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Pain and Resilience:
The Transatlantic Economy in 2022

Russia's further invasion of Ukraine has thrust the world into a dangerous and volatile era. Russian President Vladimir Putin is determined to use military force in a clear violation of Ukraine's sovereignty and international law. Not just human, political and military connections, but also commercial ties, are in the crosshairs. It is useful to recall that the pretext for Russia's 2014 illegal annexation of Ukraine's Crimean Peninsula and its military intervention in eastern Ukraine was a pending trade agreement between Ukraine and the European Union (EU), not NATO's open door.

Whatever the ultimate outcome of Putin's war, the immediate consequences for Ukrainians are horrific, in terms of lives lost, cities destroyed, and families uprooted. The implications for Russia, and for Europe more broadly, are profound, although still uncertain. What is certain: Putin has succeeded in uniting the transatlantic community in ways unknown since Europeans and Americans closed ranks in the wake of the September 11, 2001 terrorist attacks on the United States.

The Atlantic Alliance is doing what it can to support Ukraine without stumbling into direct military confrontation with Russia. The response has been tough and decisive. North America, the United Kingdom, and EU members, joined by a raft of additional countries such as Japan and even neutral Switzerland, unleashed a barrage of sanctions against Russia. Similar sanctions have been imposed on Belarus.

The most prominent sanctions are those on Russia's central bank that prevent it from using its roughly $630 billion stockpile of foreign reserves, largely denominated in euros and dollars, to defend the value of the ruble, shore up its economy, or shield it from the costs associated with its attacks on Ukraine.[1]

Western countries and their partners are also working to deny Russia's most-favorite-nation trade status, which will lead to higher tariffs on Russian goods. They are stopping Russia from borrowing at multilateral financial institutions. They are preventing some Russian financial institutions from using the SWIFT global financial messaging system, making it difficult for those institutions to complete cross-border transactions.[2] These measures build on additional sanctions that target Russian officials, oligarchs, banks, high-tech companies and aircraft makers. They accompany actions to cut Russia off from semiconductor supplies, ban sales of aircraft and jet parts to Russia, block the sale of equipment needed to upgrade oil refineries, and suspend visa-free travel for Russian diplomatic passport holders.

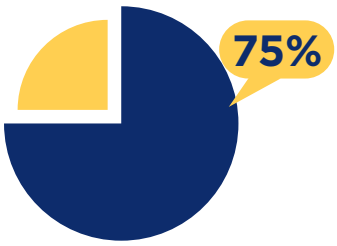
U.S. authorities have banned U.S. individuals from engaging in any transactions with Russia's central bank, its national wealth fund, and its finance ministry, and have made it clear that any bank operating in the United States that transacts with any Russian bank is in big trouble.[3] They expanded the Foreign Direct Product Rule (FDP rule), previously used to nearly bankrupt the Chinese telecom firm Huawei, to halt the export to Russia of any product derivative of U.S. technology or software regardless of its country of manufacture.[4] European countries have taken similar actions. Germany's about-face has been particularly striking. Berlin stopped the approval process for its controversial Nord Stream 2 natural gas pipeline with Russia, pledged to ramp up defense spending, dropped its resistance to arming Kyiv, endorsed damaging financial sanctions on Moscow, and embarked on a costly drive to reduce its energy dependence on Russia.

The impact has been severe. Within a week of Putin's February 24 invasion, Nord Stream 2 AG, the company behind the Russia-to-Germany pipeline, filed for bankruptcy. Moscow's stock market suffered one of the biggest collapses in financial history. The Russian government's credit rating was downgraded to "junk" status. Russian bonds tumbled, and Russian citizens were barred from transferring money to overseas accounts. The ruble plunged to record lows while interest rates doubled to 20%. Sberbank, Russia's biggest lender, pulled out of the European market. Goldman Sachs cut its forecast for Russia's economy in 2022 from 2% growth to a 7% decline.[5] Foreign companies are abandoning the Russian market. Investors are braced for the possibility that Russia could default on its debt for the first time since 1998.[6] Additional sanctions and further decoupling measures are likely.

The New Energy Landscape

In their initial response to Putin's aggression, Western leaders sought to limit the economic blowback on their own economies. Notably, the initial wave of sanctions did not target Russia's sales of oil and gas, which accounted for half of the country's export earnings in 2021. Energy sanctions would not only penalize the U.S. and European energy economies, they would drive prices up to Putin's benefit. Even without energy sanctions, the biggest early impact of the war on the U.S. economy was rising gasoline prices, which are a dollar higher than a year ago.[7] The impact has been far more severe in Europe, which even before Putin's 2022 invasion was experiencing its worst energy crisis since the Arab oil embargos of the 1970s. European energy prices had soared 26% in December 2021 over the previous year, accounting for half of the broader rise in consumer prices. Given that Russia supplies around 40% of Europe's gas and 25% of its oil, energy sanctions would exacerbate the

Share of total U.S. LNG exports going to Europe (January 2022)



crisis. The European Central Bank estimates that a 10% shortage in gas could knock 0.7% off eurozone gross domestic product.[8]

Rerouting of liquefied natural gas (LNG) tankers to Europe, mainly from the United States, had already eased shortages, even though prices remain historically high. Europe accounted for about 75% of all U.S. LNG exports in January 2022, and 61% in December 2021, far outpacing exports to Asia.[9] U.S. tankers on their way to Asia literally turned around to head for Europe. In January, for the first time ever, U.S. exports of liquefied natural gas to Europe exceeded Russia's pipeline deliveries.[10]

These efforts, while helpful, could not compensate for the volatile developments that unfolded in late February 2022. Within a week of the February 24 invasion, European natural gas prices surged to an all-time high of almost €200 a megawatt hour and crude oil topped $118 a barrel for the first time since 2014. To alleviate the pressure, the United States and allies released 60 million barrels from their reserves. Despite pain at the pump, Western determination to mitigate reliance on Putin is becoming manifest. Western energy majors BP, Equinor, ExxonMobil and Shell are divesting their stakes in Russia. Canada and the United States have banned Russian oil imports, and other countries are likely to follow. Big energy refineries, banks and shipowners are boycotting Russian energy purchases.[11]

While the United States will not fully replace Russia or other suppliers as long-term sources of natural gas for energy-starved Europe, Putin's war is recasting the European and global energy landscape. Transatlantic energy connections are growing in importance, as the United States becomes the world's largest LNG supplier, and as U.S. and European companies lead the transition to competitive clean technologies. We discuss these developments in Chapter 5.

