# Palm Classic R3 1NC v Harker AA

## Offs

## 1

#### Counterplan text: Space faring nations should apply a modified version of the doctrine of appropriation to asteroids for private entities so that:

**- claimants of asteroid resources need not be landowners**

**- ‘beneficial use’ applies to all resources capable of being transported back to Earth**

**- all claims are reported to the United Nations**

#### Modifications incentivize the rapid extraction of resources from asteroids while preventing the formation of monopolies. It solves the aff better bc it allows for private entities to keep their profits w/o redistributing them to the owners of a ‘global commons’

Meyers 15. [Ross Meyers is a J.D. candidate at the University of Oregon Law School] 2015. Oregon Review of International Law, Vol. 17, pp. 183-204, “The Doctrine of Appropriation and Asteroid Mining: Incentivizing the Private Exploration and Development of Outer Space” Accessed 20 December 2021. <<https://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/19850/Meyers.pdf?sequence=1&isAllowed=y>> //L. Su

Because the traditional rule of capture or a chattel system for the ownership of asteroids would result in waste, abstract claims, and absurd legal dilemmas, a modified doctrine of appropriation should replace existing outdated international space law relating to asteroids. CONCLUSION The doctrine of appropriation is a reasonable rule for adjudicating asteroid claims, and it could easily be modified to apply to asteroid mining. In the context of water rights, the doctrine of appropriation requires that the claimant be a landowner in order to claim the right to use a water source. It does not make sense, however, for the international community to grant complete ownership over asteroids to a single entity, so the landowner requirement of the rule should be removed. A similar modification would need to be made to the “beneficial use” language of the doctrine. In the context of water rights, an appropriator obtains rights only to water that he or she can reasonably put to beneficial use. The metals contained in asteroids have a high level of marketability. For that reason, a mining entity could potentially put any amount of obtained metal to beneficial use, in the sense that the resources can be sold. This, however, would defeat the purpose of the rule, which is to limit such unreasonable claims. To ameliorate this problem, the doctrine of appropriation could be modified to define “beneficial use” constructively by providing that beneficial use is assumed for any resources that have been removed from the asteroid that the mining entity can reasonably hope to transport to market in a return journey. With the astronomical cost of undertaking a trip to such an asteroid, this modification would limit mining entities to only what they can carry back, thereby leaving the untapped resources available to other entities capable of making the same trip. Considering the size and profitability of metal deposits on asteroids, this **modification to the doctrine of appropriation would not be overly burdensome to corporate interests**. At the same time, it would satisfy the economic imperative of promoting the rapid development of asteroid resources. By changing the landowner requirement, and qualifying the “beneficial use” language, the doctrine of appropriation would be essentially ready for application to asteroid mining claims. The only other changes necessary would be some additional requirements that are common to other space related provisions, like those found in the Outer Space Treaty of 1968. For example, a reporting requirement or a clause guaranteeing asylum for other astronauts. A functional rule might read something like this: State parties or private entities may, upon actual possession, lay claim to natural resources found on or below the surface of asteroids. Rights to appropriate are given in order of seniority, starting with the first party to land on the surface of the asteroid and establish control over the resources, be it water, methane, metal, or any other beneficial substance. A party will be said to have established control over a resource once he has mined the substance and removed it from the asteroid. A senior appropriator may use as much of the asteroid’s resources as he can take from the asteroid and put to beneficial use, and may continue to enlarge his share until another junior appropriator begins to appropriate resources from source for beneficial use. For the purposes of this Agreement, “beneficial use” refers to the amount of resources that an appropriator has removed from the asteroid that the actor may reasonably hope to bring home in a return voyage. Resources in excess of what an appropriator can reasonably hope to transport to market in a single voyage do not qualify as having a beneficial use, and are therefore not yet claimed. This means that the extraction of metal from an asteroid does not serve to provide ownership if the appropriator plans on letting the resources languish until another voyage is undertaken to secure the resources and bring them back to Earth. Junior appropriators receive rights in the source of resources (the asteroid) as they find it, and may prevent the senior appropriator from enlarging his share to the junior appropriator’s detriment under a no-injury rule. No state party will attempt to hinder other parties from landing on or using the asteroid, and parties will assist other entities on an asteroid, should they need emergency assistance. Mining claims on asteroids will be reported to the Secretary-General of the United Nations, and state parties agree to release the location of the asteroid, and any scientific findings to the United Nations, the general public, and the scientific community. In the event that the asteroid is on a collision course with any other celestial body, all state parties agree to follow the course of action suggested by the United Nations. Should the United Nations decide the asteroid must be destroyed, no state party may claim liability for resources contained within the asteroid, but not yet captured. This provision applies only to asteroids as classified by the scientific community, and does not apply to planets, comets, meteorites, or any other celestial body not mentioned. There is no doubt that asteroids may be extremely beneficial to mankind, both as a source of resources and as a jumping-off point to far off locations in space. The human-race has progressed scientifically and technologically to the point that space travel is within commercial reach, and the need for new international laws governing the ownership of space has never been more apparent. The Outer Space Treaty of 1968 made great strides in developing rational rules for space and many of its provisions should be maintained in their original form. However, by allowing ownership of asteroids under the doctrine of appropriation, the international community can incentivize the exploration and development of space in a way that reflects the needs of society in Incentivizing the Private Exploration and Development of Outer Space general, without vesting an absolute monopoly in a single entity. The doctrine of appropriation helped drive American westward expansion, and its application to space mining would help drive the human race in its expansion into the space, the final frontier.

## 2

#### Global supply chain is on the brink of collapse

Jun 21 [He Jun, Mr. He Jun is Partner, Director of China Macro-Economic Research Team and Senior Researcher. His research field covers China’s macro-economy, energy industry and public policy., 7-3-2021, "What’s Causing the Global Supply Crunch?," Supply Chain Digital, https://supplychaindigital.com/procurement/whats-causing-global-supply-crunch, accessed 11-14-2021] BCortez

As the global economy gradually recovers from the impact of COVID-19 pandemic, worldwide supply crunch is intensifying, spreading not only from one country to another, but also from one industry to another. A year ago, when the pandemic continued to spread, economies around the world were severely hit and there was panic buying among consumers. Today, it is companies that are trying to go on a stockpiling, buying more raw materials than they need to keep up with rapidly recovering demand. The panic buying is fuelling more shortages of raw materials, including copper, iron ore, steel, corn, coffee, wheat, soybeans, wood, semiconductors, plastics, cardboard, etc. As a result, inventories of seemingly every raw material around the world are running low. “You name it, and we have a shortage on it,” Tom Linebarger, chairman and chief executive of engine and generator manufacturer Cummins Inc., said earlier, and he noted that his clients are “trying to get everything they can because they see high demand”.∂ Supply shortages have driven prices up significantly, with the impact of rising prices for some key raw materials being significant. The prices of various industrial raw materials such as crude oil, plastics, and chemicals are rising. Some of the impacts of higher raw material prices have already begun to be reflected in consumer goods. Reynolds Consumer Products Inc., the maker of the namesake aluminium foil and Hefty trash bags, is planning another round of price hike, and this will be the third for the increase this year alone. Food prices are also climbing. The price of palm oil, the world's most consumed edible oil, has risen more than 135% over the past year to record levels; soybeans have topped USD 16 a bushel for the first time since 2012; corn futures prices have touched an eight-year high, and wheat futures prices have risen to the highest level since 2013.∂ Changes in factory orders due to the impact of the pandemic have also tightened supply in some markets and pushed up prices for raw materials. Some knitting enterprises in Dongguan, Guangdong, said that affected by the pandemic, about 40% of the orders have come back to China from countries such as India and Southeast Asian countries, while the factory utilisation rate has increased by about 30% to 40%, and now it has reached 100%. In Jiangyin, Jiangsu, a bedsheet enterprise adjusted its production capacity to accommodate a USD 20 million order from Southeast Asia. Increased demand from the textile industry has led to tight supplies of raw materials. In Wujiang, Jiangsu, where polyester filament yarn is the most in demand, the shortage of raw materials this year has been unexpected, especially in the current off-season, when there is not much stock. In Suzhou, also in Jiangsu, the export of polyester filament yarn increased by nearly 60% from January to April, while the price increased by 40% to 60%. Compared with the same period last year, the price of filament yarn increased by RMB 2000-3000/ton.∂ Remarkably, this hoarding frenzy is pushing global supply chains to the brink of collapse. Inventory shortages, transportation bottlenecks, and price increases are nearing critical levels, raising concerns that strong global growth could fuel inflation. The supply disruptions in the past are simply incomparable compared to the severe inventory crunch of 2021. Industry insiders predict that both large and small enterprises will be affected by this supply shortage.∂ Why are current supply shortages so acute? ∂ Researchers at ANBOUND believe that instead of having one single factor, there are multiple reasons for the emergence of complex systemic problems.∂ First of all, there is the recovery in demand as the pandemic is brought under control. This year, as vaccination rollout efforts have brought the pandemic significantly under control in the United States and some European countries, the economy has begun to show significant momentum for recovery. This trend prompted a near-simultaneous recovery in most markets around the world. The collective recovery of global markets has led to a near-simultaneous increase in demand, exacerbating the mismatch between supply and demand. In the case of commodity futures, the capital was collectively bullish on commodities under such expectations, significantly driving up the prices of commodities (mostly upstream commodities) and spreading to midstream and downstream commodities. It should be noted in particular that the surge in demand for certain specific commodities under the pandemic has also exacerbated the supply-demand mismatch in some industrial chains. For example, the increase in the need of remote, online working and studying has increased the demand for all kinds of electronic products, leading to a surge in global demand for semiconductor chips, which affects several chip-requiring industries.∂ Another reason is that the pandemic has disrupted the global supply chain system, causing distortions in supply and demand in certain industries, which are transmitted along the supply chain, causing a wider supply crunch. As ANBOUND previously pointed out, the spread of the pandemic has dealt multiple blows to global supply chains. During the pandemic, China, as the "world's factory", was affected by the pandemic and its production side was disrupted. Then, the demand side of developed countries was suppressed by the impact of the pandemic. This is followed by the fact that the malfunctioning of the global supply chain system has exacerbated global supply distortions. To cite an example, the severe shortage of containers due to disruption of the supply chain has exacerbated the global supply distortions.∂ In addition, enterprises began to collectively increase their inventories, leading to the increase of inventories in the industrial chain and supply chain, amplifying the demand for all kinds of raw materials, intermediate products, and supporting products. In the past, in order to save costs and improve efficiency, many enterprises advocated zero-inventory production and tried to reduce the inventory in the production link, thereby reducing the capital occupation. However, the smooth operation of zero inventory production depends on the efficient global supply chain system. Once a problem occurs in the global supply chain system, it can lead to chaos in the whole supply chain system. The 2011 earthquake in Tōhoku, Japan has caused the shutdown of some key auto parts plants, which once led to the global auto supply chain being affected. Likewise, the global spread of the COVID-19 pandemic since last year has damaged, distorted, and even disrupted global supply chains.∂ Finally, geopolitical factors have also contributed to the tight supply of global commodities, resulting in the artificial disruption of part of the industrial chain and supply chain. For example, the U.S.-driven crackdown on chip supply to Chinese enterprises and related sanctions have seriously disrupted the global semiconductor industry chain.

