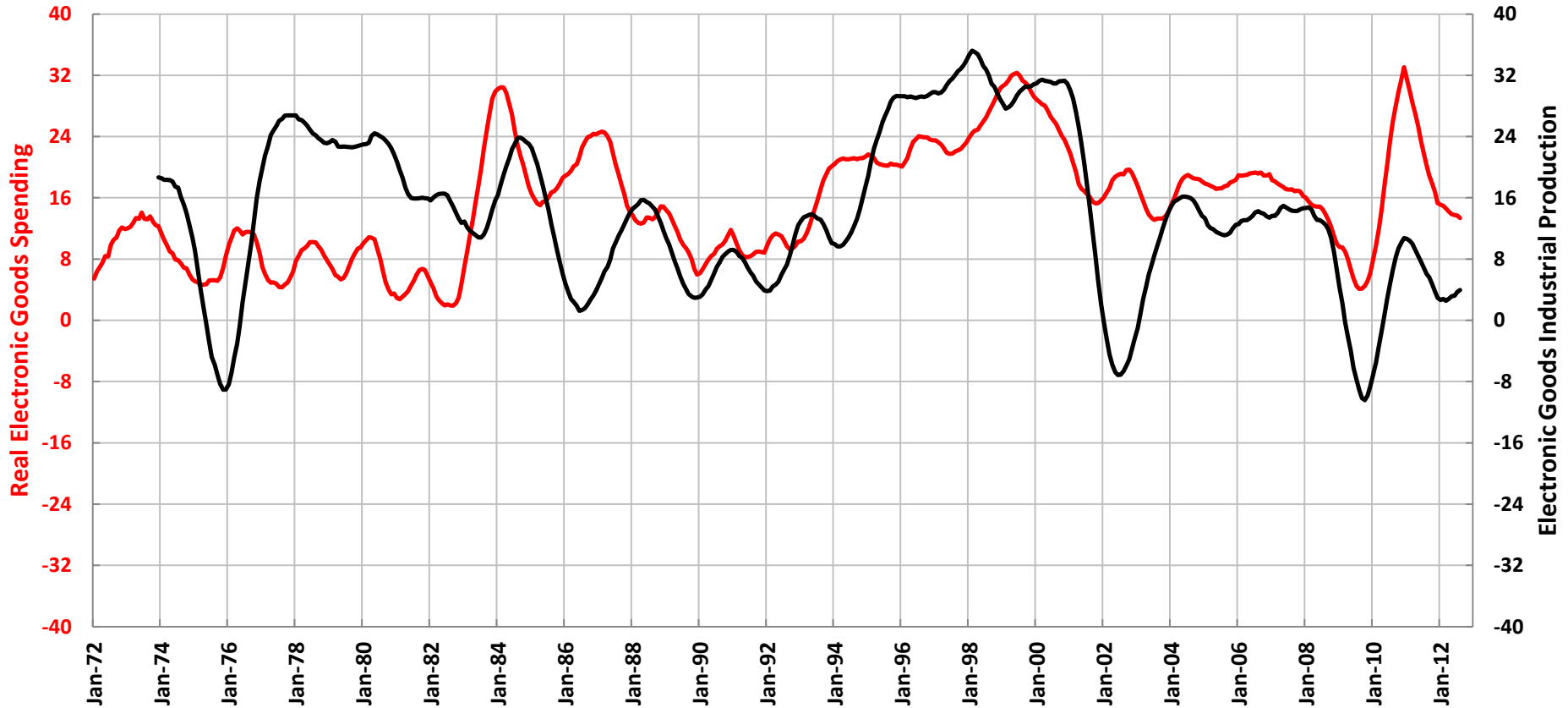
- Equipment spending remains strong as capacity utilization has leveled off
- Slight uptrend in tooling and workholding since 2008 as capacity utilization improved
- Almost half of equipment spending will be in plants with more than 100 employees
- Regional focus on East North Central, New England, and West North Central