The Commodity Pinch

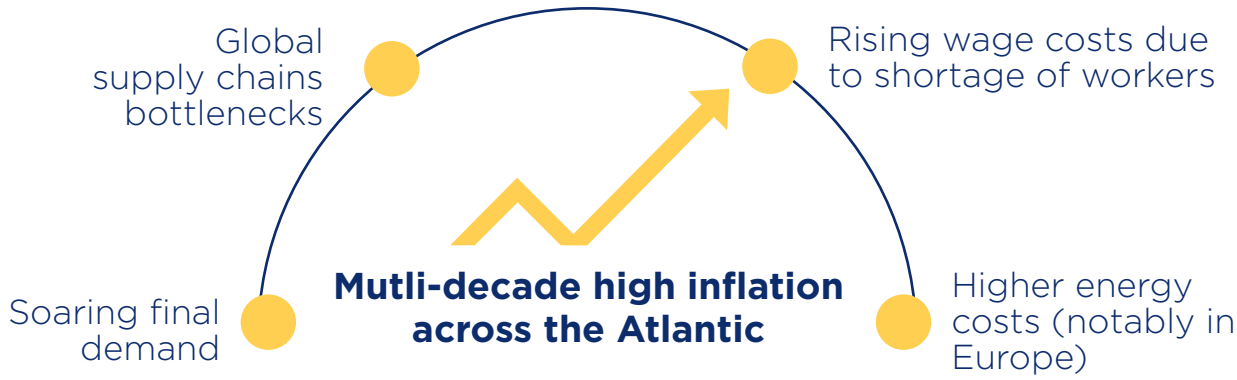
Russia's war and Western sanctions are also squeezing supplies and raising prices for other commodities. Russia and Ukraine account for up to half of global exports of neon, which is vital to semiconductor production in advanced economies. Ukraine produces more than 90% of the semiconductor-grade neon used in the United States. Russia and Ukraine account for 80% of global exports of sunflower oil, 29% of wheat, and 19% of corn. Higher prices and disrupted flows of these commodities will be felt acutely in countries such as Bangladesh, Sudan, Pakistan, Egypt, Lebanon, and Turkey, all of which import most of these commodities from the two combatant countries.[12]

Russia and Belarus are also major exporters of fertilizer, with Russia leading the world; prices, which were at historically high levels before the war, have spiked. Fertilizer scarcity further jeopardizes global crop production. The United States and its European partners will have to increase financial support for affected countries to help them cope.

Prices are also surging for industrial metals for which Russia is also a key source. These include aluminum, which is used in everything from cans to cars; palladium, which is used in mobile phones and automotive exhaust systems; titanium, needed by aircraft and jet engine manufacturers; and platinum, copper and nickel, which are used in the batteries that power electric vehicles.[13]

Under Pressure

Beyond these specific pain points, Putin's war has exacerbated two pre-existing challenges for the transatlantic partnership in 2022. The first is a spike in inflationary pressures. In the nearly two decades we have been publishing this survey, increasing prices and rising inflationary expectations have rarely warranted even a passing reference, given a rather constant low-inflation environment. Yet owing to global supply chain bottlenecks, soaring final demand, rising wage costs due to a dearth of workers, and higher energy costs, notably in Europe, headline consumer price inflation (CPI) in both the United States and Europe is presently running at multi-decade highs. In the United States, the CPI index was 7% higher in December 2021 from a year earlier, a 40-year high. The headline inflation rate for the eurozone was 5.8% in February 2022, the highest since the euro was created. Inflation is higher still in such countries as Germany, Belgium, Spain, Poland, and Lithuania. Oil at $120 to $140 a barrel could raise inflation in advanced economies



by a further 2%, pushing rates in many countries close to 10%.[14] Policy makers on both sides of the Atlantic confront a policy nemesis that has been absent for decades.

That said, the economic and political effects of rising prices on the transatlantic economy bear close watching. To dampen inflationary expectations in the United States, the Federal Reserve is expected to raise the Federal Funds rate by at least three times this year, if not more. The tighter monetary conditions become, the greater the risks of a U.S. economic slowdown and attendant constraining effects on transatlantic economic activity. Ditto for the European Central Bank: the removal of monetary stimulus this year portends weaker economic activity in 2023. In addition, both the United States and Europe are expected to pull back on fiscal spending this year, producing another headwind to future growth.

Then there are the political costs of inflation, with rising prices in the United States threatening not only to eat into the real incomes of U.S. workers but also to upend Democrats' slim governing majority in the fall midterm congressional elections. The politics of inflation could entail economic and political risks in both the United States and Europe, with voter angst acting to stall or forgo transatlantic cooperation on trade, technology, energy, sustainability and investment. The higher U.S. and European inflation rates, the greater the urge to respond with policies that are inward-looking and politically-motivated. Inflation has historically made for bad economic policies.

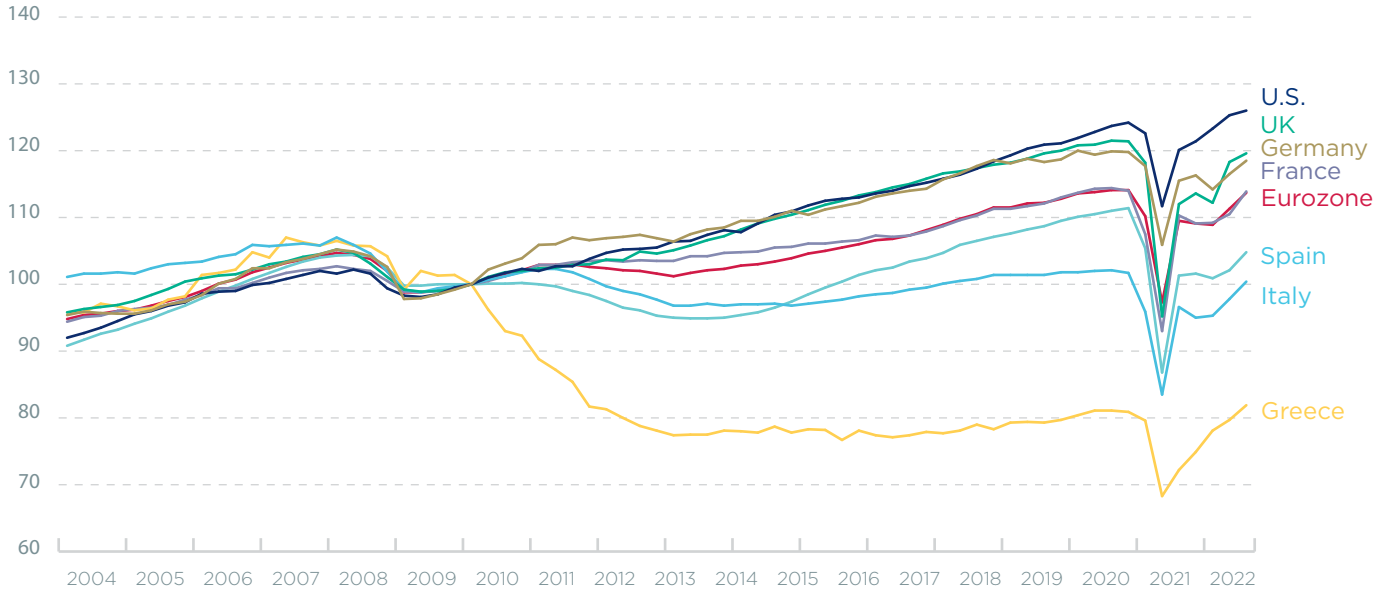
A second challenge lies with the world's congested global supply chains – the blood stream of the global economy. When the pandemic struck in 2020, many countries and companies were stunned to realize how dependent they had become on other external suppliers for critical pharmaceuticals and health care products. And as economies sputtered to restart after widespread lockdowns, soaring demand, port disruptions, material shortages, and Covid-related factory closures wreaked havoc on the world's ability to deliver goods and services through extended supply chains. The upshot: heightened anxieties about excessive dependencies, an unprecedented global supply shock, and a surge in inflationary pressures as the cost of goods soars around the world. The additional shock to energy and commodity flows generated by Putin's war has compounded these problems. It has further underscored the importance of supply chains and forced U.S. and European companies to reconsider yet again how they organize existing and future networks on a global scale. We address these issues in Chapter 3.

