MORNING BRIEFING
October 13, 2022

On Semis, Valuation & Energy

Check out the accompanying chart collection.

Executive Summary: The cyclical S&P 500 Semiconductors and Semiconductor Equipment industry indexes have had a terrible week and year. … Also: The stock market's poor recent performance has been mostly attributable to valuation resets at lower levels. Jackie finds a mixed valuation picture among sectors and industries. … And: Developments that exert upward pressure on oil prices have been countered by factors with the opposite effect; three in particular have been sapping global demand for oil lately.

Semiconductors: A No-Good, Very Bad Year. The S&P 500 Semiconductors and the S&P 500 Semiconductor Equipment stock price indexes have had a horrible year, sharply underperforming the S&P 500 index. The industries are being weighed down by their typical challenges—oversupply, weak prices, and slowing computer sales—on top of the Biden administration's ban on the sale of high-end chips and manufacturing equipment to China.

Here's how the S&P 500 Semiconductors, S&P 500 Semiconductor Equipment, and S&P 500 indexes performed on Tuesday (-1.4%, -4.2%, -0.7%), over the past week (-10.3, -14.7, -5.3), and ytd (-46.4, -42.6, -24.7) (*Fig. 1* and *Fig. 2*).

Unfortunately, analysts' collective net earnings revisions for the S&P 500 Semiconductors industry just started turning negative in July, for the first time in almost two years (-15.3% in September, -14.2% in August, and -0.9% in July) (*Fig. 3*). After the downward revisions, analysts still call for earnings growth this year—of 2.4%—followed by a 2.7% earnings decline in 2023 (*Fig. 4*).

Analysts started trimming earnings estimates for the S&P 500 Semiconductor Equipment industry in April, and estimates have weakened further for most months since, May being the exception (-9.3% in September, -9.4% in August, and -2.6% in July) (*Fig. 5*). Nonetheless, they still expect earnings to grow by 18.4% this year and 10.8% in 2023 (*Fig. 6*). The downward revisions probably aren't finished until earnings drop sharply in both industries, as they did in 2000, 2009, and 2018 (*Fig. 7* and *Fig. 8*).

During these industries' two sharp earnings drops in 2001 and 2009, their P/Es soared—to 100.7 and 74.4, respectively, for the S&P 500 Semiconductors index and to 137.5 and into the stratosphere for the S&P 500 Semiconductor Equipment index. If the current environment is anything similar, the selloff in the industries' stock price indexes may continue until their P/Es climb far above the current levels of 15.4 (for Semiconductors) and 14.2 (for Semiconductor Equipment) (*Fig. 9* and *Fig. 10*).

Here's a look at some of the news affecting the industry:

(1) *Industry slowdown continues.* Global semiconductor sales rose by 0.1% y/y in August, but these sales' three-month moving average declined by 8.3% y/y that month. Here's how the three-month moving average fared geographically: Europe (2.8%), Japan (-2.0), Americas (-6.6), Asia Pacific/All Other (-11.2), and China (-11.7) (*Fig. 11*).

The slowdown can be partially attributed to less demand for new computers after the surge in demand from pandemic-related work-from-home arrangements. Worldwide PC sales fell 19.5% in Q3 y/y, according to a Gartner *press release*. Q3 sales fell 17.3% in the US and -26.4% in Europe, the Middle East, and Asia. The drop-off of PC sales is what reportedly led Intel to plan a major headcount reduction, which may number in the thousands and will be announced as early as this month, an October 12 Bloomberg *article* reported.

Falling prices are also weighing on the industry. "The average contract prices for the two major types of memory, called DRAM and NAND flash, dropped by 15% and 28%, respectively, from the prior quarter during the July-to-September period," an October 7 *WSJ article* reported. The article's data comes from TrendForce, a market research shop that believes that the double-digit declines should end by spring and that prices should be flattish by year-end 2023.

(2) *Politics takes a toll.* The Biden administration announced on Friday that it plans to limit the sale of chips used in artificial intelligence and supercomputing, as well as the sale of chipmaking equipment, to China. Other countries are expected to announce similar restrictions.

"The US measures seek to stop China's drive to develop its own chip industry and advance its military capabilities. The impact could extend well beyond semiconductors and into industries that rely on high-end computing, from electric vehicles and aerospace to gadgets like smartphones," an October 11 Bloomberg *article* reported.

