
Payden & Rygel
POINT *of* **VIEW**

FALL 2019

Our Perspective on Issues Affecting Global Financial Markets

A RIVER RUNS THROUGH IT: THE RHINE RIVER AND THE EUROPEAN ECONOMY

The impediments to a bustling euro area economy are so well known it seems silly to repeat them here. Such concerns will not stop us, dear reader. A crippled banking system. Lack of fiscal union. A heavy regulatory burden. Unending political uncertainty. One you may not hear mentioned: river water levels. Yes, it's 2019, but a river snaking through the heart of Europe may explain at least part of the recent weakness in global economic activity.

A River Runs Through It: The Rhine River and the European Economy

In late 2018, global equity markets lurched lower. Why? One reason: slower global economic growth threatened corporate profitability worldwide. Europe was at the heart of the slowdown. The largest euro area economy, Germany, was effectively in a recession, according to many market observers.

Numerous culprits explain Germany's woes: Brexit, trade wars, new auto emissions regulations, and China's economic slowdown. All of these factors put a dent in Germany's industrial sector.

However, another reason for Germany's stumble went unheralded: the drying up of the Rhine River. That's right, one of the most under-

appreciated global macroeconomic stories of 2018 was about a river running through the heart of Europe!

Here we discuss the historical significance of the Rhine River, its role in Europe's industrial sector, and why investors might consider including the Rhine's water level as another data point to watch. Whether a Rhine River cruise or an interest in the global economy intrigues you, read on.

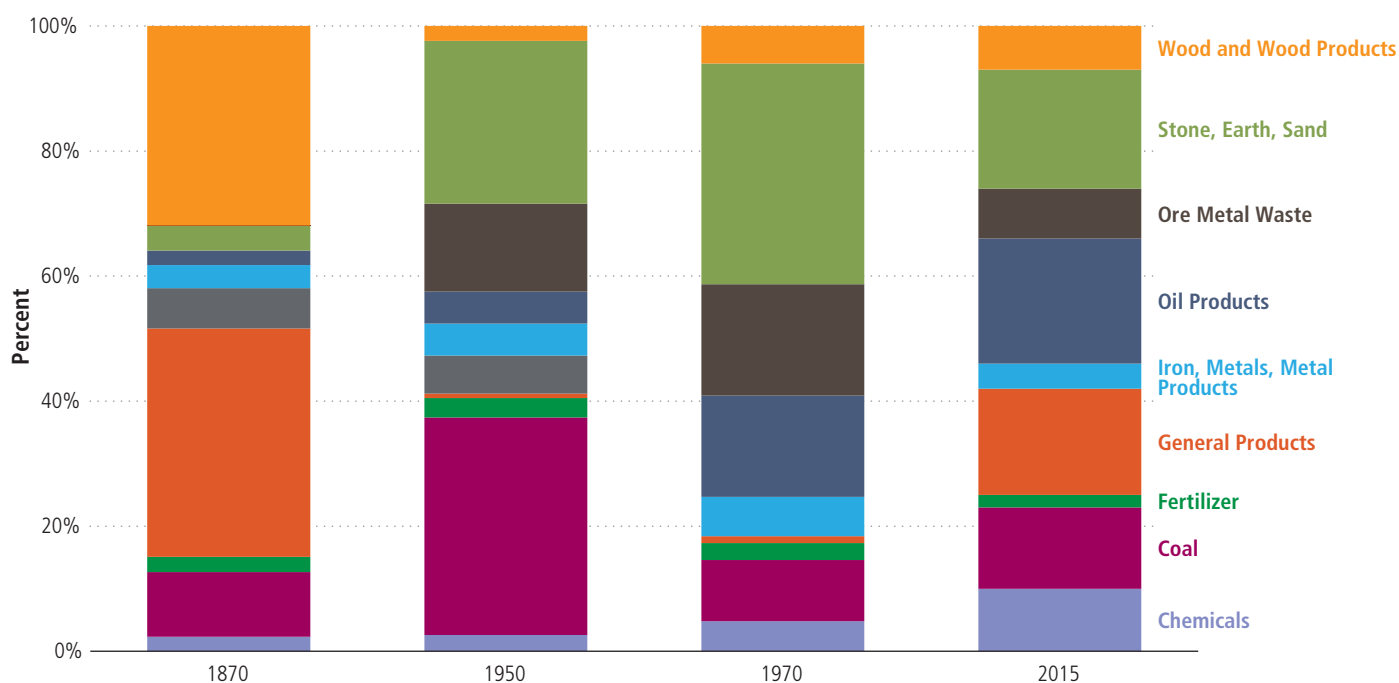
ROWING DOWN THE RHINE

The Rhine River begins in the Swiss Alps, flowing through Switzerland, France, Germany, and emptying into the ocean via the Netherlands. Trade and transportation on the Rhine date at least back to the times of the Roman Empire. None other than Julius Caesar owns the first attributed mention of the river: "The Rhine rises in the land of the Lepontii, who inhabit the Alps."¹

Caesar fell, but the Rhine remained. The Rhine featured prominently in medieval European trade. For almost 600 years, medieval laws required any ship passing through the city of Cologne to put up its goods for sale before moving on.² And you complain about the line for customs at the airport!