- **Equipment**
  - Even though the trend is down overall for equipment, turning, grinding, and milling remain the strongest
  - Very large increase in screw machines; shift from turning centers to screw machines
  - Horizontal lathes remain strong, particularly those with a less than 10 in chuck
  - Significant increases in cylindrical/external and flat/surface grinders while other grinding remains strong
  - Horizontal milling forecast to be strongest since at least 2008 while vertical milling remains strong
- **Workholding**
  - Almost 50% of spending will be milling/drilling processes
  - Sizeable increase flexible fixtures while dedicated fixtures remain the largest segment
  - Other milling/drilling processes (in. robots) highest spending since at least 2008
  - Turning emphasis is on other work load/unload devices (in. robots) and chucks
  - EDM tooling very strong in 2013
- **Tooling**
  - Stationary and rotary tool inserts remain strong
  - Drills (particularly solid carbide and indexable) will see the most spending since at least 2008; third largest tooling category in 2013
  - Grinding wheels and other abrasives, boring heads and turning tools (ex. inserts) will see the highest spending since at least 2008





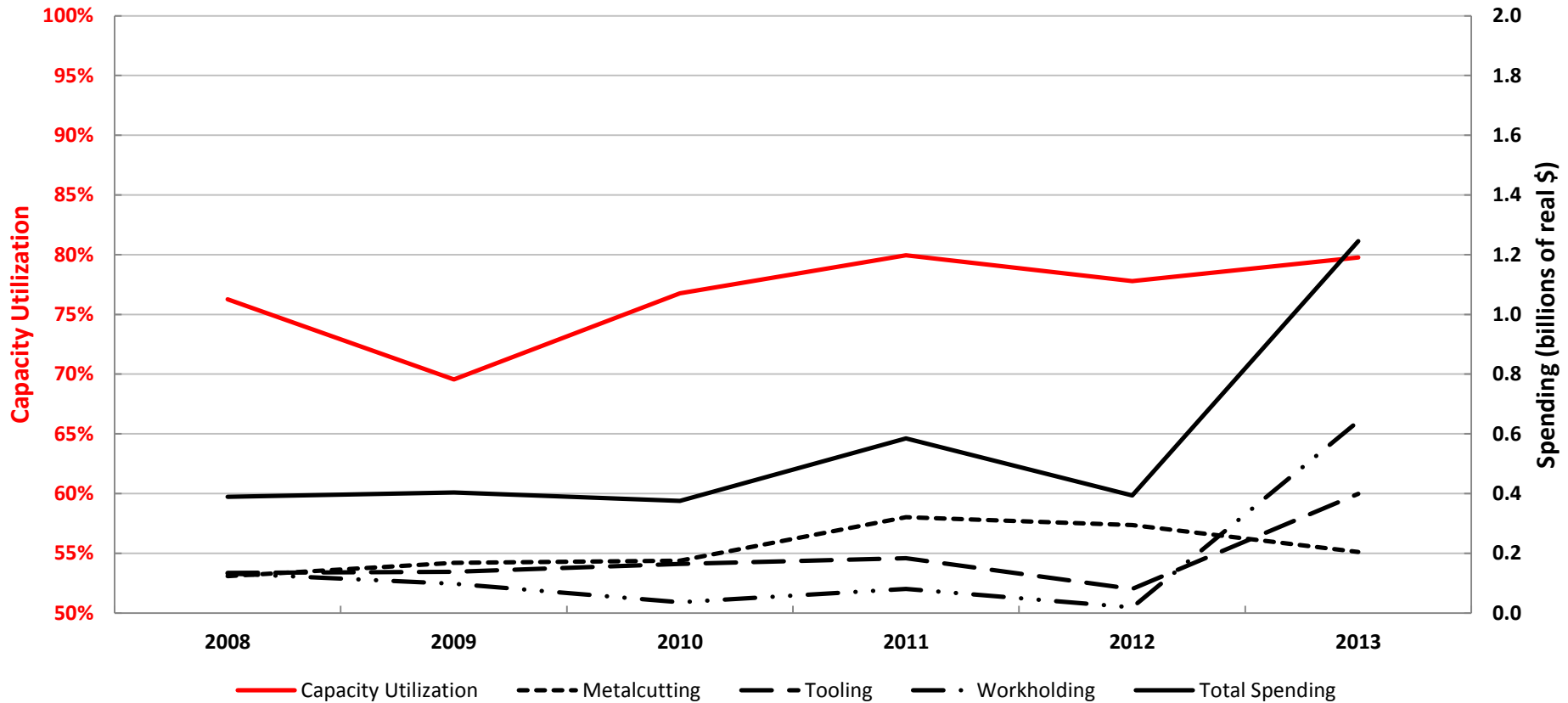
# ELECTRONIC GOODS SPENDING LEADS PRODUCTION