US semiconductor equipment suppliers reacted this week by pulling out staff based in China's leading memory chip manufacturer, state-owned Yangtze Memory Technologies.

They also stopped support of equipment that was already installed at the Chinese company and ended the installation of new tools, the *WSJ* [reported](#) yesterday. Semiconductor equipment manufacturer Applied Materials' *press release* on Wednesday said the export curbs could cut its Q4 and Q1 revenue forecast by $500 million, at the midpoint of its estimate, and potentially by more than $1 billion.

Strategy: A P/E Reset. Perhaps the only upside of the market downdraft is the resetting of forward P/E multiples. The S&P 500 forward P/E has shrunk to 16.2 from 20.4 a year ago. The index's price has declined 17.1% y/y through Friday's close. If we pretend that the forward P/E was unchanged y/y, the index price would have risen by 9.7%, the same amount as the gain in forward earnings. Likewise, if forward earnings had been unchanged, the price index would have fallen 26.8% solely due to the meltdown in the forward P/E (*Fig. 12*). (FYI: Forward earnings is the time-weighted average of analysts' consensus operating earnings-per-share estimates for this year and next; forward P/E is the multiple based on forward earnings.)

Now let's drill down to the sectors and industries of the S&P 500:

(1) *Sectors.* Joe reports that the forward P/Es of all 11 S&P 500 sectors have fallen over the past 12 months, some more sharply than others. Here's where the forward P/Es stood as of October 6 and where they were a year prior: Real Estate (32.8 as of October 6, 48.2 one year ago), Consumer Discretionary (23.2, 28.6), Information Technology (19.7, 25.1), Consumer Staples (19.2, 19.9), Utilities (18.4, 19.0), S&P 500 (16.2, 20.4), Industrials (16.0, 20.3), Health Care (15.7, 16.3), Communication Services (14.0, 21.1), Materials (13.6, 15.8), Financials (11.5, 14.6), and Energy (8.6, 13.1) (*Table 1*).

(2) *Industries.* Drilling down to the industry level, we find that those S&P 500 industries that suffered the greatest P/Es declines over the past year did so for a mixed bag of reasons, including higher forward earnings as a result of rebounding business after Covid shutdowns (e.g., Airlines and Hotels) and very high P/Es before the market sold off (Application Software and Movies & Entertainment).

(3) *Falling P/Es.* Here are the 10 S&P 500 industries that have seen their forward P/Es shrink by the greatest percentages over the past year along with their forward P/Es as of October 6 and one year ago: Airlines (8.7, 32.2), Hotel & Resort REITs (19.3, 68.0), Hotels (17.9, 45.6), Oil & Gas Refining & Marketing (7.3, 17.8), Cable & Satellite (8.4, 17.2), Movies & Entertainment (20.4, 41.3), Health Care Supplies (19.1, 37.1), Industrial REITs (33.0, 60.0), Publishing (16.9, 30.5), and Application Software (26.9, 46.7).

(4) *Rising P/Es*. One small group of industries enjoyed expanding forward P/Es over the past year. This group includes cyclical industries with earnings estimates that have declined sharply (sending their P/Es higher) and defensive industries that have traded up because they're expected to withstand an economic downturn better than cyclical areas.

Here are the 10 S&P 500 industries with forward P/Es that have increased by the greatest percentage over the past year along with their current and year-ago forward P/Es: Copper (15.2, 9.2), Health Care Distributors (13.3, 10.2), Gold (19.8, 15.5), Biotechnology (12.9, 10.2), Steel (7.8, 6.2), Managed Health Care (19.0, 16.6), Internet & Direct Marketing Retail (56.0, 51.0), Health Care Services (11.5, 10.6), Gas Utilities (17.8, 16.5), and Brewers (11.9, 11.1).

(5) *Different strokes.* After selling off for almost a year, some industries typically considered safe havens are looking expensive, while the multiples of some growth industries have become much more reasonable. While the S&P 500 Personal Products industry's forward P/E has fallen to 28.8 from 40.3 a year ago, its forward earnings growth rate is 7.8%. Water Utilities has a forward P/E of 28.7 and a forward earnings growth rate of 8.9%, while Hypermarkets & Super Centers has a forward P/E of 25.9 and a forward earnings growth rate of 8.1%. Each of these industries' forward P/E is more than three times its forward earnings growth rate.