«EUROPEAN LEADERS CAME TOGETHER AFTER THE DEFEAT OF NAPOLEON TO CREATE THE OLDEST INTERGOVERNMENTAL ORGANIZATION—THE CENTRAL COMMISSION FOR THE NAVIGATION OF THE RHINE.»

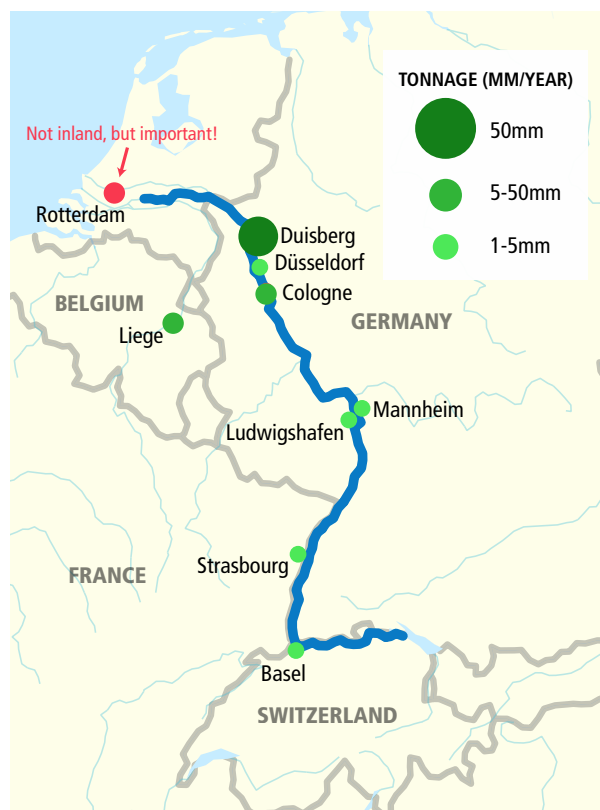
fig. 1 CHANGING WITH THE TIMES: COMPOSITION OF FREIGHT SHIPPED ON THE RHINE SINCE 1870



Source: Central Commission for the Navigation of the Rhine

fig. 2 FALL IN RHINE? MAJOR INLAND PORTS AND THEIR PRIMARY PURPOSE

PORT	TONNAGE (MM/YEAR)	SPECIALIZATION
DUISBURG, GERMANY	49	CONTAINERS, STEEL, COAL, MINERAL OIL, CHEMICALS
LIEGE, BELGIUM	13	COAL, AGRICULTURAL PRODUCTS, METAL ORES, BUILDING MATERIALS
COLOGNE, GERMANY	11	MINERAL OIL PRODUCTS, CHEMICALS, CONTAINERS
MANNHEIM, GERMANY	8	AGRICULTURAL PRODUCTS, BUILDING MATERIALS, MACHINES, CONTAINERS
STRASBOURG, FRANCE	8	AGRICULTURAL PRODUCTS, BUILDING MATERIALS, CONTAINERS
LUDWIGSHAFEN, GERMANY	7	CHEMICALS, MINERAL OIL PRODUCTS
DÜSSELDORF, GERMANY	7	AGRICULTURAL PRODUCTS, BUILDING MATERIALS, CONTAINERS
BASEL, SWITZERLAND	5	OIL PRODUCTS, CHEMICALS, ORES, AND METAL WASTES, BUILDING MATERIALS



Source: Observatory of European Inland Navigation

By 1815, the Rhine was so vital to Europe that one of the outcomes of the Congress of Vienna, when European leaders came together after the defeat of Napoleon, was to create the oldest intergovernmental organization—the Central Commission for the Navigation of the Rhine (CCNR).³ In 1868, CCNR negotiated the Mannheim Act, making shipping along the Rhine free.⁴ Arguably, this was the first step to the European Union’s customs union. Since then, the goods carried on the Rhine have changed (see Figure 1 on previous page) as the economy has evolved.

The river has also gone through drastic changes as engineers have tinkered with it over time. Notably, they have straightened the river to tame its flooding and narrowed it to use the force of water to make the river deeper, allowing heavier ships to pass through.

EUROPE’S INDUSTRIAL ARTERY

With a length of just 775 miles, the Rhine is one fifth the length of Africa’s famous Nile River.⁵ However, what the Rhine lacks in length, it makes up for in economic importance. Today, the Rhine River is Europe’s most important inland waterway, responsible for two-thirds of all freight transported through inland waterways.⁶ While only 4% of total European freight is transported through inland waterways, Germany and the Netherlands rely heavily on inland waterways for 9% and 42% of their overall freight transport, respectively.