#### Private investment in the space race key to revitalizing supply chains.

GreenBiz 15. 15 May 2015. GreenBiz. “Will the private space race reinvigorate the supply chain?” Accessed 11 January 2022. <https://www.greenbiz.com/article/will-private-space-race-reinvigorate-supply-chain> //L. Su

As with any program of the magnitude, both men have a massive vision that extends well past the atmosphere of Earth. The astronomical budgets that the projects require are not simply being shot off into space, but infused into the economy and the supply chain at large. Taking the supply chain to new heights There is something very fascinating about this 21st-century space race. During the initial race to the moon in the 1950s and '60s, countries were competing against each other. Now, it's entrepreneurs trying to get to Mars in a market where manufacturers and suppliers can demand a price for their goods. This is truly a market for the supply chain. When engineers and builders demand the highest quality materials for spaceships that eventually will lead to interplanetary travel, the final word belongs to the companies providing said products. With this, the space travel supply chain truly will take on a new life. Musk has gone on record to proclaim he would like his company to complete 12 launches a year, and he will need numerous parts to make this goal possible. Now that NASA is no longer sending people into space, the suppliers of spaceship materials have business again. **Even if these new programs aren't immediately successful, this space race still will have untold benefits for the supply chain as a whole**. While it's true that space exploration is not completely out of the picture for various governments, private-sector contracts have the potential to be more lucrative for procurement management services. **More money into these companies means more money into the economy**, making the mere attempt at space travel a win-win situation. Ideally, Musk and Bezos' ventures into interplanetary exploration will be successful, which would open the door to the production of spaceships on a much larger scale. Our hopes for the success of these programs, and the associated supply chain, are astronomically high. Perhaps reaching for the stars won't just be wishful thinking after​ all.

#### Supply chains are incredibly complex and vulnerable to shocks – failures cause economic collapse and breakdown of social order.

Rickards 12/13. [James G. Rickards is the editor of Strategic Intelligence, Project Prophesy, Crash Speculator, and Gold Speculator. He is an American lawyer, economist, and investment banker with 40 years of experience working in capital markets on Wall Street. He was the principal negotiator of the rescue of Long-Term Capital Management L.P. (LTCM) by the U.S Federal Reserve in 1998. His clients include institutional investors and government directorates. His work is regularly featured in the Financial Times, Evening Standard, New York Times, The Telegraph, and Washington Post, and he is frequently a guest on BBC, RTE Irish National Radio, CNN, NPR, CSPAN, CNBC, Bloomberg, Fox, and The Wall Street Journal. He has contributed as an advisor on capital markets to the U.S. intelligence community, and at the Office of the Secretary of Defense in the Pentagon. He has also testified before the U.S. House of Representatives about the 2008 financial crisis. Rickards is the author of The New Case for Gold (April 2016), and four New York Times best sellers, Currency Wars (2011), The Death of Money (2014), The Road to Ruin (2016), and Aftermath (2019) from Penguin Random House. And his latest book, The New Great Depression was published in January 2021.] 13 December 2021. Daily Reckoning. “The Great Supply Chain Collapse” Accessed 23 January 2022. <https://dailyreckoning.com/the-great-supply-chain-collapse/> //L. Su

Most people have some notion of how supply chains work, but few understand how extensive, complex and vulnerable they are. If you go to the store to buy a loaf of bread, you know that the bread did not mystically appear on the shelf. It was delivered by a local bakery, put on the shelf by a clerk, you carried it home and served it with dinner. That’s a succinct description of a supply chain – from baker to store to home. Yet that description barely scratches the surface. What about the truck driver who delivered the bread from the bakery to the store? Where did the bakery get the flour, yeast and water needed to make the bread? What about the ovens used to bake the bread? When the bread was baked, it was put in clear or paper wrappers of some sort. Where did those come from? Even that expanded description of a supply chain is just getting started in terms of a complete chain. The flour used for baking came from wheat. That wheat was grown on a farm and harvested with heavy equipment. The farmer hires labor, uses water and fertilizer and sends his wheat out for processing and packaging before it gets to the bakery. The manufacturer who built the oven has his own supply chain of steel, tempered glass, semiconductors, electrical circuits and other inputs needed to build the ovens. The ovens are either hand crafted (engineered-to-order) or mass produced (made-to-stock) in a factory that may use either assembly lines or manufacturing cells to get the job done. The factory requires inputs of electricity, natural gas, heating and ventilation systems, and skilled labor to turn out the ovens. The store that sells the bread is on the receiving end of numerous supply chains. It also requires electricity, natural gas, heating and ventilation systems and skilled labor to keep the doors open and keep merchandise in stock. The store has loading docks, back rooms for inventory, forklifts and conveyor belts to move its merchandise from truck to shelf. Every link in these supply chains requires transportation. The farmer relies on trucks or rail for deliveries of seeds, fertilizers, equipment and other inputs. The oven manufacturer also relies on trucks or rail for deliveries of its inputs, including oven components. The bakery and the store rely mainly on trucks for deliveries of their inputs and the finished loaves of bread. The consumer relies on her automobile to get to the store and return home. These transportation modes have their own supply chains involving truck drivers, train engineers, good roads, good railroads, rail spurs and energy supplies to keep moving and keep deliveries on time. This entire network (farms, factories, bakeries, stores, trucks, railroads and consumers) relies on energy supplies to keep working. The energy can come from nuclear reactors, coal-fired or natural gas-fired power plants or renewable sources fed to a grid of high-tension wires, substations, transformers and local connections to reach the individual user. Everything described above sits somewhere in a complex supply chain needed to produce one loaf of bread. Now take everything else in the grocery store (fruits, vegetables, meat, poultry, fish, canned goods, coffee, condiments and so on) and imagine the supply chains needed for each one of those products. Then take all the other stores in the shopping center (home goods, clothing, pharmacy, hardware, restaurants, sporting goods) and imagine all the goods and services available from those vendors and the supply chains behind each and every one of those. In case you think I have exaggerated the components and steps in making a loaf of bread in the above example, I didn’t. The example above is a grossly simplified description of the actual supply chain. A full description of the needed supply chain would reach back further (where do the seeds for the wheat come from?) and branch off in tangential directions (where do the bread wrappers originate?). A full description of the loaf of bread supply chain with choice of vendor analysis, quality-control tests and bulk purchase discounts among other decision tree branches could easily stretch to several hundred pages. Now consider all of the supply chain links and possible bottlenecks described above are purely domestic. But very few supply chains are actually that local. CEOs, logistics engineers, consultants and politicians have spent the past 30 years making supply chains global. You’ve heard discussion of globalization since the early 1990s. What one may not have realized is that the process that was being globalized was the supply chain. You know your iPhone comes from China. Did you know that the specialized glass used in the iPhone comes from South Korea? Did you know the semiconductors in the iPhone come from Taiwan? That the intellectual property and design of the iPhone are from California? The iPhone includes flash storage from Japan, gyroscopes from Germany, audio amplifiers, battery chargers, display port multiplexers, batteries, cameras and hundreds of other advanced parts. In total, Apple works with suppliers in 43 countries on six continents to source the materials and parts that go into an iPhone. That’s a quick overview of the iPhone supply chain. Of course, every supplier in that supply chain has its own supply chain of sources and processes. Again, supply chains are immensely complex. Once the global perspective is added, we have to expand our transportation options from trucks and trains to include ships and planes. That means ports and airports are additional links in the chain. Those facilities have their own links and inputs including cranes, containers, port authorities, air traffic controllers, pilots, captains and the vessels themselves. And to our list of trucks, trains, ships and planes we can add pipelines that transport liquids such as petroleum, gasoline and natural gas. You get the idea. Supply chains may be hidden but they are everywhere. They are interconnected, densely networked and unimaginably complex. The touchstone of these efforts was the idea of just-in-time inventory (JIT). If you’re installing seats on an automobile assembly line, it is ideal if those seats arrive at the plant the same morning as the installation. That minimizes storage and inventory costs. The same is true for every part installed on the assembly line. The logistics behind this are daunting but can be managed with state-of-the-art software. All these efforts are fine as far as they go. The cost savings are real. The supply chains are efficient. The capacity of this system to keep a lid on costs is demonstrable. The supply chain revolution since the early 1990s has been about cost reduction, which gets passed to consumers in the form of lower prices. That practically explains the entire phenomenon. There’s only one problem. The system is extremely fragile. When things break down, everything gets worse at the same time. One missed delivery can result in an entire assembly line shutting down. One delayed vessel can result in empty shelves. One power outage can result in a transportation breakdown. In a nutshell, that’s what has happened to the global supply chain. There’s a lack of redundancy. The system is not robust to shocks. The shocks have occurred nevertheless (pandemic, trade wars, China-U.S. decoupling, bank collateral shortages and more) and the system has broken down. The failures have cascaded. Delays in receiving commodity inputs in China have resulted in manufacturing delays for exports. Energy shortages in China have resulted in further disruption of steel production, mining, transportation and other basic industries. Port delays in Los Angeles have resulted in component and finished goods delayed in the U.S. Semiconductor shortages have halted production of electronics, appliances, automobiles and other consumer durables that rely on automated applications. You’ve seen how complex the system is. The bottom line is if supply chains are breaking down, the economy is breaking down. If the economy breaks down, the breakdown of social order is not far behind. And the costs of social disorder are far higher than any possible savings from supposedly efficient supply chains.