- Electronic goods spending continues to make new all-time highs
- Production levels are back of 2008 but are leveling off
- Leading to slower spending in equipment but tooling and workholding is still needed because of the high production levels



# ELECTRONICS – CAPACITY UTILIZATION VS. SPENDING



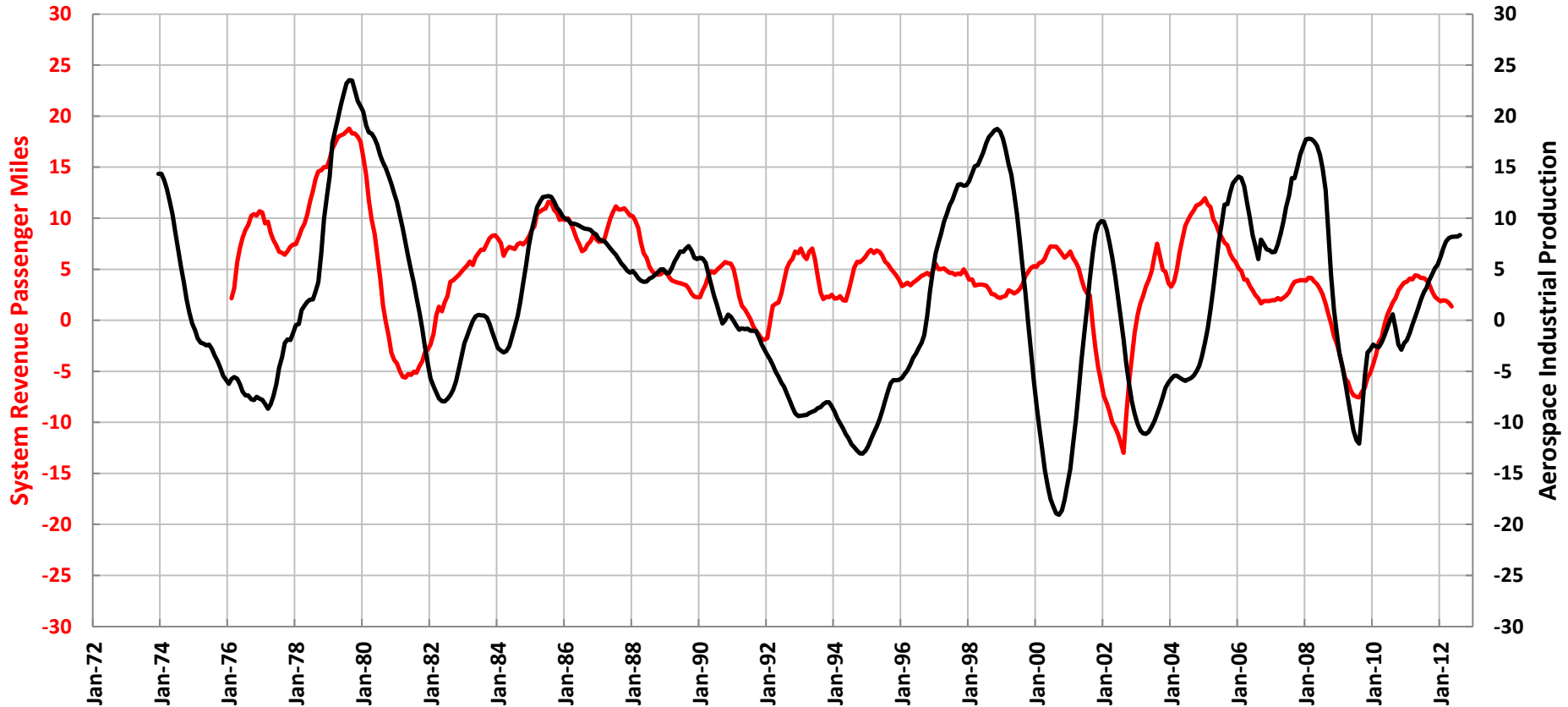
- Growth is in computer and electronic product, in particular the semiconductor industry
- Electronics industry has been very stable compared to most others



- **Equipment**
  - Machining centers remain the strongest equipment category
  - HMCs to remain flat from 2012 while VMCs look to be about half of 2012
  - Turning emphasis will be on horizontal lathes with a larger than 10 in chuck
  - Reasonably strong spending in other equipment with a particular emphasis in transfer and special purpose machines
- **Workholding**
  - Big increases in all processes
- **Tooling**
  - Stationary and rotary tool inserts not up as much as other categories