Meanwhile, some growth industries have forward P/E multiples that are about twice their expected forward earnings growth: Application Software (forward P/E of 26.9, forward earnings growth of 14.3%), Systems Software (22.8, 12.3%), and Internet Services & Infrastructure (20.2, 9.9%).

Energy: Sliding Demand. President Joe Biden was understandably upset when Saudi Arabia and OPEC+ decided on October 5 to cut oil production by 2 million barrels a day (mbd). Prior to the meeting, the price of Brent crude oil futures had fallen to the low- to mid-$80s from their peak of $123.58 on June 8. Since the announcement, the price of Brent futures rose to $97.92, before dropping back down to $94.29 on Tuesday (*Fig. 13*). Anything that boosts the price of oil not only hurts Western economies but also boosts Russia's oil-related revenues, padding its war coffers.

So far, the impact of the supply cut hasn't been dramatic because of the global economic slowdown. A strong dollar and more Covid-related shutdowns in China haven't helped the oil market either. And looking out into the future, the growing adoption of hybrid and electric vehicles may curb demand for black gold.

Let's turn to some of the moving parts affecting the price of oil:

(1) *Fears of global economic slowdown.* It's not often that the whole world's economy faces a synchronized economic slowdown, but that's what appears to be occurring. In Europe, high natural gas and electricity prices are crushing consumer demand and boosting corporations' expenses. And missteps by the UK government's new leaders have spooked that country's financial markets, sending interest rates and inflation spiraling higher. The latest reading of German industrial output fell by 0.8% m/m in August.

In Asia, China's economy continues to be dragged down by real estate developers defaulting on their debt. The latest defaults occurred on Monday as payments were missed on $225 million of trust borrowings owed by units of China SCE Group Holdings and Shimao Group Holdings, an October 10 Bloomberg *article* reported. SCE is ranked 27th nationwide in sales.

Widespread lockdowns due to a very small number of Covid cases has also hurt the Chinese economy. Cases jumped to 2,089 on October 10—the highest since August 20—after domestic travel increased during "Golden Week" earlier this month, an October 11 Reuters *article* relayed. Increased testing and targeted lockdowns reportedly are occurring. Nomura estimates that 36 cities are under various degrees of lockdown or control, affecting 196.9 million people.

The preventative steps are being taken days before the Communist Party Congress starts on Sunday. The latest dour economic reading arrived earlier this week: The Caixin China General services purchasing managers *index* fell to 49.3 in September, down sharply from 55.0 in August.

Earlier this week, the International Monetary Fund lowered its 2023 estimate for global economic growth by 0.2ppt to 2.7%. That's slower than the 3.2% growth expected this year and the 6.0% growth the global economy produced in 2021. OPEC also lowered its global economic growth forecast for 2022 to 2.7%, down from its prior forecast of 3.1%. Its forecast for 2023 economic growth was also lowered to 2.5% from 3.1%. "OPEC also lowered its oil-demand growth forecasts by 460,000 barrels a day to 2.64 million barrels a day for 2022. For 2023, the Vienna-based group lowered its forecast by 360,000 barrels a day to 2.34 million barrels a day," a *WSJ* *article* reported yesterday.

(2) *Strong dollar packs a punch.* The strong US dollar may also be weighing on the price of crude oil, which is largely traded in dollars. The greenback is up 16.5% from its 2021 low

(*Fig. 14*). The higher the dollar, the more expensive it is for other countries to buy oil, and that hurts demand.

(3) *EVs starting to pinch?* Global sales of passenger electric vehicles (EVs)—both battery electric vehicles (BEV) and plugin hybrid electric vehicles (PHEV)—continue to grow and take market share. In August, 847,580 EVs were registered, up 60% y/y, an October 3 InsideEVs *article* reported. Market share increased to 15% of new vehicles registered, which includes 11% for BEVs and 4% for PHEVs. (Excluding China, PHEV sales fell 9%.)

The International Energy Agency's 2022 *outlook* estimated that the global EV fleet in 2030 would displace about 3.4mbd of diesel and gasoline, assuming that EVs reach just over 20% of sales in 2030. If EV sales represent more than 30% cars sold globally, they could displace about 4.6mbd, up from about 0.3mbd in 2021. The impact on the market will also depend on whether the demand for crude oil-based fuels by industrial users remains flat, increases, or decreases.