In Germany, the Rhine is host to the largest chemical plant in the world, BASF Ludwigshafen. The riverbank also is host to manufacturers including automaker Daimler AG, engineering firm Robert Bosch GmbH, pharmaceutical giant Bayer AG, and steelmaker Thyssenkrupp AG.⁷ These companies don’t just use the Rhine for transportation of raw materials and goods but also as a source of water for their factory processes.⁸

«RHINE RIVER IS EUROPE’S MOST IMPORTANT INLAND WATERWAY, RESPONSIBLE FOR TWO-THIRDS OF ALL FREIGHT TRANSPORTED THROUGH INLAND WATERWAYS.»

To get a sense of how much the people on the river bank utilize the Rhine, at any given moment one-sixth of the river’s water is going in and out of pipes on its banks.⁹

According to the U.S. Energy Information Administration, the Rhine is also a “major petroleum product transport corridor,” connecting the refineries of Antwerp, Rotterdam, and Amsterdam to countries in the heart of Europe.

The Rhine's capacity is evident in both the number of inland ports it supports and the diversity of products and freight that travel its waves (see Figure 2 on previous page). If the Port of Rotterdam is the "Gateway to Europe," then the Rhine is the red carpet heading to the gateway.

WARNING - SHALLOW WATER: NO DIVING (OR SHIPPING)

By the end of 2018, the German economy slowed to a crawling pace of 0.6% year-over-year growth in real GDP from 2.8% in 2017. What else had ground to a halt? Shipping on the Rhine River.

The cause? The Rhine River dropped to its lowest levels since the 1920s. In the city of Kaub, a chokepoint in the river, the water level fell as low as 33 centimeters (see Figure 3).¹⁰ As water levels drop, shipping becomes more expensive.

«BARGE RATES IN COLOGNE INCREASED 432% FROM THEIR AVERAGE!»

Even a decline from 250 cm (from the floor to the ceiling of your room) to 75 cm (water below your waist) means a ship has to carry one-fourth of its usual load or risk hitting the riverbed and running aground. These restrictions make shipping more expensive.¹¹ Barge rates in Cologne, for example, increased 432% from their average! Wa-

ter levels also impacted companies that use water in their production processes. Production requires water for cooling then returns that water to the river at a higher temperature. Due to environmental protections regulating the temperature of the water in the river, low water levels mean companies have to limit the amount of cooling water they extract and return to the river.¹²

Europe quickly felt the results of low water levels. Forced to use alternative transportation options, BASF reported that it lost €250 million, while steelmaker Thyssenkrupp AG reported delaying shipments to customers as such Volkswagen.¹³

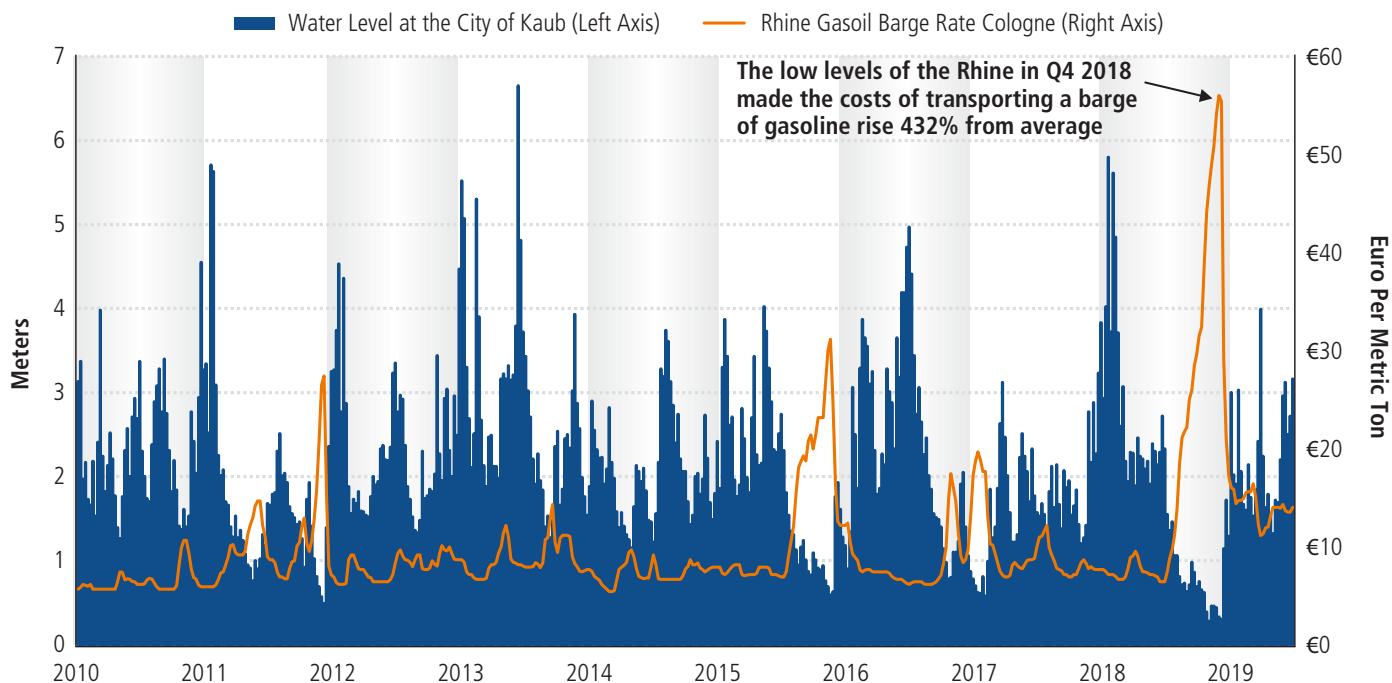
Industrial businesses were not the only victims of the Rhine water drop. Households may have experienced the brunt of the impact. Switzerland had to dip into its emergency diesel reserves as gas prices soared. Even heating oil prices increased in Switzerland and Germany, while natural gas prices in Europe surged 13% in November 2018.¹⁴