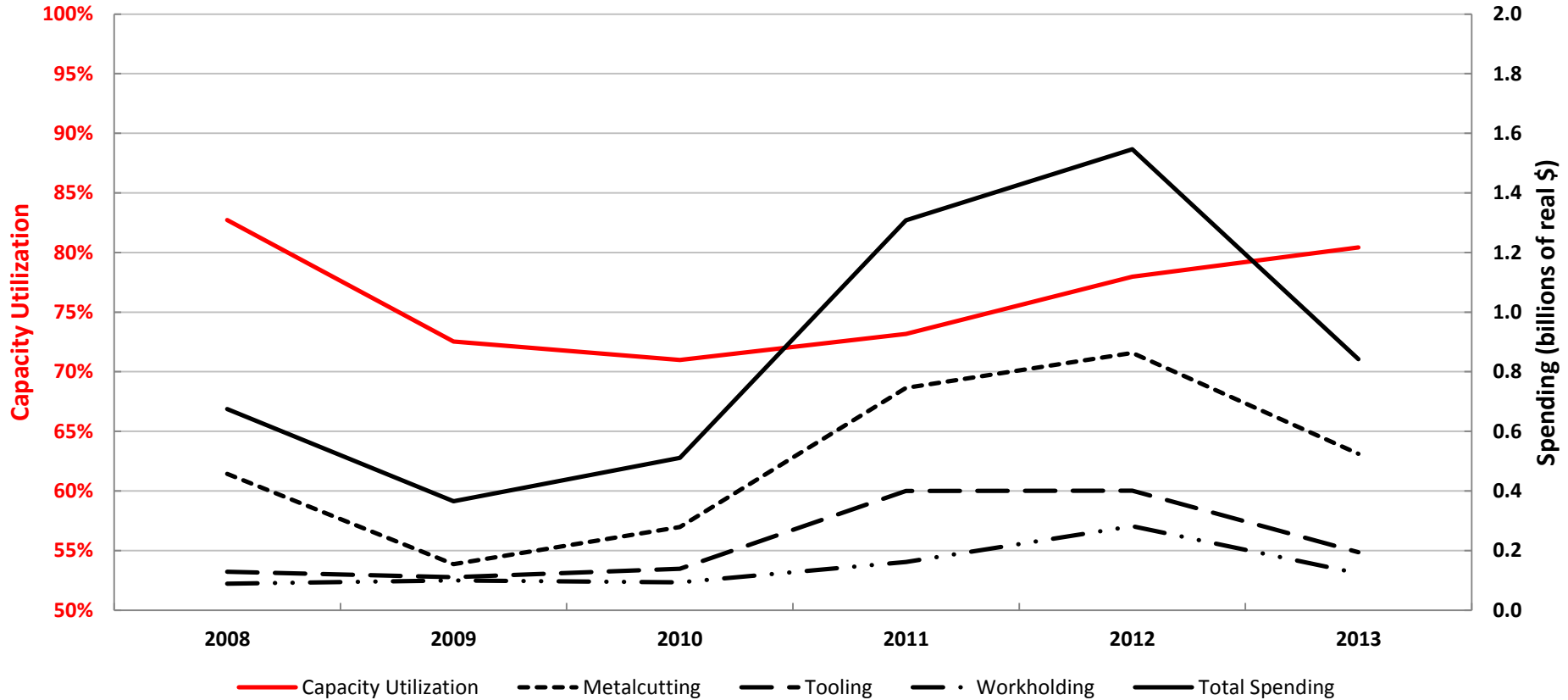
# SRPM LEADS AEROSPACE PRODUCTION



- Slowing growth in airplane usage should lead to slowing growth in aerospace production
- May begin to see significant cancellation of airplane orders (already happened in August) unless SRPM starts growing faster