Resiliency and Strength

Despite these challenges, what Putin's war has uncovered is the impressive strength and resiliency of the transatlantic economy. The North American and European economies will be far better able to withstand the pain of sanctions than will the Russian economy. Apart from Europe's significant dependence on Russian energy, Western economies overall have limited exposure to the Russian economy and are relatively insulated from the impact of Russia's growing economic isolation. Western banks had already reduced their exposure to Russian financial institutions by 80% following Putin's 2014 intervention in Ukraine, and their claims on the rest of Russia's private sector have halved since then.[15] JPMorgan estimates that the total exposure of foreign banks to Russian banks, companies and the state only amounted to about $89 billion.[16] U.S.-Russia trade is negligible; Russia accounts for roughly 0.55% of total U.S. trade in goods and services. And while the European Union is Russia's largest trading partner, accounting for 37% of Russia's global trade in 2020, Russia represents only around 5% of the EU's trade with the world.[17] Russia is a relatively minor player in the global economy, accounting for just 1.7% of the world's total output – a figure that has surely already shrunk since Putin initiated his latest invasion.[18]

Moreover, the two sides of the North Atlantic enter 2022 in a strong position. In a remarkable demonstration of resiliency and dynamism, the key drivers of the transatlantic economy – investment,

Table 1 **Covid-19 Economic Downturn in the U.S. and European Countries** (Real GDP level, Q1 2010 = 100)



Source: Haver Analytics.
Data through Q3 2021.

income and trade – staged a robust rebound in 2021. Indeed, 2021 was record breaking on many fronts. Transatlantic trade in goods reached an all-time high of $1.1 trillion in 2021. According to estimates for 2021, U.S. foreign direct investment (FDI) flows to Europe surged to an all-time high of $253 billion; U.S. foreign affiliate income earned in Europe reached an estimated $300 billion, a record high; European affiliates in the United States earned a record-breaking $162 billion; and European FDI flows into the United States surged to the highest levels since 2017, hitting $235 billion.

These figures are emblematic of a world economy that recovered much faster from the Covid-19 pandemic than most expected. Owing to rising global vaccination rates, notably in the developed markets of the United States and Europe, and to uber-monetary and fiscal support, the global economy staged an impressive rebound from the dark days of March 2020, when Covid-19 brought things to a standstill. Global output in 2020 contracted by a stunning 3.1%, one of the severest downturns on record. U.S. output dropped by 3.4%, while economic output in the eurozone plunged 6.4%.

Last year, however, as the world emerged from the pandemic-related lockdowns of 2020, global growth surged, fueled by soaring consumption and investment, and backstopped by generous levels

2021: a record-breaking year

Transatlantic trade in goods

$1.1 trillion

FDI flows (2021 estimates)

$253 billion
U.S. to Europe

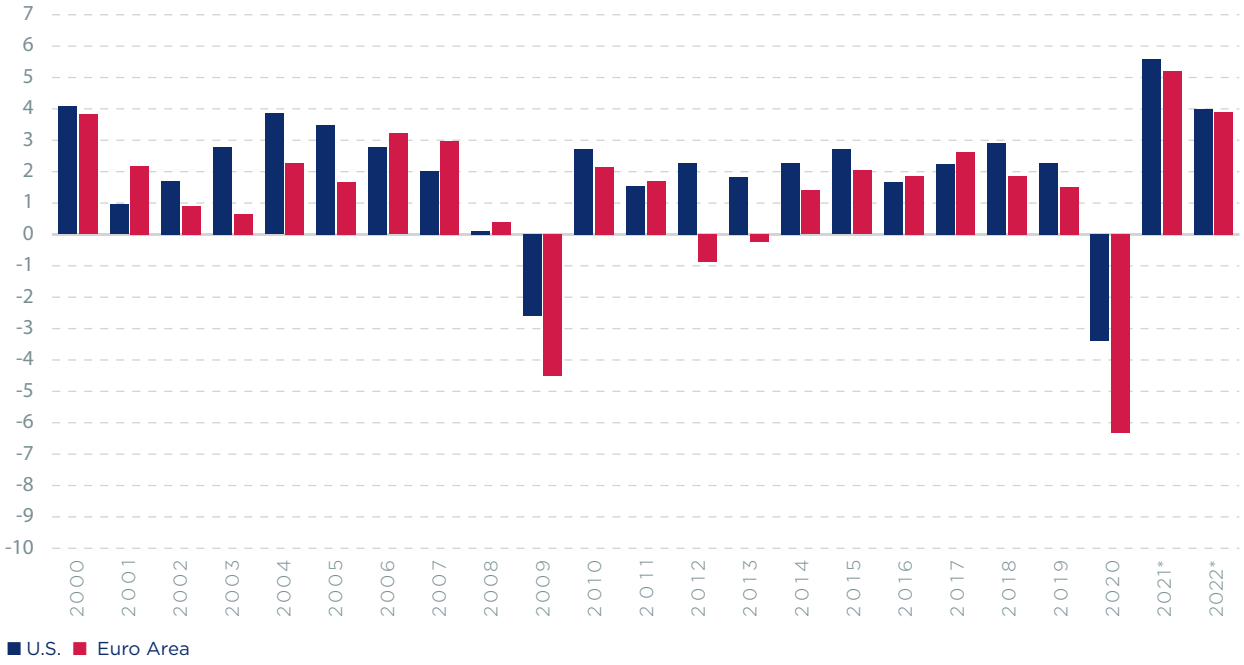
$235 billion
Europe to U.S.