According estimates from The Kiel Institute for the World Economy, Rhine river levels shaved off 0.8% and 0.4% of German real GDP in Q3 2018 and Q4 2019, respectively.

ABANDON SHIP OR ALL ABOARD?

While the summer of 2018 might seem like a one-off, the Swiss government conducted a study of glaciers in the Alps that feed water to the Rhine and found that flow from the glaciers fell almost 35% between 1973 and 2010.

fig. 3 WATER LEVELS FALL, COSTS SKYROCKET:
RHINE RIVER LEVEL AND THE COST OF BARGE TRANSPORTATION



Sources: Bloomberg, PJK International

Meanwhile, German policymakers from cities and regions that are most impacted by Rhine water levels have pledged to combat issues by removing sediment on the riverbed and deepening the water level by dredging and other means. Such projects are estimated to take as long as a decade.


Companies like BASF have also made improvements to their transportation methods, buying more barges and ships that function better in low water conditions and making upgrades to their water technology, allowing them to use less water in their production process.¹⁵

**«SHIPPING SOMETHING
ON THE RHINE
FROM ROTTERDAM,
NETHERLANDS TO BASEL,
SWITZERLAND IS 40%
CHEAPER THAN USING
RAILWAYS.»**

The alternative to transportation on the Rhine is via roads and railway. Given the historic reliance on the Rhine, trucks, and railways can't handle the goods transported on the Rhine. Even if you do find a truck or railway to ship your goods, transportation through barges on the Rhine is more economical. According to the German Federal Institute of Hydrology, shipping something on the Rhine from Rotterdam, Netherlands to Basel, Switzerland is 40% cheaper than using railways.

For certain raw input materials, it's just not economically feasible to use other means of transportation. Simply put, according to the head of Thyssenkrupp Steel's Duisburg unit: "For [us], the Rhine is a question of survival."

In the end, even as the global trade slowdown and tariffs weigh on European economic activity, the headlines are often not the entire story.

As we go to print, Germany's industrial sector has weakened further from global trade headwinds. Meanwhile, summer temperatures increase the risk of river levels dropping drastically, again. Our advice: include the Rhine River water level as one of your global macroeconomic indicators to watch. 

SOURCE

1. Cioc, Mark (2002). *The Rhine: An Eco-Biography*. University of Washington Press.
2. "The Rhine River: Lifeline, transportation way and origin of legends". *BASF Ludwigshafen Website*
3. https://www.ccr-zkr.org/files/communication/flyerCCNR2012_en.pdf
4. *The Rhine River - BASF Ludwigshafen Website*
5. Cioc (2002)
6. Observatory of European Inland Navigation - CCNR
7. Wilkes, William, Vanessa Dezem and Brian Parkin (2019) "Europe's Most Important River Is Running Dry." *Bloomberg*.
8. "The Rhine". *BASF Ludwigshafen Website*
9. *Ibid.*
10. Sheppard, David, and Guy Chazan (2018) "Rhine drought leaves Europe's industry high and dry". *Financial Times*.
11. Fuzesi, Greg (2019). "Germany: quantifying the impact of low water levels in the Rhine". *J.P. Morgan Europe Economic Research*
12. "Well Chilled?" *BASF Ludwigshafen Website*
13. Wilkes et. al. (2019)
14. *Ibid.*
15. Pourriahi, Shahrzad (2019). "BASF preparing for low Rhine water levels". *Rubber and Plastics News*.