# AEROSPACE – CAPACITY UTILIZATION VS. SPENDING



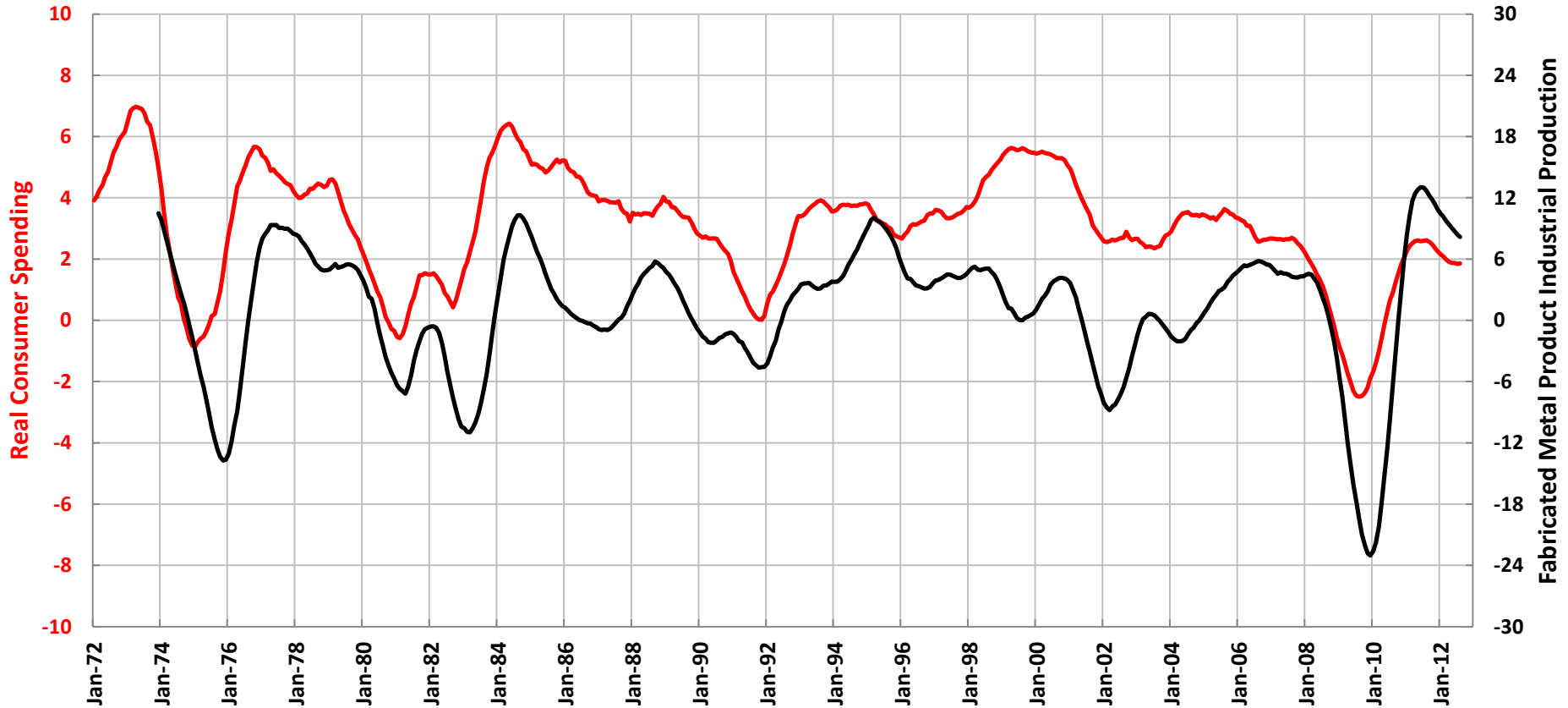
- Aircraft and aircraft part spending is down even though capacity utilization is still increasing
- Probably because of large increase in spending in 2011 and 2012 in anticipation of the Dreamliner launch
- Guided missile and space vehicle spending up big in 2013 – DRONES!



- **Equipment**
  - Reason for the decrease in equipment spending is a large decrease in milling machines
  - 2012 spending on milling probably an aberration; otherwise spending would be up on equipment
  - HMCs with a less than 400 mm pallet almost double any year since 2008
  - HMCs with a 400-800 mm pallet more than 30% of all projected spending
  - Very strong spending on turning equipment, especially small horizontal turning centers and CNC screw machines
  - Significant spending on vertical lathes and large horizontal lathes
  - Sizeable spending on ID/OD grinding
- **Workholding**
  - Spending on fixtures for milling/drilling processes down from the last two years
  - Spending on chucks remains strong
  - Decrease in spending on other turning workholding and bar feeders
- **Tooling**
  - Grinding wheels and other abrasives will see most spending since at least 2008; largest tooling segment
  - Increased spending in other cutting tools
  - All other areas are below levels of last two years