Growth

5.7%
U.S.

5.2%
Euro Area

Table 2 **U.S. vs. Euro Area** Real GDP, Annual Percent Change



**2021 estimate, 2022 forecast.*
Data as of January 2022.
Source: International Monetary Fund.

of public sector spending. Global output in 2021 rose 5.9% according to IMF estimates, one of the strongest economic rebounds in decades. The UK's economy expanded by 7.5%, the best in the G7 group of big, industrial nations, followed closely by France at 7%. The U.S. economy grew by 5.7%, with real GDP reaching pre-pandemic levels in the second quarter of 2021. The euro area posted growth of 5.2% in 2021, and many European economies are on their way to reaching pre-pandemic levels of output. While Germany's export-led economy struggled with global supply chain backlogs and slowing growth in China, it looks to recover in 2022.[19]

Both the United States and Europe are poised for solid economic growth in 2022, with the disruptive effects of the pandemic likely to fade, the impact of Russia's isolation largely manageable, and as the spillover effects of easy monetary and fiscal policies help to grease economic activity. The combined U.S. fiscal and monetary response – over $12 trillion in 2020-2021 – was more than half of U.S. GDP, representing one of largest government spending surges in U.S. history. European policy makers also stepped up in a big way, with eurozone and UK governments introducing roughly $8 trillion in fiscal and monetary stimulus since the beginning of the pandemic.

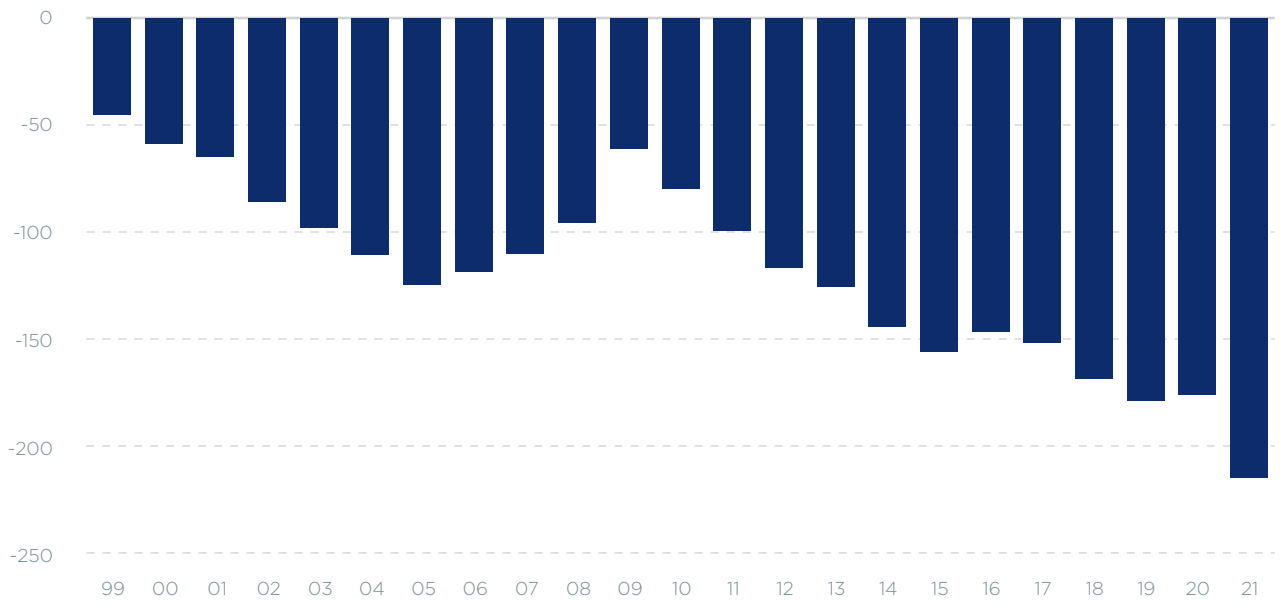
As policy tailwinds fade in 2022, the baton of growth is being passed to consumers and companies. The outlook for U.S. consumer spending is one of the strongest in years, with full employment, rising wages, and rising home and stock values helping to drive increased spending levels, notably among high-income households. The downside: real wages in the United States and Europe are falling due to the effects of accelerating inflation, hurting low-income families the most. This dampening effect is expected to be offset by rising pent-up spending among various cohorts on both sides of the Atlantic.

Transatlantic personal consumption accounted for roughly half of global consumption in 2020, versus India and China's combined share of 15%. This fact underscores the attractiveness of the transatlantic economy and reinforces a point we have long made: notwithstanding rising consumer expenditures in China, the United States and Europe still control the commanding heights of global consumption. Consumption is dependent on per-capita income, and based on this metric, the average transatlantic consumer is far wealthier than their counterparts in Asia's twin giants.

In terms of corporate spending, U.S. firms were sitting atop some $7 trillion in free cash flow at the end of 2021, thanks to record corporate profits and the low cost of credit. Firms on both sides of the pond are flush with cash, which portends more transatlantic mergers and acquisitions (M&A), more hiring, even faster wage growth, and more bilateral investment in 2022.

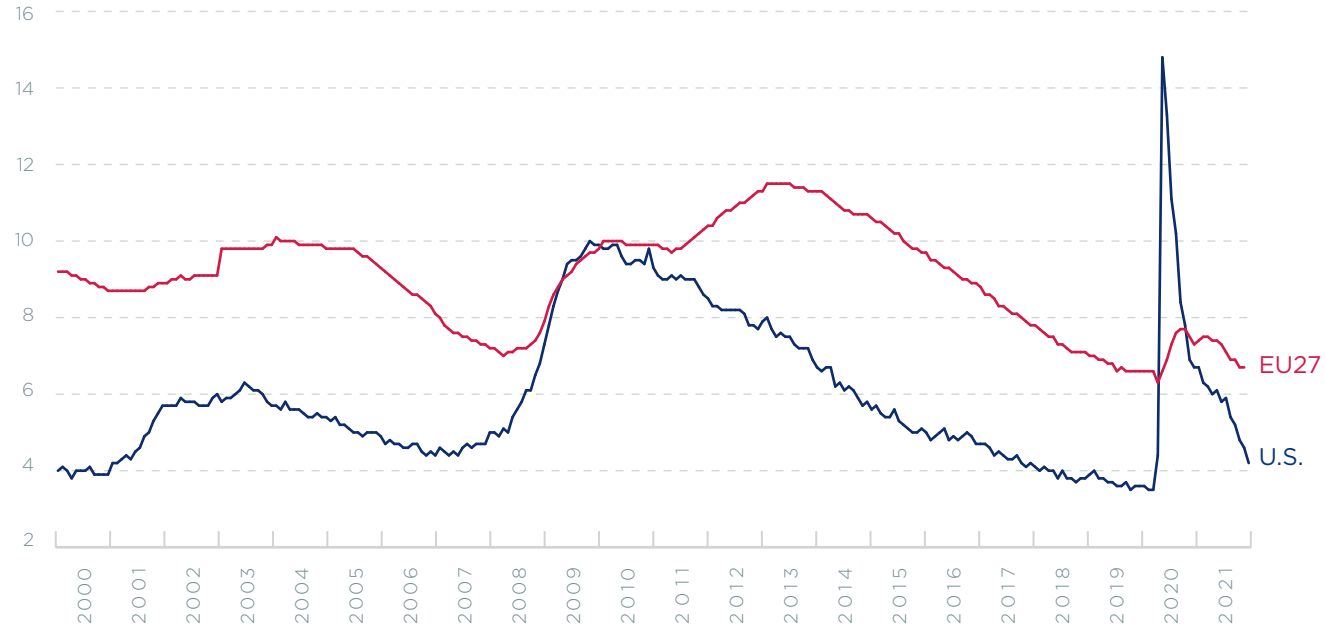
Transatlantic goods trade soared in 2021, with both U.S. goods exports to Europe ($386 billion) and U.S. goods imports from Europe ($670 billion) hitting