In the US, roughly 45% of US crude oil is turned into gasoline and used by cars, according to US Energy Information Administration *data*. The impact of EVs on fuel demand has caught the attention of some state finance departments that collect gasoline taxes. Fuel taxes provide roughly 40% of the revenue that states use to fund transportation spending, and much of it could disappear in the coming decades, according to an October 3 *report* by Pew Charitable Trusts.

West Virginia's Department of Transportation in 2021 *estimated* that fuel tax revenue could fall by 11%-20% from 2021 through 2030 and by 31%-52% from 2031 through 2050 as more EVs hit the road and the fuel efficiency of cars with internal combustion engines improves. States will need other revenue sources, which might include a mileage-based tax, a new real estate or sales tax, or a general transportation fee.

A 2021 *report* by the Connecticut Office of Policy and Management noted that revenue from the state's motor fuels tax was growing until 2020, when Covid hit and consumption fell. In early 2022, consumption remained below pre-pandemic levels and was not expected to recover over the next five years. But even apart from the pandemic, the state had assumed that the growth in motor fuels consumption would drop either because gas prices jumped or because "alternatively-powered vehicles" would increasingly be used. The state estimates that the motor fuels tax will recover to $490.2 million in fiscal 2023 and gradually decline to $485.3 million in fiscal 2026.

Calendars

US: Thurs: Headline & Core CPI 0.2%m/m/8.1%y/y; 0.5%m/m/6.5%y/y; Initial & Continuous Claims 225k/1.365m; Federal Budget Balance; Natural Gas Storage; Crude Oil Inventories; IEA Monthly Report; IMF Meetings. **Fri:** Retail Sales Total, Core, Control Group 0.2%/-0.1%/0.3%; Consumer Sentiment Index Headline, Current Conditions, and Expectations 59.0/59.9/58.5; Business Inventories 0.9%; Baker-Hughes Rig Count; IMF Meetings; Cook. (Bloomberg estimates)

Global: Thurs: Germany CPI 1.9%m/m/10.0%y/y; China CPI 0.4%m/m/2.8%y/y; China Trade Balance ¥81.0 billion; China Exports & Imports 4.1%/1.0% y/y; BOE Credit Conditions Survey; Mann; Nagel. **Fri:** Eurozone Trade Balance; France CPI -0.5%m/m/5.6%y/y; Spain CPI -0.6%m/m/9.0%y/y; Eurogroup Meetings; BOE Quarterly Bulletin; Mauderer. (Bloomberg estimates)

Strategy Indicators

Stock Market Sentiment Indicators (*link*): The BBR sank further below 1.00 this week, dropping for the fourth consecutive week to 0.57 (the lowest since the March 2009), after rising from 1.00 to 1.15 the prior week. *Bullish sentiment* slipped to 25.0% (the fewest bulls since early 2016) this week after holding steady at 25.4% last week; it was at 45.1% seven weeks ago. Meanwhile, *bearish sentiment* exceeded bullish sentiment for the fourth week, moving higher for the fourth week by 15.9ppts (to 44.1% from 28.2%), equaling the mid-June peak reading. It was the largest group for the second straight week, unseating the correction count—which had the top spot the prior four weeks. The *correction count* dropped for the second week to 30.9% this week, after climbing from 38.6% to 40.3% the prior week. In the meantime, the *AAII Sentiment Survey* (as of October 6) showed optimism rebounding though remaining unusually low, while pessimism fell after moving above 60% for a consecutive week, though remains unusually high. The *percentage expecting stocks will rise over the next six months* rose for the second week by 6.2ppts (to 23.9% from 17.7%) after falling 8.4ppts (to 17.7% from 26.1%) the prior week, with optimism remaining below its historical average of 38.0% for the 46th consecutive week; it was unusually low for the sixth successive week and the 29th time in 40 weeks. (The breakpoint between typical and unusually low readings is currently 27.6%.) The *percentage expecting stocks to fall* *over the next six months* fell for the second week, from 60.9% to 54.8%, with nearly the entire decline occurring during the latest week; it had increased five of the prior six weeks, by 24.2ppts (60.9 from 36.7), with 14.9ppts occurring during September 22 week. Bearish sentiment has been above its historical average of 30.5% in 45 of the last 46 weeks, and is at an unusually high level for the 30th time in 38 weeks. (The breakpoint between typical and unusually high readings is currently 40.6%.)