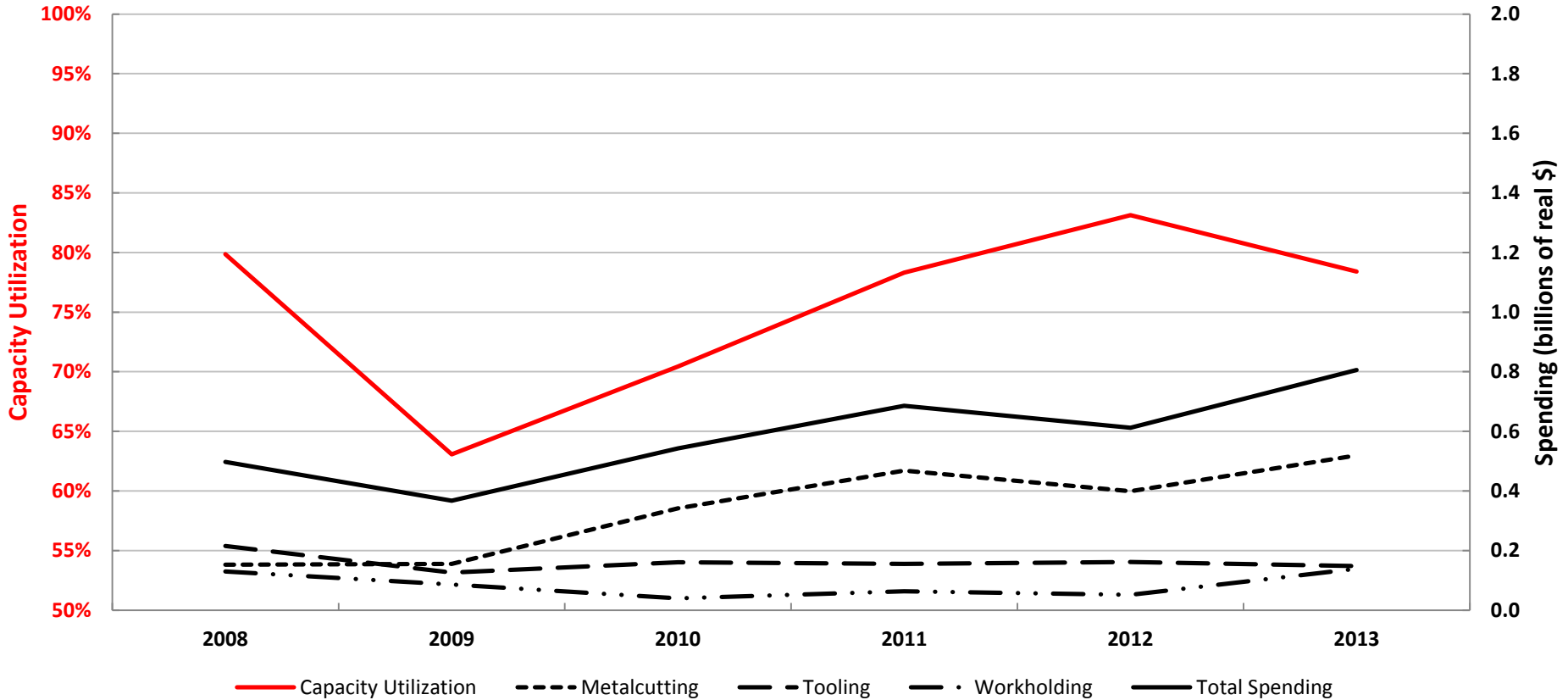
# CONSUMER SPENDING LEADS FABRICATED PRODUCT PRODUCTION



- Consumer spending continues to make new all-time highs
- Production levels have been growing rapidly but are still well below peak levels