## Case

### Hedge

#### 1AR theory is skewed towards the aff – a) the 2NR must cover substance and over-cover theory, since they get the collapse and persuasive spin advantage of the 3min 2AR, b) their responses to my counter interp will be new, which means 1AR theory necessitates intervention. Implications – a) reject 1AR theory since it can’t be a legitimate check for abuse, b) drop the arg to minimize the chance the round is decided unfairly

### 1NC: Mining

#### 1] **No resource depletion, they’re seriously underestimating the amount of resources on Earth.**

Goreham 19. [Steve Goreham, a policy advisor to The Heartland Institute, is a speaker, author, and researcher on environmental issues as well as an engineer and business executive. Steve Goreham is a speaker, author, and researcher on environmental issues, energy, and public policy. He’s a frequently invited guest on radio and television as well as a free-lance writer. He is the Executive Director of the Climate Science Coalition of America (CSCA), a non-political association of scientists, engineers, and citizens dedicated to informing Americans about the realities of climate science and energy economics. CSCA is the US affiliate of the International Climate Science Coalition. Steve is the author of three books on sustainability, climate change and energy. His latest book, Outside the Green Box: Rethinking Sustainable Development, tells readers “what their green consultant didn’t tell them.” More than 100,000 copies of his books are now in print. Steve holds an MS in Electrical Engineering from the University of Illinois and an MBA from the University of Chicago. He has more than 30 years of experience at Fortune 100 and private companies in engineering and executive roles. In his last industry position, he was vice president and general manager of an engineering and manufacturing operation with 350 employees and annual sales of $300 million.] 14 May 2019. The Washington Times. “Why resources aren’t ‘natural’ and will never run out.” Accessed 5 January 2022. <https://www.washingtontimes.com/news/2019/may/14/why-resources-arent-natural-and-will-never-run-out/> //L. Su

Last week, the World Wildlife Fund proclaimed May 10 to be Europe’s Overshoot Day, the day that Europe consumed its portion of Earth’s resources for the year. The WWF, the United Nations and universities continue to warn that modern society is rapidly depleting our natural resources. But instead, trends show that for all practical purposes, Earth’s resources will never run out. The World Wildlife Fund proclaims Aug. 1 this year as Earth Overshoot Day, where society will have used “more natural resources than the planet is able to produce in a 12-month period.” The WWF estimates that Overshoot Day for the United States occurred already in March, warning that the United States is using four times its share of sustainable global resources. Overshoot Day is a continuation of the long-running ideology that humans are consuming too much of Earth’s resources. Environmentalist David Suzuki said, “We live in a world of finite resources. Although it may sometimes seem quite big, Earth is really very small — a tiny blue and green oasis of life in a cold universe.” UK Environment Secretary Margaret Beckett pointed out in 2006, “It is a stark and arresting fact that, since the middle of the 20th century, humankind has consumed more natural resources than in all previous human history.” Price trends are usually a good indicator of resource scarcity. The World Bank maintains a world commodity price database of 41 commodities from 1960 to present. Inflation-adjusted trends show that from 1960-2015, food prices have declined, agricultural raw material and industrial metal prices have been flat, and energy prices, dominated by the price of oil, have increased. Commodity prices fluctuate widely from decade to decade, but we don’t see a rising price trend indicating resource exhaustion. The 1972 international best-selling book “Limits to Growth” predicted humanity would run out of aluminum by 2027, copper by 2020, gold by 2001, lead by 2036, mercury by 2013, silver by 2014, and zinc by 2022. But today, none of these metals is in historically short supply. Global production of industrial metals soared from 1960-2014. Annual production levels were up: aluminum (996 percent), copper (417 percent), iron ore (531 percent), lead (343 percent), nickel (455 percent), tin (66 percent), and zinc (348 percent). At the same time, the World Bank industrial-metal real price index of these seven metals was flat, down a little more than 1 percent by 2015. World reserves of copper, iron ore, lead and zinc stand near all-time highs. Prices are not rising as predicted by resource-depletion pessimists. “Natural resources” is a misleading label. The term “natural resources” conveys the naive idea that food, energy or materials can merely be plucked from a tree or gathered from a field or stream. Raw materials are natural, but resources are created by humans from raw materials. Consider the miracle of copper refining. Rock containing copper is fragmented by explosions and then loaded onto huge trucks with 240-ton capacity. Each ton of rock contains only 13 pounds of copper. The copper ore then goes through a series of milling machines that grind the rock down to a fine powder. Next, the powder goes through a flotation cell, where the copper floats to the top of a solution and is skimmed off, producing 28 percent copper concentrate. Three different furnaces come next, smelting the metal into 98 percent copper. Finally, electrolysis is used in a half-mile-long factory to produce ingots that are 99.99 percent copper. Advancing human technology continues to produce high-quality copper from ores of declining copper concentration. But aren’t we running out of raw materials to make copper metal and other resources? Most people don’t realize the vast quantity of raw materials available on our planet. Canadian geologist David Brooks estimated that a single average cubic mile of the Earth’s crust contains a billion tons of aluminum (from bauxite), more than 500 million tons of iron, a million tons of zinc and 600,000 tons of copper. There are 57 million such square miles of Earth’s land surface and almost triple that area under the surface of the oceans. Of course, only a tiny fraction of metals in the Earth’s crust is economically recoverable with today’s technology. Nevertheless, the Earth’s supply of raw materials is finite, but vast. But aren’t we running out of hydrocarbon energy? In 1977, President Jimmy Carter told the nation, “World consumption of oil is still going up. If it were possible to keep it rising during the 1970s and 1980s we could use up all the proven reserves of oil in the entire world by the end of the next decade.” Mr. Carter and his advisers were wrong. Petroleum engineers changed the world with the technological advances of hydraulic fracturing and horizontal drilling. U.S. daily oil production more than doubled from 5 million barrels in 2008 to more than 12 million barrels today. U.S. natural gas production also doubled over the last decade. From 1980-2017 world petroleum production increased more than 50 percent. But world crude oil reserves increased 150 percent, from 27 years of supply to 46 years of supply at higher production rates. The same doomsayers that continue to forecast resource depletion were certain we had reached peak oil a decade ago. Today, humanity has the greatest abundance of resources in history. Human ingenuity determines resource availability, not the amount of fruit on a tree or the number of rocks on the ground. Driven by advancing human technology, for all practical purposes, the Earth’s resources will never run out.