Table 3 U.S. Merchandise Trade Balance with the EU (including the UK) ($Billions)



Source: United States Census Bureau.
Data as of February 2022.

Table 4 U.S. vs. EU Unemployment Rate Harmonized Unemployment Rate, % of Labor Force (Monthly)



Source: OECD.
U.S. data through November 2021. EU data through October 2021. EU excludes the UK.

The U.S. and the EU reinvigorated their partnership in 2021

Vaccine roll-out

Global corporate tax agreement

Climate action

Trade dispute resolutions (aircraft subsidies and steel and aluminum)

Trade and Technology Council

record highs. This discrepancy also led to an all-time merchandise trade deficit of $284 billion. That said, there is more to transatlantic trade than goods. Commercial transactions are far more balanced if one includes services trade, digitally-enabled commerce, and investment flows, as we highlight in Chapters 2 and 4.

Both sides of the Atlantic also took important steps to reinvigorate their partnership in 2021, the fruits of which are reflected in economic recovery and a united front against Putin. They agreed to provide vaccines to two-thirds of the world's population. They agreed to rewrite global tax rules on corporate income that could overturn a century of established tax practice. They agreed to again join forces to tackle climate change, including through the Global Methane Pledge. They agreed to suspend for five years mutual tariffs related to the ongoing Boeing-Airbus dispute, as they seek an ultimate resolution to the matter. They also agreed to lift U.S. tariffs on European steel and aluminum and countervailing European tariffs on U.S. goods. And they created a U.S.-EU Trade and Technology Council (TTC) to grow the bilateral trade, investment, and technology relationship; avoid new unnecessary technical barriers to trade; facilitate regulatory cooperation; and cooperate on international standards development. The TTC comprises 10 working groups on issues ranging from supply chain resilience and data governance to technology standards and clean technology development. The parties have already signaled close alignment on investment screening and export controls. In this year's survey, we explore four additional areas where the TTC could make a difference: ICT competitiveness; semiconductors; artificial intelligence; and clean tech and critical materials. Each of these topics is addressed in a separate box later in this chapter.

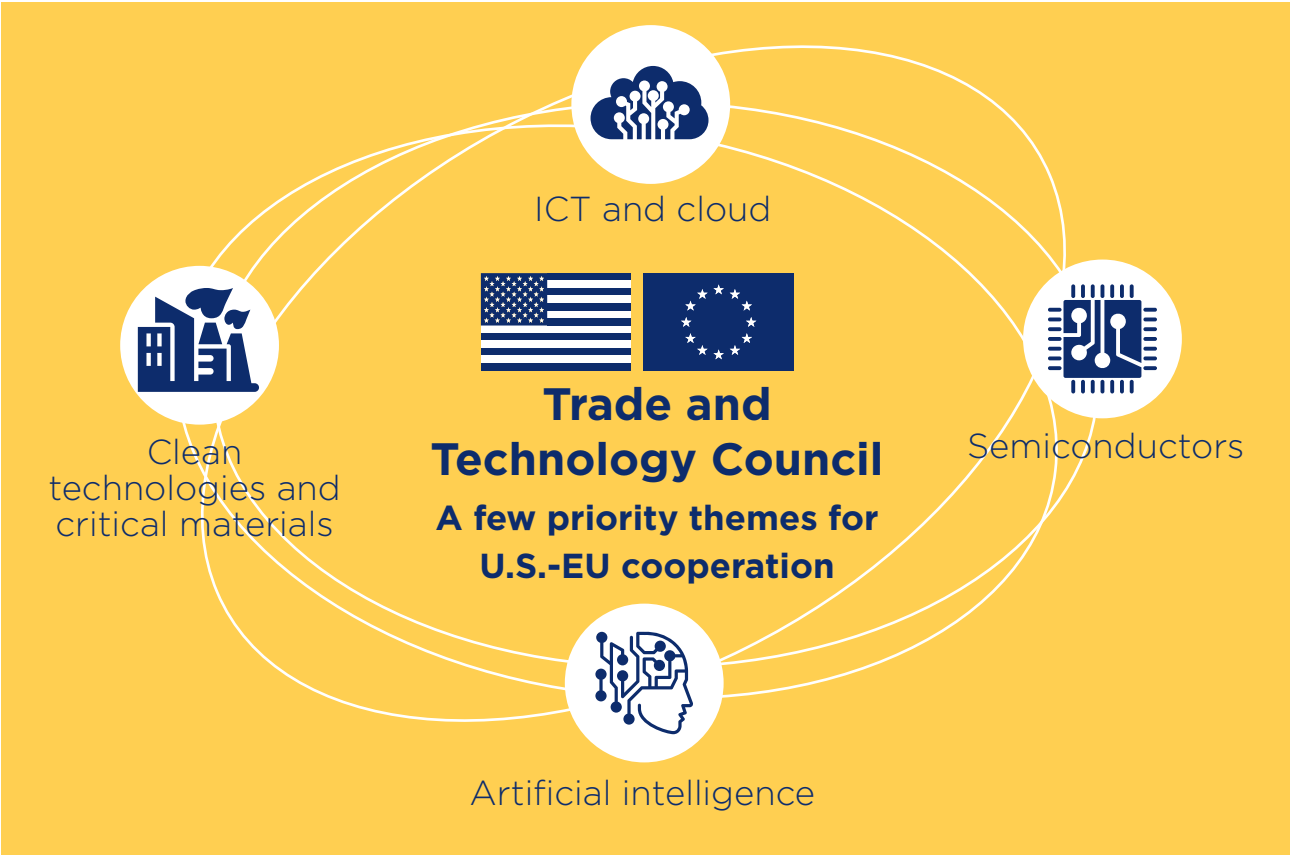
This newfound sense of transatlantic unity is an opportunity for the United States and the EU to address lingering irritants in their own relationship. U.S. concerns center on the motivations behind the collapse of the U.S.-EU Privacy Shield governing transfers of personal data, the protectionist impulses behind the Digital Markets Act, industrial strategies intended to promote "European champion" companies, and the EU proposal for a carbon border adjustment mechanism, which could disadvantage non-EU companies. The EU worries about the Biden Administration's efforts to strengthen "Buy America" rules, its proposals for electric vehicle tax credits, and its decision to postpone but not resolve transatlantic disputes on U.S. steel and aluminum tariffs. Each party's efforts to subsidize its semiconductor sector and other digital industries could lead to subsidy wars that would only benefit China.