# FORMING & FABRICATING – CAPACITY UTILIZATION VS. SPENDING



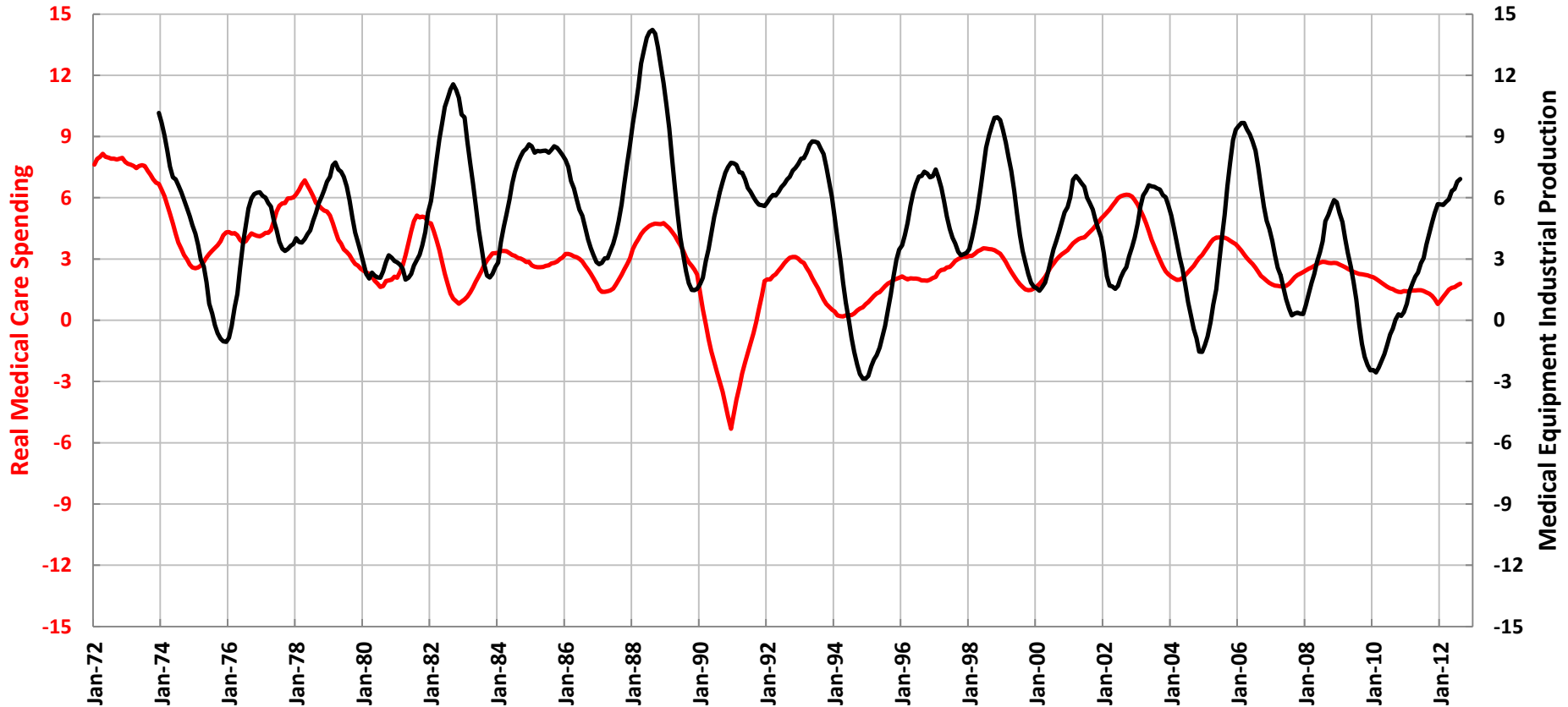
- Increase in equipment spending is due to coating, engraving and heat treating industry
- Ornamental & architectural metal product and forging & stamping are the most significant spenders on workholding and tooling



- **Equipment**
  - Very large increase in HMCs in the 400-800 mm pallet size range
  - Very large spending in rotary transfer and transfer and special purpose machines; emphasis on forged valve and plumbing products
  - About average spending in horizontal lathes with a less than 10 in chuck but other lathe categories are down
- **Workholding**
  - Big increases in all processes
  - Increase in milling/drilling processes due to dedicated fixtures
  - Turning processes will see significant spending on chucks
- **Tooling**
  - Most of the spending will be stationary and rotary tool inserts, drills, milling tools (ex. inserts), and milling toolholders