#### Warming solves Greenland’s economy and rare earth mineral shortages

McGinnis 12 (Paul E. McGinnis is a contributing writer to EcoWatch. He has interviewed a stellar array of change makers including Sylvia Earle, Dean Kamen, Ray Kurzweil, Fabien Cousteau and Josh Fox. Paul is also a New York based real estate broker, and green building and renovation consultant. He is a member of the U.S. Green Building Council, the Northeast Sustainable Energy Association, and the New York State Association of Realtors. McGinnis, P. E. “Greenland’s Ice Melt Ignites Race for Rare Earth Metals,” 11/12/2012, http://ecowatch.com/2012/11/12/greenlands-rare-earth-metals//ghs-kw)

Greenland’s vast, pristine, virtually-untouched terrain is becoming a hotbed for resource extraction. The Arctic is melting at an unprecedented rate, making Greenland’s natural resources, including high demand commodities such as oil, gas, gold, iron, copper and rare earth metals, more accessible. Insatiable international oil, gas and mining conglomerates are now aggressively vying to control access to the riches glaciers once denied. “This is not just a region of ice and polar bears,” Prime Minister of Greenland, Kuupik Kleist, told Reuters in the capital Nuuk, formerly known by its Danish name Godthab. “Developing countries are interested in a more political role in opening up of the Arctic. Greenland could serve as a stepping stone.” Greenland has less than 60,000 people living in an 836,109 square mile area. Comparatively, Greenland is almost a quarter the size of the continental U.S. Until recently, the country was regarded by strategists as barren wasteland with little political or economic import. But now this once overlooked arctic island is being targeted by government and politically connected entities, anxious to extract what lies beneath the glacier ice sheet. The powerful and deep-pocketed interests include China, the U.S., Russia and the European Union. Many in Greenland are excited about the attention the remote island nation is attracting and are happy to have world powers courting Greenland looking to strike it rich. Greenlanders are hoping they too will get rich along with the foreign investors. Henrik Stendal, head of the geology department at Greenland’s Bureau of Minerals and Petroleum, a Dane who has worked in Greenland since 1970, told the U.K. Guardian in July: “We have shown that we have huge potential—it has been an eye-opener for the mining industry. The EU has shown a lot of interest and that’s been very good—we believe this could be very valuable for Greenland. There could be benefits for everyone—at present most of our income is from fishing and a little bit of tourism, so the government really wants another income.” In addition to oil and gas, and perhaps even more attractive to industry, are rare earth metals that lie beneath the ground in Greenland that are essential components in new technologies, including computer hard drives, cell phones and flat screen devices. The world is consuming these rare earth metals at a voracious rate. For instance, in the first weekend of sales, the 4G iPad mini sold four million units. Our appetite for these devices and the rare metals required seems unending. Rare earth metals are also essential elements to military guidance systems and other defense related technology. Most of the rare earth metals are currently sourced in China. Now, the world’s nations are considering Greenland’s resources not just from an economic point of view, but, perhaps more importantly, a strategic perspective. There is a national security imperative when looking at availability of these resources and who controls them. The New York Times reported in September: “Western nations have been particularly anxious about Chinese overtures to this poor and sparsely populated island, a self-governing state within the Kingdom of Denmark, because the retreat of its ice cap has unveiled coveted mineral deposits, including rare earth metals that are crucial for new technologies like cellphones and military guidance systems. A European Union vice president, Antonio Tajani, rushed here to Greenland’s capital in June, offering hundreds of millions in development aid in exchange for guarantees that Greenland would not give China exclusive access to its rare earth metals, calling his trip ‘raw mineral diplomacy.'” “In the past 18 months, Secretary of State Hillary Rodham Clinton and President Lee Myung-bak of South Korea have made debut visits here, and Greenland’s prime minister, Kuupik Kleist, was welcomed by President José Manuel Barroso of the European Commission in Brussels.”

#### Conflict over resources in the arctic goes nuclear

Cohen 10 Ariel [Senior Research Fellow for Russian and Eurasian Studies and International Energy Policy, The Kathryn and Shelby Cullom Davis Institute for International Studies] “From Russian Competition to Natural Resources Access: Recasting U.S. Arctic Policy” The Heritage Foundation 6/15/10 <http://www.heritage.org/research/reports/2010/06/from-russian-competition-to-natural-resources-access-recasting-us-arctic-policy>

To advance its position, Russia has undertaken a three-year mission to map the Arctic.[26] The Kremlin is also moving rapidly to establish a comprehensive sea, ground, and air presence. Under Putin, Russia focused on the Arctic as a major natural resources base. The Russian national leadership insists that the state, not the private sector, must take the lead in developing the vast region. The Kremlin published its Arctic doctrine in March 2009.[27] The main goal is to transform the Arctic into Russia’s strategic resource base and make Russia a leading Arctic power by 2020. Russian Militarization of the Arctic.The military is an important dimension of Moscow’s Arctic push. The policy calls for creating “general purpose military formations drawn from the Armed Forces of the Russian Federation” as well as “other troops and military formations [most importantly, border units] in the Arctic zone of the Russian Federation, capable of ensuring security under various military and political circumstances.”[28] These formations will be drawn from the armed forces and from the “power ministries” (e.g., the Federal Security Service, Border Guard Service, and Internal Ministry). Above all, the policy calls for a coast guard to patrol Russia’s Arctic waters and estuaries.Russia views the High North as a major staging area for a potential nuclear confrontationwith the United States and has steadily expanded its military presence in the Arctic since 2007. This has included resuming air patrols over the Arctic, including strategic bomber flights.[29] During 2007 alone, Russian bombers penetrated Alaska’s 12-mile air defense zone 18 times.[30] The Russian Navy is expanding its presence in the Arctic for the first time since the end of the Cold War, increasing the operational radius of the Northern Fleet’s submarines.Russia is also reorienting its military strategyto meet threats to the country’s interests in the Arctic, particularly with regard to its continental shelf.[31] Russia is also modernizing its Northern Fleet. During 2008 and 2009, Russian icebreakers regularly patrolled in the Arctic. Russia has the world’s largest polar-capable icebreaker flotilla, with 24 icebreakers. Seven are nuclear, including the 50 Years of Victory, the largest icebreaker in the world.[32] Russia plans to build new nuclear-powered icebreakers starting in 2015.[33] Moscow clearly views a strong icebreaker fleet as a key to the region’s economic development. Russia ’s Commercial Presence. Russia’s energy rush to the Arctic continues apace. On May 12, 2009, President Dmitry Medvedev approved Russia’s security strategy.[34] This document views Russia’s natural resources in the Arctic as a base for both economic development and geopolitical influence. Paragraph 11 identifies potential battlegrounds where conflicts over energy may occur: “The attention of international politics in the long-term will be concentrated on controlling the sources of energy resources in the Middle East, on the shelf of the Barents Sea and other parts of the Arctic, in the Caspian Basin and in Central Asia.” The document seriously considers the use of military force to resolve competition for energy near Russia’s borders or those of its allies: “In case of a competitive struggle for resources it is not impossible to discount that it might be resolved by a decision to use military might.The existing balance of forces on the borders of the Russian Federation and its allies can be changed.”[35] In August 2008, Medvedev signed a law that allows “the government to allocate strategic oil and gas deposits on the continental shelf without auctions.” The law restricts participation to companies with five years’ experience in a region’s continental shelf and in which the government controls at least a 50 percent stake. This effectively allows only state-controlled Gazprom and Rosneft to participate.[36] However, when the global financial crisis ensued, Russia backtracked and began to seek foreign investors for Arctic gas development.

#### 2] Satellites hold Russia accountable for methane leaks – that allows the EU to penalize natural gas imports.

Mufson et al 21. [Steven Mufson covers the business of climate change for The Washington Post. Since joining The Post in 1989, he has covered economic policy, China, diplomacy, energy and the White House. He has also been an editor in the Outlook section. Earlier, he spent six years working for the Wall Street Journal in New York, London and Johannesburg. In 2020, he shared the Pulitzer Prize for a climate change series "2C: Beyond the Limit." Isabelle Khurshudyan is a foreign correspondent based in Moscow. A University of South Carolina graduate, she has worked at The Washington Post since 2014, previously as a sports reporter covering the Washington Capitals, high school sports and local colleges. Chris Mooney writes about energy and the environment at The Washington Post. He previously worked at Mother Jones, where he wrote about science and the environment and hosted a weekly podcast. Mooney spent a decade before that as a freelance writer, podcaster and speaker, with his work appearing in Wired, Harper’s, Slate, the Los Angeles Times and the Boston Globe, to name a few. He also has published four books about science, politics and climate change. Brady Dennis is a national reporter for The Washington Post, focusing on the environment. He previously has covered food and drug issues, public health crises such as the Ebola and Covid-19, and the nation's economy, including the global financial crisis that began in 2008. He worked for the St. Petersburg (Fla.) Times and The Seattle Times prior to coming to the Post. John Muyskens is a graphics editor at the Washington Post specializing in data reporting. He worked on the Post's Pulitzer-winning projects documenting fatal police shootings and global warming hot spots. Naema Ahmed is a graphics reporter at The Washington Post. Before joining The Post, she worked at Axios as a data visualization designer. ] 19 October 2021. The Washington Post. “Russia allows methane leaks at planet’s peril.” Accessed 30 January 2022. <https://www.washingtonpost.com/climate-environment/interactive/2021/russia-greenhouse-gas-emissions/> //L. Su