S&P 500 Earnings, Revenues, Valuation & Margins (*link*): The S&P 500's forward profit margin remained steady last week at a 14-month low of 13.0%. That's down 0.4ppt from its record high of 13.4% achieved intermittently from March to June. Since the end of April 2020, it has exceeded its prior record high of 12.4% in September 2018. It's now up 2.7ppts from 10.3% during April 2020, which was the lowest level since August 2013. Forward revenues rose back up to a fresh record high as forward earnings edged up less than 0.1% w/w to 1.7% below its record high in mid-June. Both had been steadily making new highs from the beginning of March 2021 to mid-June; prior to that, they peaked just before Covid-19 in February 2020. The consensus expectations for forward growth remained steady w/w as analysts awaited the start of the Q3 earnings season. Forward revenues growth tumbled 0.5ppts w/w to a 25-month low of 5.1%, down from a record high of 9.6% growth at the end of May 2021. Still, that's up from 0.2% forward revenues growth during April 2020, which was the lowest reading since June 2009. Forward earnings growth was down 0.1ppt w/w to a 26-month low of 7.1%. That's down from its 23.9% reading at the end of April 2021, which was its highest since June 2010 and up substantially from its record low of -5.6% at the end of April 2020. So far this year, analysts' revisions to their forecasts for 2022 revenues have outpaced their revisions for 2022 earnings, so the imputed 2022 profit margin estimate that we calculate from those forecasts has ticked down 0.6ppt to 12.6%. They expect revenues to rise 11.8% (down 0.1ppt w/w) in 2022 and 4.0% in 2023 (down 0.1 ppt w/w) compared to the 16.4% gain reported in 2021. They expect earnings gains of 9.0% in 2022 (down 0.2ppt w/w) and 7.0% in 2023 (down 0.2ppt w/w) compared to an earnings gain of 50.2% in 2021. Analysts expect the profit margin to drop 0.4ppt y/y to 12.6% in 2022 (down 0.1ppt w/w) compared to 13.0% in 2021 and to improve 0.4ppt y/y to 13.0% in 2023 (unchanged w/w). The S&P 500's weekly reading of its forward P/E rose 0.3pt w/w to 16.2 from a 14-week low of 15.9. That compares to a 15-week high of 18.2 in mid-August and is up from a 26-month low of 15.8 in late June. That also compares to 23.1 in early September 2020, which was the highest level since July 2000 and up from a 77-month low of 14.0 in March 2020. The S&P 500 weekly price-to-sales ratio rose 0.04pt w/w to 2.10 from a 29-month low of 2.06. That's down from a 15-week high of 2.38 in mid-August. That also compares to a record high of 2.88 at the end of 2021 and a 49-month low of 1.65 in March 2020.

S&P 500 Sectors Earnings, Revenues, Valuation & Margins (*link*): Last week saw consensus forward revenues rise for four of the 11 S&P 500 sectors, forward earnings rise for five sectors, and the forward profit margin rise for five sectors. Nearly all of the sectors are below recent record highs in their forward revenues, earnings, and profit margins. Consumer Staples is the only sector with forward revenues at a record high this week, and Energy is the only sector with forward earnings at a record high. Energy still has forward revenues well below a record high, and Utilities' forward revenues and margin are lagging too. All sectors now have forward profit margins that are below their record highs, but those of Energy, Industrials, and Real Estate remain closest to their post-pandemic highs. Only three sectors posted a higher profit margin y/y during 2020: Consumer Staples, Tech, and Utilities; during 2021, all of the sectors but Utilities posted a y/y improvement. Just four sectors are expected to see margins improve y/y for full-year 2022, followed by seven sectors in 2023. Here are 2022's gainers: Energy, Industrials, Materials, and Utilities. Here's how they rank based on their current forward profit margin forecasts along with their record highs: Information Technology (24.5%, down 0.1ppt w/w and from its 25.4% record high in early June), Financials (18.4, down from its 19.8 record high in August 2021), Real Estate (18.3, down from its 19.2 record high in 2016), Communication Services (15.3, up 0.1ppt w/w and down from its 17.0 record high in October 2021), Utilities (13.8, down 0.1ppt w/w and from its 14.8 record high in April 2021), S&P 500 (13.0, down from its record high of 13.4 achieved intermittently from March to June), Materials (12.3, down 0.2ppt w/w and from its 13.6 record high in June), Health Care (10.5, down from its 11.5 record high in March), Industrials (10.2, down from its 10.5 record high in December 2019), Energy (12.1, down from its 12.3 record high in August), Consumer Discretionary (7.5, down from its 8.3 record high in 2018), and Consumer Staples (7.2, down 0.1ppt w/w and from its 7.7 record high in June 2020).