Negotiations on a successor agreement to Privacy Shield are particularly fraught. Transatlantic data flows – the lifeblood of the transatlantic economy – remain in legal limbo after the European Court of Justice in summer 2020 invalidated for a second time U.S.-EU arrangements governing the transfer of personal data for commercial purposes. Negotiators are seeking yet another successor agreement, which U.S. Commerce Secretary Gina Raimondo has called "the number one priority."[20] However, since the Court's judgment is rooted in differences in law rather than in policy, even a Privacy Shield 2.0 is likely to face legal challenges from within the EU.

There are also signs that the global tax deal agreed by 139 countries in October 2021 may be in for a rough ride. The deal's Pillar One would enable countries to tax between 20% and 30% of the profits of the world's largest and most profitable companies above a 10% earnings margin, based on where a company

makes its sales, rather than where it is incorporated. For Pillar 1 to come to life, international tax treaties need to be amended. In the United States, this means that two-thirds of a deeply divided U.S. Senate will need to agree to any changes – and Republicans have already poured cold water on the arrangement. The deal's Pillar 2 deal would apply a minimum 15% corporate tax rate to a much larger set of companies by the governments where those companies are headquartered, if a company has not paid 15% overall across its global operations. The goal is to remove incentives by those companies to shift profits between jurisdictions to avoid taxes. While all EU member states originally signed on, Hungary, Estonia and Poland have threatened to veto an EU directive to implement the deal until the United States implements Pillar One. The upshot is that the deal is unlikely to be fully implemented anytime soon.

These policy differences, while quite real, are now playing out in a context of transatlantic unity rather than division. Despite Putin's disruptive war, the macroeconomic and policy backdrops for the transatlantic economy are generally quite positive for 2022. Real growth is decelerating but at above-average historical levels. The drivers of growth are shifting from the public sector to the private sector, while employment levels remain strong. Pre-pandemic output levels will be achieved in many economies. Bilateral trade and investment flows are solid. There are bumps on the road to recovery, yet transatlantic partnership rebounded in 2021, is proving itself to be resilient in the face of new challenges, and all indications are that it will forge ahead again in 2022.



TTC Priority Theme A: ICT and Cloud

U.S. and European goals in the ICT/cloud sectors align in many ways. However, instead of building on dense transatlantic digital interconnections and the shared principles that underpin them, in recent years the two parties have allowed a series of digital disconnects to roil U.S.-EU relations.

If one analyzes the full technology stack, important opportunities emerge. An overall bargain could conceivably be achieved by joint efforts to enhance Open RAN for 5G, advance common or compatible privacy standards, and guarding against external and internal security threats and market abuses, coupled with U.S. willingness to grant European firms greater access to its domestic 5G market and European willingness to cooperate more closely on potential regulations for platforms and artificial intelligence (AI).

Whereas the EU is relatively underdeveloped compared to the United States in higher technology layers such as AI and platforms, the United States is relatively underdeveloped compared to the EU in key parts of lower technology layers such as 5G. Moreover, after the initial transatlantic turmoil generated by U.S. efforts to oust Chinese 5G telecoms from critical networks, not only at home but in Europe and elsewhere, many – but not all – European allies have also acted to marginalize those companies' presence in their networks. If anything, the two sides have only grown closer in their analyses of the economic challenges from non-market economies in the intervening years.

The two parties have opportunity to use the U.S.-EU Trade and Technology Council (TTC) to harness their respective strengths to enhance their technological leadership. It would be useful for both parties to reaffirm their joint commitment to core principles, such as transparency in legislation and regulation; the independence of regulatory authorities; open networks for consumers to access and distribute information, applications and services of their choice; the importance of a strong and competitive shared environment for ICT development and use; strong yet flexible intellectual property (IP) laws; interoperable data protection regimes that enable innovation while also protecting privacy; agreement that governments should allow foreign participation in their ICT services; affirmative policies in support of digital trade and data flows; science and technology cooperation related to digital innovation and research; and robust international cooperation to manage policy differences. In addition, the two parties should foster industry Codes of Conduct for data protection in the cloud, building on efforts currently under way on each side of the Atlantic. If the two sides of the Atlantic prove able to harness their joint potential based on these principles, they could form the core of a wider technology alliance of like-minded democracies that could prove much more vibrant and attractive than autocratic alternatives.[21]

TTC Priority Theme B: Semiconductors

The leading supply chains of common interest to the United States and the EU revolve around semiconductors, which the two parties have called "the material basis for integrated circuits that are essential to modern-day life and underpin our economies." In this area, the two parties have acknowledged that they have "some important respective strengths as well as ongoing, significant mutual dependencies, and common external dependencies." Each has announced initiatives to mitigate those dependencies, improve security of supply, and boost their ability to design and manufacture the "most powerful and resource efficient semiconductors."[22]

To understand how the two parties could accomplish these goals, it is important to look at the key elements of highly-fragmented, highly-specialized, and global semiconductor production networks. The key stages are design, fabrication, assembly, testing and packaging (ATP), and production of semiconductor manufacturing equipment (SME). While specific companies and countries may be leaders in one or more elements of the overall process, none has a lock on all.[23]

U.S. enterprises are global leaders in SME production and in semiconductor design and associated design tools. European firms also show strength in design and SME production, and in some materials key to the semiconductor manufacturing process. The EU has a strong position in certain sub-segments such as discrete semiconductors (global sales leader), analogue integrated circuits, micro-controllers, power electronics, sensors, chip architecture and advanced chip-making equipment. The EU is also well positioned in the 'More than Moore' market (products made up of a mix of semiconductors), as well as in dedicated processors for applications in the automotive and industrial sectors (including machinery), which are all expected to grow significantly in the future.[24] Despite these respective strengths, each party relies heavily on third countries for highest-end chip manufacture, critical materials, and assembly packaging and testing.