On the morning of Friday, June 4, an underground gas pipeline running through the ancient state of Tatarstan sprang a leak. And not a small one. In a different era, the massive leak might have gone unnoticed. But hovering 520 miles above the Earth, a **European Space Agency satellite** was keeping watch. The four-year-old Copernicus Sentinel-5P, which orbits the planet 14 times a day, looks for traces of methane and other gases. At 11:01 a.m. in **Moscow**, **the satellite spotted a methane leak on the edge of its field of vision**. On its next pass, 1 hour and 40 minutes later, the sensor captured an even larger view of the leak. Crews from the natural gas giant Gazprom hurried to repair a defect in the steel pipeline and stem the rush of **methane** — an invisible but powerful greenhouse gas — which was **escaping into the atmosphere at** a breakneck **rate of approximately 395 metric tons an hour.** Two weeks later, after inquiries from a geoanalytical firm called Kayrros and from journalists, Gazprom acknowledged the colossal methane release, though **the energy company remained secretive**, declining to disclose the exact location of the leak. But a Washington Post photographer, using satellite imagery and tracking GPS coordinates, found a likely spot an hour’s walk from the nearest public roadway, 490 miles east of Moscow. There he saw a deep gash and tire tracks over an area half a football field in size, flanked by yellow signs warning of underground pipelines between stands of trees. Image without caption (Arthur Bondar for The Washington Post) About this series The world has pledged to rapidly cut greenhouse gas emissions in the coming decades, but **there remains a vast gap between the commitments countries have made and the rising concentrations of planet-warming gases in the atmosphere**. In the first installment of our series, Invisible, The Washington Post exposes the gulf between Russia's reported methane emissions and the readings that a new breed of satellites have detected. The episode reflects a fundamental shift in climate politics. Many countries and companies have long misrepresented or simply miscounted how much fossil fuel-based methane they have let escape into the air. Now, **new satellites devoted to locating and measuring greenhouse gases** are orbiting Earth, with **more on the way.** These sentinels in the sky are auguring an era of data transparency as their patrons seek to safeguard the planet by closing the gap between the amount of methane that scientists know is in the atmosphere versus what is reported from the ground — industry by industry, pipeline by pipeline, leak by leak. **Satellites can provide real time evidence** of massive, unreported methane leaks — and **who is responsible for them**. That information can help officials hold the polluting companies accountable or expose governments that hide or ignore dangerous emissions that are warming the world. “The atmosphere doesn’t lie,” said Daniel Jacob, an atmospheric scientist at Harvard University who uses satellite measurements to try to interpret the world’s methane emissions. Story continues below advertisement The **satellite revelations could further complicate a critical United Nations climate summit** in Scotland in November, known as COP26, **where world leaders will face pressure to slash greenhouse gas emissions.** Many nations have yet to live up to the promises they made when they forged the Paris climate accord in 2015 — pledges that climate negotiators say are already too low to limit catastrophic warming. Methane, the second-most abundant greenhouse gas after carbon dioxide, accounts for roughly a quarter of global warming since the industrial revolution, according to NASA. It is the chief component of natural gas. Today, the second-biggest natural gas producer is Russia, fed by the prolific Yamal region, followed by Iran and its Persian Gulf gas fields. Next come China, Canada and Qatar, with its flotilla of liquefied natural gas tankers. The United States, bolstered by horizontal fracking in the Permian Basin across west Texas and eastern New Mexico, remains the world’s largest natural gas producer. Scientists say that rapidly cutting methane “is very likely to be the most powerful lever” to slow the rate of warming. But they have also documented a disturbing and surprising spike in atmospheric concentrations in recent years that they have not yet pinned down. The methane mystery has also drawn the attention of climate negotiators, who will converge in Glasgow with methane near the top of the agenda. Ahead of those talks, the United States and Europe launched a Global Methane Pledge that aims to reduce methane emissions nearly a third by 2030. Dozens of nations, including nine of the world’s top 20 emitters, have signed onto the effort — but so far, Russia has not. Given Russia’s sprawling oil and gas industry, climate summit watchers say persuading President Vladimir Putin to plug his nation’s leaking pipelines and dial back plans to grow natural gas exports will be important. The White House’s chief climate negotiator, John F. Kerry, has spent hours with top Russian officials in search of a “road map,” said Ruslan Edelgeriyev, special presidential envoy on climate issues for the Russian Federation. Edelgeriyev said that under new bylaws Russia’s methane requirements “will be stricter” because, unlike carbon dioxide, methane cannot be absorbed by forests. In a joint statement in July, the two nations agreed to cooperate on a wide range of climate issues, including limits on methane and the satellite monitoring of emissions. “We are not trying to hide anything. We do realize that problems exist, and we are trying to find solutions,” Edelgeriyev said, conceding that “at the moment we do not have a complete picture of emissions.” Want to know how much a ton of methane really amounts to? Use our calculator throughout the story. So far, Russia’s numbers don’t add up, a Post analysis has found: • Russia claims that it emitted 4 million metric tons of methane from the oil and gas sector in 2019, the most recent year reported. But six studies and scientific emissions data sets reviewed by The Post, using various methods, found much higher annual numbers in recent years, in some cases two to three times as large. The Paris-based International Energy Agency (IEA), an intergovernmental organization set up in the wake of the 1973 oil crisis, puts the country’s 2020 figure at nearly 14 million tons, which would make Russia the world’s largest emitter of oil and gas-based methane. • The number of methane plumes emitted from the aging Russian gas infrastructure rose by at least 40 percent last year, even though natural gas exports to Europe fell an estimated 14 percent due to the coronavirus pandemic, according to Kayrros. A recent scientific study found that a significant portion of Russia’s estimated annual methane releases are due to a relatively small number of catastrophic events like the one on June 4, frequently dubbed “super-emitters.” • Russia has repeatedly revised its methods for calculating emissions, not only shrinking current figures but also rolling back past estimates. The year 2010 shows how Russia’s calculations have fluctuated wildly. In a succession of annual reports to the United Nations, Russia has changed its estimate for oil and gas methane emissions for that year from 15.4 million tons, to 31.5 million tons, to 24.7 million tons, to 23.6 million tons, to 6.5 million tons, and — most recently — 5.1 million tons. Edelgeriyev said that Russia’s overall estimate of methane emissions had been “audited by international experts” and are “in accordance with an established procedure.” He said fugitive emissions from infrastructure failure and the difficulty of tracing them was one reason he proposed joint satellite monitoring. How Russia’s methane estimates keep shrinking — on paper In 2006, Russia told the U.N. that methane emissions going back to 1990 had been around 10 million tons per year from its oil and gas industry. Scroll to continue Since then, Russia has revised its numbers repeatedly, and the changes have sometimes been enormous. For the year 2016 alone, Russia changed its estimates from 24.9 million tons, to 6.3 million tons, then — most recently — to 4.3 million tons. Why did the numbers plunge? Russia recalculated, shaving 90.5 percent off of its estimated oil production leaks. In its most recent report, Russia’s revised oil and gas methane emission numbers are at their lowest yet. Experts say that while the very high numbers reported in the past may have been an overshoot, it now looks like the country is underestimating its methane problem. As for the changing numbers, Anna Romanovskaya, a scientist and director of the government-organized Institute of Global Climate and Ecology, said the shifts reflect more accurate information. The most recent numbers are “a result of analysis of new data on methane emissions obtained directly from companies in the oil and gas sector,” she said in a statement. Romanovskaya contends that Russia’s own figures for fossil-fuel methane emissions are “within the range” of those produced by satellites and reported by the Global Carbon Project, a respected academic consortium that analyzes and quantifies the world’s greenhouse gases. But while there are indeed a few low figures in the Global Carbon Project’s results that resemble Russia’s, most are considerably higher. Expert reviewers at the U.N. Framework Convention on Climate Change, set up to stop “dangerous” human interference in the climate system, have challenged Russia’s numbers. In May, they questioned the country’s major downward revision of leaks from oil production — by over 90 percent — saying Russia “did not provide information on the significant decrease in the level of [methane] emissions” caused by its recalculations. At the request of The Post, experts from the Environmental Defense Fund (EDF) and Harvard sought to measure Russia’s recent emissions using a technique called atmospheric “inversion,” drawing on 22 months of infrared data collected by the Sentinel-5P satellite. For an enormous area covering much of Russia’s largest oil and gas region, they estimated 7.6 million tons of methane emissions per year — and for the entire country, 8.3 million tons. That’s more than twice as high as Russia’s latest reported figure. The Paris agreement is voluntary, and there is no international mechanism for cracking down on greenhouse gases contaminating the Earth’s air. Story continues below advertisement But that might be changing. **European regulators are planning to open a new front in trade wars, imposing import taxes to penalize companies** that sell natural gas in Europe while **leaving behind a trail of leaked methane.** “**If they want to continue to export to the European Union, then they must clean up the production methods that they are using**. And this applies to every country that is exporting to the E.U.,” said Brendan Devlin, strategy adviser to the European Commission, the European Union’s executive body.