US Economic Indicators

Producer Price Index (*link*): The final demand PPI rose for the first time in three months in September, climbing 0.4% after a two-month drop of 0.6%. The yearly rate eased for the sixth month, since reaching a record high of 11.7% in March, slowing to 8.5% in September. Meanwhile, core prices—which excluded food, energy, and trade services—advanced 0.4%, following gains of 0.2% and 0.1% the prior two months, with the yearly rate holding at 5.6%, down from March's record high of 7.1%. *Final demand goods* increased 0.4% last month after declines of 1.1% in August and 1.8% in July—attributable to sharp drops in gasoline prices. Sixty percent of September's increase in final demand goods was attributable to a 1.2% increase in foods; energy prices were up 0.7%. The yearly rate for final demand goods has dropped 6.3ppts to 11.3% from June's record high of 17.6%. Meanwhile, *final demand services* increased 0.4% last month, following gains of 0.3% and 0.2% during August and July, respectively, with the yearly rate moving up to 6.8% y/y after easing steadily from a record high of 9.4% in March to 6.5% in August. The *PPI for personal consumption* climbed 0.4% in September after no change in August and a 0.6% drop in July; it averaged monthly gains of 1.0% the first half of the year. The yearly rate has eased steadily from March's 10.4% record high, falling to 7.4% by September. The yearly rate for personal consumption excluding food & energy ticked up to 6.1% y/y after easing from a record-high 8.1% in March to 6.0% by August. Looking at *pipeline prices*, pressures remain elevated, though have eased from recent highs. The yearly rate for intermediate goods prices eased to an 18-month low of 13.1% from a cyclical high of 26.5% in November, while the crude goods rate slowed to 33.9% y/y after picking up a bit from a 17-month low of 32.2% in July to 37.2% in August; it peaked at 59.0% last April—which was only a tick below its record-high 59.1% in August 1973.

Global Economic Indicators

Eurozone Industrial Production (*link*): Headline production, which excludes construction, rose for the third time in four months in August, by 1.5% m/m and 1.4% over the period; it had contracted 2.3% in July—which was the first decline since March and the third this year. *During August*, production of capital (2.8%), consumer durable (0.9) and consumer nondurable (0.7) goods moved higher, while intermediate goods (-0.5) and energy (-2.1) moved lower. *Compared to a year ago*, headline production was up 2.5%, with capital (8.2) and consumer durable (7.0) goods output up sharply, while energy output dropped 2.9%. Consumer nondurable (0.4) and intermediate (-0.5) goods production levels were basically flat with a year ago, with the former a few ticks above zero and the latter a few ticks below. *Production data are available for the top four Eurozone economies* and show both France (2.5) and Italy (2.3) posted solid gains, while Spain's (0.5) output was fractionally higher and Germany's (-0.5) fractionally lower. Over the 12 months through August, Spain (5.4) showed the biggest increase in output, followed by Italy (2.9), Germany (2.4), and France (0.8).

UK GDP (*link*): Real GDP in August unexpectedly contracted, with industrial production the main contributor to the decline. Real GDP fell 0.3% in August following a 0.1% uptick in July, as *industrial output* sank for the third month, by 1.8% m/m and 3.2% over the period;

manufacturing output was down 1.6% and 3.5% and mining & quarrying down 8.2% and 7.6% over the comparable periods. As for the *main industrial sectors*, output of capital (-12.7%), intermediate (-11.0), and consumer nondurable (-9.2) goods output are down sharply from their record highs during December 2020, November 2020, and December 2021, respectively. Meanwhile, production of consumer durable goods remains in a volatile flat trend at a high level, near the middle of the range. *Services output* ticked down 0.1% in August, only its second decline since July 2021, dragged down by declines of 1.3% and 5.0%, respectively, in human health & social work activities and arts, entertainment & recreation. *Construction output* expanded for the second successive month, by 0.1% m/m and 0.5% over the period, after contracting 0.7% in June. Output in *consumer-facing services* contracted 1.8% in August after a 0.7% gain in July.

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