Whereas EU leaders have used the concept of "strategic autonomy" to animate their efforts to alleviate semiconductor supply chain dependencies, U.S. commentators speak of "decoupling" from non-market economies. The decoupling metaphor is easy to understand, because it evokes a simple image of disconnecting a cable, in this case a worrying link to China. If drawn to their ultimate conclusions, however, both terms would wreak havoc on the U.S., European, and global economies. Despite each side's push for self-reliance, achieving fully independent chip supplies is unrealistic, given the highly complicated, specialized and global nature of semiconductor supply chains. Moreover, neither term is an accurate depiction of actual U.S. or EU policies. Neither party is really trying to break free of its interdependencies; each is more intent on redefining the terms of those interdependencies in ways that can enhance its relative security and prosperity. Given each party's relative balance of strengths and weaknesses, the best course for the two parties to enhance security of semiconductor supply is not to "decouple" or become fully "autonomous" from all other semiconductor producers; it is to ensure that other semiconductor producers remain dependent on them, by doubling down on areas of strength.[25]

For the United States, this can mean some efforts to mitigate strategic vulnerabilities such as reliance on foreign semiconductor fabrication, and assembly packaging and testing. It means working with the EU and other like-minded countries to ensure reliability of supplies of critical materials. Most of all, it means reinforcing U.S. strengths in semiconductor design and SME production. For the EU, it means acknowledging that becoming completely autonomous in high-end semiconductor fabrication is just "not doable," as EU competition chief Margrethe Vestager has acknowledged[26] -- not only because the EU has neither the incentives or the resources to overtake the world's leading high-end fabricators, but because the EU itself has relatively low demand. As a whole, the EU accounts only for 9% of global semiconductor imports, compared to Asia, which accounts for 83% of exports and 81% of imports. Instead, the EU should focus its resources on areas of strength

by fostering semiconductor subsectors upon which other countries, including the semiconductor superpowers, are reliant. Those strengths include R&D projects in chip and software design, SME, and materials innovation for important chip manufacturing inputs, such as chemicals, sensors, power electronics, embedded security solutions and security chips. Furthermore, potential exists for transatlantic complementarities and synergies—especially when it comes to investing in cutting-edge technologies that do not yet have market viability. Coordination in the implementation of both the U.S. and EU CHIPS Acts will be essential.

While the TTC's potential regarding semiconductors is currently limited by France's insistence that the focus remain on "short-term supply chain issues" rather than longer-term strategies, it offers a chance for the two parties to harness their respective strengths and mitigate their respective dependencies within semiconductor supply chains. The two parties have already agreed to jointly identify gaps and vulnerabilities, map capacity in the semiconductor value chain, and strengthen domestic semiconductor ecosystems. They could conduct a joint assessment of supply chain vulnerabilities, improve transparency throughout the semiconductor supply chains, build synergies between the U.S. National Science Foundation and the Horizon Europe framework programs, and work to design new microchips that could perform better – and require less energy – than silicon. U.S.-EU cooperation could form the core of a broader semiconductor consortium of like-minded nations, including Japan, Taiwan and South Korea, that could also consider forging a common innovation base with R&D of next-generation semiconductor designs and materials.[27]

TTC Priority Theme C: Artificial Intelligence

McKinsey estimates that widespread adoption of artificial intelligence (AI) could grow European economic activity by almost 20% by 2030. However, even though the EU has more specialized AI researchers than the United States or China, it lags both in AI investments, adoption, and R&D spending. The EU's fragmented market hampers the scale-up of small- and-medium sized AI and blockchain enterprises, and constrains the access of such firms to creation of large, cross-country pools of data for building and testing their algorithms, limiting their ability to compete globally.[28]

When it comes to AI, the European Commission has prioritized risk management and trust. It has introduced draft legislation for a new regulatory framework through the Artificial Intelligence Act (AIA), which is the first effort to create a comprehensive AI law, and another example of EU efforts to lead the world in making rules to govern the digital economy, which tracks with parallel efforts to regulate online content, competition in digital markets, privacy, and other areas. While a final law is only likely to emerge after several years, the current draft would apply to any company selling an AI product or service in the EU, so would be extraterritorial in nature, and thus could become another digital flashpoint between Washington and Brussels.[29]

Despite potential transatlantic challenges, U.S. policymakers share the EU's interest in mitigating risks associated with AI. In addition, even though the United States is the world's AI leader, with the largest share of private investment, the most start-ups, and strengths in AI talent, R&D, data, hardware and commercialization of innovation, U.S. public and private leaders are concerned about the country's ability to maintain this position, particularly in light of rising Chinese competition. Here, too, there is potential—and arguably the imperative—for greater transatlantic cooperation.[30]

U.S. and EU policymakers are aligned around two core themes for AI policy: (1) enabling innovation and competition, and (2) ensuring trust and accountability. But there are important differences in these policy approaches. Washington tends to focus on the importance of incentivizing innovation and growth, greater R&D funding, and light-touch regulation, whereas Brussels tends to focus on risk management and trust. The TTC could play a role by exploring to what extent these approaches can be aligned behind a joint U.S.-EU effort to enable safe and responsible AI innovation and adoption globally. Whether the two parties can avoid costly divergence in the regulation of AI in the future will become apparent quickly as discussions move to legal definitions and metrics for risk management requirements. The task is to seek common or complementary positions that balance AI risks against the risks inherent in slowing technological innovation. As Nigel Corey of ITIF warns, the United States and the EU should seek common principles, norms and regulations, "but they should not expect to achieve complete convergence."[31] Indeed, the goals of the TTC overall are all about encouraging the coherence and interoperability of U.S. and EU regulatory approaches—without necessarily insisting on the same approaches.

TTC Priority Theme D: Clean Technologies and Critical Materials

Existing and emerging technologies are transforming the way energy is produced, transported, and consumed. They will be indispensable to decarbonization. Competitive considerations come into play, as each side of the Atlantic is focused on promoting its own clean-tech commercial breakthroughs. Nonetheless, the immense scale of the climate challenge gives the two parties both need and opportunity to harness their respective strengths. European research and early-stage development of low-carbon technologies continues to be world-beating. Yet the EU is relatively weak when it comes to scaling and commercializing its innovations. The United States, in contrast, accounts for more than 65% of global cleantech growth equity funding and venture capital investments, yet trails in areas of low-carbon research where Europe is strong. Given the deeply integrated nature of the transatlantic innovation economy, both parties stand to gain by harnessing their relative synergies to promote scaled-up demonstration projects that hold promise for commercialization.[32]

Such efforts are not just "nice to do," they take on added urgency when considering that autocratic governments such as China do not necessarily need to rely on purely market-based approaches to deploy the technologies of the future. Beijing directs massive resources to promote its own competitors in many clean-tech areas, based on differing norms than those likely to be found in democracies. A cautionary tale is offered by the solar industry, where pioneering U.S. and European companies once led global markets. Today, thanks to substantial government subsidies, forced technology transfer, and predatory pricing, China produces three-quarters of global supplies.