#### Decline in natural gas exports decks the Russian economy – stability in the European market is key.

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The current events and recent data on the volumes of Russian natural gas export to Europe supports the analysis provided by Mitrova et al. [28] on its continuous prominent role in EU natural gas import, despite strong climate agenda [25]. Furthermore, regardless of all threats, the Russian export strategy for the European market should not be directed toward maximization of short-term revenues, but instead, toward securing a share of the European market through the gradual development of a win-win strategy. This implies stable export volumes for Russia as an exporter, and secure and stable supplies for Europe as a consumer. The benefits of such strategy can be exemplified of the positive impact of recently signed agreements between Gazprom and Naftogaz (Ukraine) to continue Russian gas transit through Ukraine until 2024 inclusive [60], which contributes to stabilization and security of the European natural gas market, and also keeps the current export share of Gazprom stable. 5.3. Asian markets The diversification of Russian natural gas exports is essential from the market perspective (developed from the 1990s) [27], and does not contradict with the European export direction since export volumes to Europe will not be affected by the growing volumes to Asian markets [61] However, successful diversification requires careful planning. The SWOT analysis in Table 6 summarizes the main factors determining the future of Russian exports to Asian markets. The current export volumes from Russia to Asian markets are modest, but can be significantly increased, both in the form of LNG and pipeline gas, through the development of infrastructure. Further projects to allow higher export volumes to Asian markets are the Sakhalin-3 project (potential resources 1.3 trillion m3 of gas) [62], and an LNG transshipment terminal in Kamchatka Peninsula (21.7 million tons of LNG per year by 2026, delivered from Novatek gas liquefaction plants located in Yamal Peninsula) (Fig. 8). The existing resources and infrastructure allow Russia to compete for higher shares in Asian markets, specifically in Japan, India, and South Korea. Fig. 8 Download : Download high-res image (218KB)Download : Download full-size image Fig. 8. Scheme of LNG transportation from Yamal Peninsula to the Asian region and the pipeline “Power of Siberia”. China has the most attractive market potential for Russian natural gas export due to huge volumes and projected growth potential. Both Russia and China have already taken serious steps towards expanding cooperation – Gazprom, and the China National Petroleum and Gas Corporation signed a 30-year contract for 38 billion m3 of gas annually, starting from 2019 through the gas pipeline “Power of Siberia” which was launched on December 2, 2019 (Fig. 8). The two countries have already committed to more intense long-term export-import relationships, but there is still a significant potential to expand, where the already existing infrastructure can serve as a base for further cooperation. Additionally, another potential gas pipeline – ‘Power of Siberia-2’ or ‘Altai’ project – clearly defines the priorities of the Russian natural gas export strategy to expand [63]. These announced constructions and developments of the natural gas export infrastructure contradict with the analysis provided by Orlov [19] on the potential scarcity of natural gas reserves. Further, it should be noted that based on this study and recent events (i.e. prolonged contract with Ukraine and Nord Stream-2 sanctions, section 5.2), additional gas export pipelines and diversification of exports towards Asia does not seem to add to the “bargaining position” [21] of Russia with Ukraine and EU, but are directed to increase access to Asian markets. Even though Asian markets are highly competitive, and there is a potential threat of oversupply, these markets are capable of accommodating even larger natural gas volumes due to intensive natural gas consumption growth. From a commercial and strategic perspective, Russia has the capabilities to diversify towards Asian markets, and should seek increased access. 5.4. Pricing and natural gas hubs Pricing is one of the cornerstones for Russian natural gas export, if not always the decisive factor, as geopolitical and strategic issues tend to dominate. Nevertheless, there are some pricing issues to consider, such as natural gas market price wars and price benchmarking. Gas-to-gas competition is a challenge for Russia, both from the external perspective (e.g., shale gas from the U.S.), but also from the internal one. Gazprom, being a monopolist in Russian pipeline natural gas, may be affected by potential market liberalization or competition from other Russian companies [23]. This may change the Russian gas market dramatically [16]. In order to keep its position in the European market while gaining higher shares in Asian markets, Gazprom should choose the right strategy, including a price policy. Another challenge for Russian natural gas export is the creation of a price benchmark in the Asian region. Specifically, this is an issue with regard to natural gas export to China. Since natural gas prices in China have historically been benchmarked with much cheaper coal [64], Russia has difficulties in sustaining its export margin, especially compared to the exports to European markets. Future LNG projects (Table 2) will open new opportunities for Russia's natural gas export. The list of importing countries may be significantly extended, including the growing import volumes from the partner countries (foreign investors from China, India and Europe). This will also demand higher attention to pricing issues, such as the development of the spot market for natural gas. The initial step towards mitigating the pricing misbalance is the creation of a gas hub network. The transshipment terminal being built in Kamchatka Peninsula can become the first Russian gas hub in the Asia-Pacific region, but for the reliable and secure operation of the gas pipeline “Power of Siberia,” at least one more gas hub is needed. Taking into consideration the location of the main natural gas resources directed for exports, existing and future transportation systems, and export potential to the Asian markets, the most promising areas for gas hubs are in the East Siberia region (Krasnoyarsk and Irkutsk production centers, Fig. 8). 5.5. Practical implications, limitations and future research The analysis presented in the paper is built on the most recent data, thus gives the updated and most relevant view on the state of global natural gas markets, and perspectives of Russian natural gas exports, thus useful for policymakers and industry practitioners. The presented analysis, including graphical material and SWOT analysis, can serve as a base for continuing investigations of challenges and opportunities for Russian natural gas exports. Specifically, the study is useful for further development of the Energy Strategy of Russia and the General Scheme. The results of the study can be used for scenario and planning purposes, for example, for the planning of related strategies in the EU, Russia, and Asian countries. This study is, however, subject to some limitations. First, a different methodology (i.e. literature review) can provide slightly different results. Even though the more complex method can be applied, we found the results reliable and confirmable by the current global natural gas markets’ developments. Second, given the strategical importance of the topic, there is a limited excess to the primary documents, which otherwise could have resulted in a more detailed analysis. For example, in order to analyze how a set of the new agreements between Gazprom and Naftogaz will affect the security of Russian natural gas transportation through the Ukrainian pipeline system, we need to get a full text of these documents. Unfortunately, these documents are not available in open access. Nevertheless, the limited access to the primary documents is compensated by trustworthy and detailed international statistical data sources (i.e., BP). Third, it may be of use to conduct a more detailed analysis of each of the national markets within the EU and Asia. Such kind of analysis may provide a more detailed understanding of the global natural gas markets’ development. Such an analysis may be a subject for a larger investigation. Finally, given the urgency of the subject, the constantly updating situation on the global natural gas markets, new agreements on e.g. pipelines construction, etc., may require regular updates. Russia is one of the world's largest producers and exporters of natural gas, and experiences significant challenges in maintaining and increasing its natural gas export volumes. At the same time, it is exposed to new opportunities. A decrease in export incomes will inevitably and negatively affect the country's economy; thus, the importance of a natural gas export strategy cannot be underestimated. Nevertheless, Russian natural gas export and energy strategies have not been renewed since 2009, and do not reflect the recent global changes, which significantly influence the positioning of Russian natural gas exports. By focusing on the recent changes on the global natural gas markets, the study addresses the lack of continuity in the analysis of challenges and opportunities for the Russian natural gas exports and provides the most contemporary analysis and overview of the related issues. The largest natural gas consumption markets are the U.S., European, and Asian markets. The study analyzed the Russian natural gas export potential in all the above, according to the recent macroeconomic and geopolitical changes, and global trends. The analysis of the U.S. natural gas market showed that there is no capacity for Russian natural gas exports due to increasing internal production of shale gas. Moreover, the United States has become a competitor for Russia in other natural gas markets. European markets are still the main destination for Russian natural gas exports, but the prospects are mixed. There are contradicting trends in the European market, such as reducing consumption, declining internal production, and others, which blur Russian natural gas export perspectives. Simultaneously, increased competition from other natural gas producers, gas-to-gas competition, price wars, and geopolitical issues add significant challenges for Russia. Nevertheless, the analysis showed that efforts should be directed towards maintaining the current natural gas export shares.

#### Russian economic decline causes nuclear war – Extinction

Stahl 15 Dr. Benjamin, CEO of the Blue Institute, PhD in Business Studies and Economics from Uppsala University, MA in International Relations from the University of Kent, and Johan Wiktorin, Founder and CEO of the Intelligence Company Brqthrough, Licensed Master of Competitive Intelligence and Former Member of the Swedish Armed Forces, “What’s At Stake?: A Geopolitical Perspective on the Swedish Economic Exposure in Northeast Europe”, Swedish Growth Barometer, 7/1/2015, https://blueinst.com/wp-content/uploads/2019/07/whats-at-stake\_geopolitical-perspective.pdf