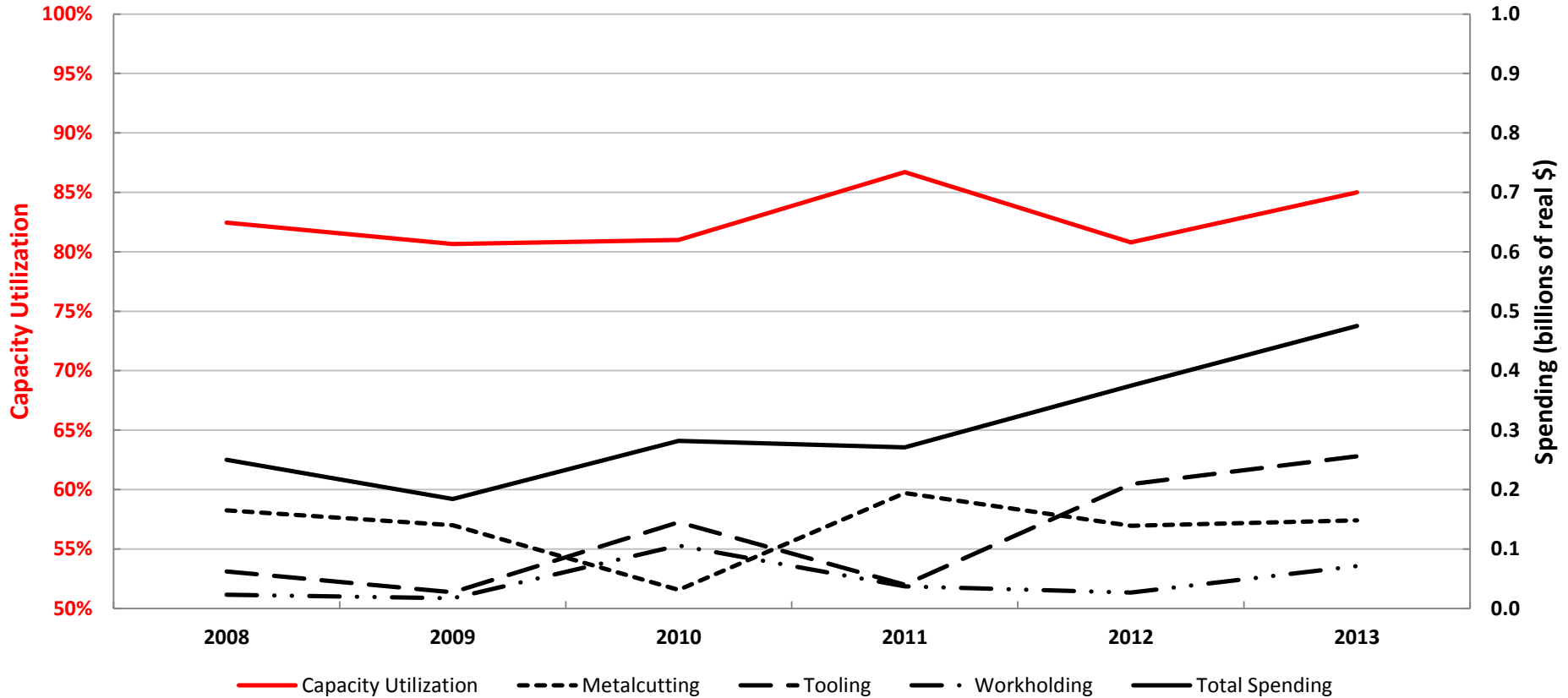
# MEDICAL CARE SPENDING LEADS MEDICAL EQUIPMENT PRODUCTION



- Medical is an industry that almost never contracts
- The rate of growth in medical care spending has been decelerating for a decade but that looks to be changing (hmmm...just before Obamacare takes affect)
- Medical equipment production growing at about an average historical rate



# MEDICAL – CAPACITY UTILIZATION VS. SPENDING



- Capacity utilization is fairly consistent although it has been slightly higher the couple of years
- Equipment spending remains strong but tooling spending has increased due to growing production and capacity utilization



- **Equipment**
  - While turning is still the largest segment it is the only segment that is below levels of the last two years
  - Decrease in turning is due to a reduction in small horizontal lathes
  - Screw machines, both automatic and CNC, will be strong in 2013
  - Machining center spending to be split between HMCs (less than 400 mm pallet) and VMCs (greater than 20 in Y)
  - Significant spending on centerless and ID/OD grinding
  - Wire-type EDM at highest level since 2008
  - Vertical milling at highest level since at least 2008
- **Workholding**
  - Big decrease in spending due to a drop in workholding for milling/drilling processes; could be an aberration in other milling/drilling spending in 2012
  - Spending on fixtures for milling/drilling at highest levels since 2010
  - Notable spending on grinding work load/unload devices
- **Tooling**
  - Stationary tool inserts will see significant growth
  - Rotary tool inserts remain strong
  - Significant spending on milling tools, boring heads, drills, and grinding wheels and other abrasives



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