Russia's war on Ukraine further highlights the urgent imperative of promoting new energy sources, increasing Europe's energy security, and the need to wean itself off of overdependence on oil and gas from unreliable actors.

Leaders at the June 2021 U.S.-EU Summit pledged to "work towards" a Transatlantic Green Technology Alliance. Both parties must use the TTC to make it real. A Green Technology Alliance could help both parties align on technical standards, address regulatory discrepancies, and mobilize public and private investment to rapidly scale up breakthrough technologies in hard-to-abate sectors so they can become

more affordable, accessible and attractive than their traditional, higher-carbon counterparts.[33] This will require greater public investment in demonstration projects, which is a major weakness in the clean energy innovation system. Public investments should not and cannot take the place of the far larger resources the private sector can bring to bear, but private investment is currently deterred by the high costs and risks still associated with scaled-up clean tech demonstration projects. Governments can set incentives and market signals to help make clean-tech innovations commercially viable, spurring further investments and paving the way for widespread adoption and deployment by the private sector. [34]

A related challenge is posed by the flow of critical materials. The IEA projects that global demand for critical materials generated by the widespread deployment of clean technologies will quadruple by 2040 and increase six-fold by 2050. EU demand is slated to increase 10-fold.[35] The largest reserves of such materials are in developing countries already struggling to raise their populations from poverty even as they commit to low-carbon development. Many developed countries are likely to be as dependent on these critical-materials producers as they have dependent on fossil-fuel suppliers. The issue is particularly sensitive because the United States and the EU are each inordinately dependent on China for many critical materials, potentially opening them to economic coercion. China controls 50-90% of the world's clean energy minerals supply chains and is dominant in their processing and refining. When it comes to rare earths, China accounts for 98% of EU imports and 80% of U.S. imports.[36]

While both parties are slowly taking action to wean themselves off their respective dependencies, those efforts will take time and be incomplete. It is in the interest of both parties to work together, with other democratic market economies, and with key critical-materials suppliers, in strategic partnerships that can forge secure and sustainable supply chains and low-carbon development of these critical materials.

Box 1.1 Brexit All the Way

One year after the United Kingdom shed the last vestiges of its membership in the European Union, Brexit remains a rocky road.

It is difficult to distinguish the pandemic's disruptive effects from those generated by Brexit. Nonetheless, it is notable that tariff-free UK-EU trade has rebounded far less robustly than the UK's and EU's trade flows with other countries. China has overtaken Germany as the largest single source of UK goods imports. Ongoing UK-EU disruptions have led the two sides to further extend deadlines for some types of customs provisions, rules-of-origin declarations, medicines labelling, and food controls, along with product conformity assessments. The UK has deferred introduction of various new health and safety regulations that would diverge from EU practice. Still, relations are strained.

The UK's Withdrawal Agreement treats Northern Ireland, which is part of the UK, as being within the EU customs area, to prevent the need for a hard border on the island of Ireland. But it also requires checks on goods flowing from Great Britain to Northern Ireland. This essentially creates a customs border in the middle of the Irish Sea, although the checks would be performed at British ports. However, London now insists that this provision needs to be overhauled, both to dispense with those checks and to diminish the role of the European Court of Justice in settling disputes. It is threatening to trigger the Brexit agreement's Article 16 safeguard clause, which would suspend the customs checks. The EU, in turn, has warned that invoking Article 16 could lead to suspension of the entire UK-EU agreement. The negotiations are becoming politically fraught ahead of Northern Ireland elections in May 2022.

Significantly, UK-EU divorce arrangements did not include meaningful provisions for trade in services, which make up some 80% of the British economy. The two parties inked a memorandum of understanding enabling the financial industry to trade across the UK-EU border, but a formal "equivalence" deal remains elusive. The stakes are high: Britain sells billions in financial services to the EU each year, even as it consistently runs deficits in trade in goods. The EU has made clear that over time it expects banks to move their euro-denominated trades into the bloc, although it has been quick to say that it wants to avoid a "cliff edge" when it comes to limiting bilateral financial flows.[37]

The impact has already been dramatic. More than 440 London-based financial institutions have moved part of their business or set up hubs within the eurozone, shifting assets equivalent to 10% of the UK's banking system.[38] The EU's largest stock market operator, Euronext, is moving the data centers that house all of its trading from Basildon, England to Bergamo, Italy. And Amsterdam has displaced London as Europe's top share trading venue, with average daily trading of €9 billion ahead of London's €8.3 billion.[39]

Despite these hiccups, financial services remain one of the UK's key industries, and London remains Europe's overall top financial center and a dominant force in global finance. UK banking sectors assets totaled £10.3 trillion at the end of the first half of 2021, the third-largest in the world and the largest of any country in Europe. EU financial markets were just half the size of the UK's in April 2021. The UK also has Europe's biggest legal services and insurance markets. Brexit-related job moves from the UK to the EU totaled less than 7,400, according to EY figures as of December 2021. That is far fewer than the tens of thousands predicted after the 2016 referendum. And UK banks continue to account for a major share of EU financial transactions – as much as 90% in the case of euro-denominated financial derivatives.[40]

Brexit has also affected the UK's economic relationship with the United States. Overall, U.S.-UK commercial ties are robust and thriving. Measured on an historic cost basis, U.S. companies had invested a record $890 billion in the UK economy and British firms roughly $500 billion in the U.S. economy by 2020 – directly supporting over 2.6 million jobs in both countries. U.S. FDI in the UK in 2020 was seven times more than such investment in China. The United States has become the leading destination for UK financial services exports since the UK's departure from the EU. Two-way services trade totaled $114 billion and goods trade an additional $108 billion.

In terms of trade policies, however, bilateral ties have hit a rough patch. While the UK joined in the U.S.-EU ceasefire over Boeing-Airbus subsidies, it was not part of the bilateral arrangement under which Washington agreed to suspend its steel and aluminum tariffs on the EU and Brussels suspended its countervailing tariffs on U.S. goods. Only in January 2022 did Washington and London start talks on reaching a similar arrangement; meanwhile, bilateral tariffs remain in place. U.S.-UK talks on a possible free trade agreement are still on hold, in part due to Washington's concerns that abrogation of the Northern Ireland protocol could endanger the Good Friday peace agreement that was brokered by the United States.

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