Scenario 1: Disintegration If the Russian economy continues to deteriorate and the regime continue to distance themselves from the West, the centre may not be capable to maintain legitimacy and keep the periphery together. Already, some regions and counties are highly indebted. In other parts, ethnic Russians are a minority. Regions in eastern Russia, rich in raw materials, may look to China for funding. It is, however, probable that Beijing will not want to undermine the stability in Russia. Closer to the region in focus in this report, Kaliningrad is an area that could distance itself from the Kremlin. Economic problems and security concerns form a background that could lead to a political uprising. A “Kaliningrad-Maidan” development is at the heart of this scenario. Triggers could also come from outside Kaliningrad, in or in the immediate surrounding of the Russian Federation, or from other factors such as severe pollution. The other countries in the region would in all probability remain cool in this situation, considering the county’s military importance for the Russian government. However, a mutiny like the ones in Kroonstad in June 1917, March 1921 or on the frigate Storozjevoj in November 1975 cannot be excluded. Economic and political tensions in Europe could weaken the EU and worsen the development at the same time. A Greek withdrawal from the EU, triggered by its exit from the Eurozone, could set such a movement in motion. A Podemos-led government in Spain could undermine confidence for the single market, at a time when Europe also faces the consequences of a highly unstable North Africa, with a large flow of migrants. Attempts by Russia to influence certain members in the EU, such as Hungary and Cyprus, could sow further discord in the EU. At the most severe levels of disintegration, France could adopt policies effectively blocking EU and NATO response in a time of increased tensions. Britain may opt out of the union altogether, or be forced out if their demands for special status is rejected by the other member states. In all varieties of disintegration, uncertainty concerning the control over the nuclear arsenals will increase. The US will become involved both diplomatically and financially in order to bring clarity and establish control over the arsenals. Should Russia, in that situation, ask for military support for this, it is highly probable that the US would acquiesce: such operations in other parts of the world were the object of joint US-Russian exercises just a few years ago. Scenario 2: Ultra-nationalism If Russian domestic and international policy continues to become more radicalised, it might take ever more drastic forms. As the economy deteriorates, wages fall and shortages become common, a focus on nostalgic nationalism, using belligerent rhetoric and demonstrations of military power, could be used to deflect growing discontentment. A logical target would be to “protect” zones which are perceived as Russian, e.g. where there are Russian ethnic minorities or even just Russian-speaking areas. Such rhetoric was and is used in the Ukraine. The coming years will tell what the Russian ambitions are in the Ukraine. Offensives to secure and expand their supply lines, and weakening those of the Ukraine, are probable, and more ambitious plans, such as the opening of new directions in Kharkiv or Odessa, are possible. As a distraction, conflicts in Moldavia can be fuelled. If the West, primarily the US, UK and Poland, support Ukraine with military means, the risk increases for further escalation of the conflict. Remaining passive, on the other hand, runs the risk that Russia perceives that it could act against other targets. A second country that could be the target of Russian nationalism is Belarus. Judging by president Putin’s justification of the annexation of Crimea, Belarus would similarly be a legitimate candidate for “re-inclusion” in Russia. There are indications that the regime in Belarus are worried about such a development and acting to thwart it. In late 2014, Lukashenko appointed a new government, and has increased the emphasis on “Belorussian”. The fragmented (and thoroughly infiltrated) opposition has declared that it will not field candidates in elections this autumn, since they deem the threat of president Putin to be greater than of Lukashenko himself. Belarus has also passed laws permitting prosecution of non-regular armed troops, as a consequence of the Russian method employed in the annexation of Crimea. In the economic sphere, Russia has complained that Belarus is profiting from sanctions against Russia. Any attempts from Russia to enter Belarus’ with military means would probably not be met by any effective resistance from the Belorussian security apparatus. The opportunities for Russia are in some ways more favourable here than in Ukraine, due to the close cooperation between the countries’ armies and intelligence services. Passive resistance cannot be ruled out but would not mean much in a short-term. However, tensions with other former Soviet Union republics, with the EU and with NATO would surely increase. Polish and Lithuanian forces would probably mobilize to counteract spillover effects. EU policy would be substantially revised. Belorussian citizens would attempt to flee, primarily to neighbouring Poland, Lithuania and Latvia. The Russian government would also threaten the Baltic states, in order to undermine their economies and try to influence policy in these countries. Estonia, Latvia and Lithuania would be in a precarious situation. While they need to strengthen their civil and military defence, they must retain credibility with their allies and not be perceived as to exaggerate the Russian threat. The higher the tensions, the more sensitive the world is to psychological influence. Russia would, in this scenario, also fan nationalism in other parts of Europe through political and financial support. West Balkan is particularly vulnerable, as the EU and the US have invested considerable political capital in the region with only mixed success. Bosnia, Kosovo and Macedonia have stagnated in their political and economic development with high levels of unemployment, political polarisation and even the establishing of Islamic fundamentalist cells: a fertile ground for nationalist movements. Finally, Russian ultra-nationalism would also be directed inwards, with an escalated persecution of the domestic political opposition, independent media, and nationalisation of foreign assets. This will be combined with attacks on minority groups, especially on Jews. This scenario could happen separately or as a precursor to the final, and most dangerous, scenario. Scenario 3: Test of strength In this scenario, Russia would attempt to break NATO through challenging of one or more of the Baltic states. The objective would be to demonstrate to alliance members that NATO’s response is too late and too weak. A precondition for success is a distraction through a crisis by an intermediator, which would tie down especially American attention and resources. The distraction could come in many forms, e.g. by partnering with North Korea, fanning war in the Middle East, or even hidden support for terrorists. If the current polarisation in US domestic politics continues, any reaction will be obstructed and delayed. An especially vulnerable window of opportunity is in the period between the presidential elections in November 2016 and the installation of the new president in January 2017, which could create a legitimacy problem for the American political system when it comes to the possibilities of directly confronting Russia quickly. An attack on any Baltic state would directly affect Swedish territory and air space. In the worst-case scenario, it will happen immediately before open conflict with NATO. The Baltic states each offer different opportunities for Russia, but they all have in common that they lack any strategic depth, which means that an open invasion would be accomplished in a few days, unless support from other alliance members is forthcoming. Estonia, which is the most powerful of the three, both economically and military, poses as a potential threat to the trade over St Petersburg. To control the maritime traffic through the Gulf of Finland is an important motive for Russia to influence Estonian politics. The population of Estonia, with 25 percent ethnic Russians, could be used to legimize action and as grounds for destabilisation, especially around the border town Narva where more than 90% of the population is ethnic Russian. Latvia is the most vulnerable of the three states. The economy is weaker; the Russian minority is about the same as in Estonia; and Russian organised crime has a strong hold. Especially the eastern parts of the country are vulnerable to Russian influence. Lithuania only have about six percent ethnic Russians and a stronger military tradition. On the other hand, Lithuania offers access to Kaliningrad. Lithuania’s attempts to decrease their dependence on energy from Russia has annoyed the Russian regime, as is evident in the harassments by the Russian navy of the cabling operation which will connect the Lithuanian grid to Sweden. There are also some tensions surrounding the Polish minorities in the country which Russia could exploit. How fast Sweden will become involved depends on the extent of open, armed actions against one or all of the Baltic States. If a confrontation occurs with non-regular or paramilitary means, maintaining dominance over Swedish territory and territorial waters will be in focus. The same will be the case for Finland, but Finnish action could be influenced by Russian fabrication of tensions in Karelia, that Helsinki could be blamed for. NATO would try to respond in a controlled manner, i.e. prioritizing transports by air and sea. This would mean greatly increased traffic in and over the Baltic Sea. Tensions will rise drastically, with increased risks of miscalculations on both sides. Sweden and Finland are expected to act together with the rest of the EU and the US. If no direct military threat emerges against Sweden, then Sweden cannot count on any enforcements from the rest of the world apart from mutual information exchange. The instance that the citizens in the Baltic states perceive a risk of a Russian incursion, the probability is high that a flow of refugees will commence. From Lithuania, the biggest flow will be to Poland while Latvian will flee to Sweden, mainly Gotland. Refugees from Estonia can be expected to flee towards Finland or Sweden depending on where in the country they live and where they have relations or connections. In the worst-case scenario, Swedish and Finnish territory will become an arena for hostilities. As Russian readiness exercises have shown, airborne and marine infantry could rapidly and with surprise occupy parts of Gotland and Åland. A possible option is also to mine the Danish Straits in connection with this. By supplies of surface-to-air and anti-ship missiles, Russian forces can temporarily extend their air and coastal defence in the Baltic Sea, protecting an incursion by land into the Baltic states. NATO would be faced with a fait accompli. The invasion does not need to happen in all three states nor include the entire territory of a country. The only thing that is needed is a demonstration of NATO’s inability to defend alliance members. This would establish a new security order. Depending on the level of conflict that Russia would be willing to risk, air and navy bases in Sweden and Finland could be struck with missiles from the ground, air and sea. It is, however, likely that the governments would be issued an ultimatum to remain neutral, with only a few hours to comply. Public announcement of the ultimatum would put immense pressure on the political system and weaken resistance. Such diplomatic tactics could be reinforced by forced cyber attacks on the electricity and telecommunication networks. During the coldest months of the year, the vulnerability would be the highest. At the same time, Sweden would be expected to support their Western partners’ need for transports into the theatre of action. If Russia would close the Danish Straits, any military support to the Baltic states would need to move over Swedish territory; such as air support Norwegian air bases or aircraft carriers in the Norwegian Sea. There would also be demands to clear of mines in Oresund, and possibly for allowing equipment and troop transports to harbours on the east coast for further transport across the Baltic Sea. The Swedish to such demands would have consequences for generations to come. If Gotland would not be occupied by Russian forces, NATO would demand to set up bases on the island. The smallest indication of acquiescing to such demands would have the Russians racing to the island. Furthermore, Russia would coordinate activities in the far north, with submarines of all kinds and possibly even direct action in northern Finland and even in northern Sweden, in order to expand Russian air defence. Faced with the risk of direct confrontations between Russian and American forces, Russia could mount land-based as well as amphibian operations in the north of Norway and on Svalbard, to improve the defence of Murmansk. Following a similar strategy, occupying parts of Bornholm would make it more difficult for NATO to support their members. This is probably not necessary, but it is a possible option. In most people’s minds, there is a sharp line between the Baltic states’ eastern borders and Russia, the crossing of which is unconceivable. By first gaining the control over Gotland and Åland, the Russian General Army Staff could circumvent a mental Maginot line, in the same way as Germany attacked France through Benelux in May 1940. Russian success in this scenario hinges on speed and the ability to contain the conflict. The first message to Washington will entail the understanding that this is not a direct conflict between the US. For Russia, the uncertainty is therefore how US interests are perceived from an American perspective. For the US, it is not just the credibility of NATO that is at stake but also the unity of the EU. This has global connotations since allies (and enemies) in the Middle East and Asia will also form assumptions regarding the willingness and ability of the US to act in order to protect their allies. The risk is obviously that Russia miscalculates and underestimates the difference between, for instance, the departing presidential administration perceptions of US security interests on the one hand with the wider US security establishment’s perception of these on the other. During the whole process, the threat of nuclear strikes would hover over all decision makers, which increases the degree of uncertainty. Nuclear tests in the period before a test of strength cannot be ruled out, especially since Russian emphasis on nuclear deterrence could lose credibility over time. Direct threats of using the nuclear weapons is, however, completely excluded in this scenario.

#### 3] No war impact to collisions –

#### A] Planning priorities mean threats are overestimated.

Bowen 18 [Bleddyn Bowen, Lecturer in International Relations at the University of Leicester. The Art of Space Deterrence. February 20, 2018. https://www.europeanleadershipnetwork.org/commentary/the-art-of-space-deterrence/]

Space is often an afterthought or a miscellaneous ancillary in the grand strategic views of top-level decision-makers. A president may not care that one satellite may be lost or go dark; it may cause panic and Twitter-based hysteria for the space community, of course. But the terrestrial context and consequences, as well as the political stakes and symbolism of any exchange of hostilities in space matters more. The political and media dimension can magnify or minimise the perceived consequences of losing specific satellites out of all proportion to their actual strategic effect.

#### B] Military Precedent proves no escalation.

Zarybnisky 18, Eric J. Celestial Deterrence: Deterring Aggression in the Global Commons of Space. Naval War College Newport United States, 2018. (Senior Materiel Leader at United States Air Force)//Elmer

PREVENTING AGGRESSION IN SPACE While deterrence and the Cold War are strongly linked in the public’s mind through the nuclear standoff between the United States and the Soviet Union, the fundamentals of deterrence date back millennia and deterrence remains relevant. Thucydides alludes to the concept of deterrence in his telling of the Peloponnesian War when he describes rivals seeking advantages, such as recruiting allies, to dissuade an adversary from starting or expanding a conflict.6F 6 Aggression in space was successfully avoided during the Cold War because both sides viewed an attack on military satellites as highly escalatory, and such an action would likely result in general nuclear war.7F 7 In today’s more nuanced world, attacking satellites, including military satellites, does not necessarily result in nuclear war. For instance, foreign countries have used highpowered lasers against American intelligence-gathering satellites8F 8 and the United States has been reluctant to respond, let alone retaliate with nuclear weapons. This shift in policy is a result of the broader use of gray zone operations, to which countries struggle to respond while limiting escalation. Beginning with the fundamentals of deterrence illuminates how it applies to prevention of aggression in space.

#### C] It takes thousands more particles until we’re over the brink

CNN ‘2 (“Scientist: Space weapons pose debris threat” http://www.cnn.com/2002/TECH/space/05/03/orbit.debris/)

That scenario would likely never succeed or even happen in the first place, other space experts said. Military satellites are hardened to resist impacts from debris already in space and future orbiters will likely become even more protected as the technology improves, said Michael Kucharek, spokesperson for the U.S. Air Force Space Command. The Colorado-based outpost tracks almost 10,000 thousands of pieces of space junk four inches (10 cm) in diameter or larger. Moreover, such an attack would be technologically and economically daunting. "Very few nations could do that today. Even If you were to put tens of thousands of particles out there, it would pale in comparison to what is already out there," said Nick Johnson of NASA's Orbital Debris Program Office, which monitors the threat of small space debris to spacecraft. "We've looked at so-called chain reaction scenarios and it would require an exceptionally large number of particles," Johnson said.

#### D] Worst-case predictions show Kessler syndrome doesn’t prohibit space travel or pose a major threat to satellites in high LEO.

Von Fange 17. [Daniel von Fange] 21 May 2017. Braino. “Kessler Syndrome is Over Hyped.” Accessed 30 December 2021. <http://braino.org/essays/kessler\_syndrome\_is\_over\_hyped/> //L. Su

How bad could Kessler Syndrome in High LEO be? Let’s imagine a worst case scenario. An evil alien intelligence chops up everything in High LEO, turning it into 1cm cubes of death orbiting at 1000km, spread as evenly across the surface of this sphere as orbital mechanics would allow. Is humanity cut off from space? I’m guessing the world has launched about 10,000 tons of satellites total. For guessing purposes, I’ll assume 2,500 tons of satellites and junk currently in High LEO. If satellites are made of aluminum, with a density of 2.70 g/cm3, then that’s 839,985,870 1cm cubes. A sphere for an orbit of 1,000km has a surface area of 682,752,000 square KM. So there would be one cube of junk per .81 square KM. If a rocket traveled through that, its odds of hitting that cube are tiny - less than 1 in 10,000. So even in the worst case, we don’t lose access to space. Now though you can travel through the debris, you couldn’t keep a satellite alive for long in this orbit of death. Kessler Syndrome at its worst just prevents us from putting satellites in certain orbits. In real life, there’s a lot of factors that make Kessler syndrome even less of a problem than our worst case though experiment. Debris would be spread over a volume of space, not a single orbital surface, making collisions orders of magnitudes less likely. Most impact debris will have a slower orbital velocity than either of its original pieces - this makes it deorbit much sooner. Any collision will create large and small objects. Small objects are much more affected by atmospheric drag and deorbit faster, even in a few months from high LEO. Larger objects can be tracked by earth based radar and avoided. The planned big new constellations are not in High LEO, but in Low LEO for faster communications with the earth. They aren’t an issue for Kessler. Most importantly, all new satellite launches since the 1990’s are required to include a plan to get rid of the satellite at the end of its useful life (usually by deorbiting) So the realistic worst case is that insurance premiums on satellites go up a bit. Given the current trend toward much smaller, cheaper micro satellites, this wouldn’t even have a huge effect.

### 1NC: Multilateralism

#### **The US already permits mining under the SPACE Act – the plan undermines US law and scares away investors.**

Putro 20. [Yaries Putro is a student in the LLM program of the European and International Business Law, Faculty of Law, University of Debrecen, Hungary] December 2020. Prophetic Law Review, vol. 2, no. 2. “Mars Colonization Plan: The Possibility And Scheme For Appropriation On Mars” Accessed 24 December 2021. <https://www.researchgate.net/publication/348881202\_Mars\_Colonization\_Plan\_The\_Possibility\_And\_Scheme\_For\_Appropriation\_On\_Mars> // L. Su

The most important reform in U.S. space law came with the 2015 Spurring Private Aerospace Competitiveness and Entrepreneurship (SPACE) Act. As laid down in the U.S.C. Section 51, this Act provides: A United States citizen engaged in commercial recovery of an asteroid resource or a space resource under this chapter shall be **entitled to any asteroid resource or space**. Resource obtained, including to possess, own, transport, use, and sell the asteroid resource or space resource obtained in accordance with applicable law, including the international obligations of the United States.57 Whilst the idea that private companies could have access to space would have seemed far-fetched to the drafters of the Outer Space Treaties, the SPACE Act 2015 was the first instance for a government recognizing this trend and recognizing the commercial rights of private companies to space supply by law. Now that the new Section 51 was amended in 2015 has been in place, **US companies can be assured that any profits they generate from space mining at least under US jurisdiction are strictly legal**. While the United States was the first country to reinterpret the non-appropriation principle, others are adopting it. Luxembourg passed the Discovery and Use of Space Tools law on 20 July 2017, with 55-2 votes.58 Article 1 of the new law expressly specifies that 'space may be reserved' and that Article 3 clearly allows private companies to operate and space can be used for commercial purposes.59 The Act entered into force on 1 August 2017. The Official commentary on this Act provides that its aim is to provide companies with legal certainty regarding the ownership of space resources, an aim that commentators regard as valid under the Outer Space Treaty despite the concept of non-appropriation.60

#### Debris creates existential deterrence by raising the bar for conflict – international norms fail

Miller 7/31 [(Gregory, Chair of the Department of Space Power at the Air Command and Staff College, Ph.D. in Political Science from The Ohio State University) “Deterrence by Debris: The Downside to Cleaning up Space,” Space Policy, 7/31/2021] JL

The danger of kinetic strikes increasing orbital debris is a common theme in the literature, but the positive deterrent effects of some debris are often overlooked. The debris resulting from destroyed satellites, or other space objects, creates a deterrent effect on actors who might otherwise violate international norms and strike at objects in space, either to test their capabilities or as an act of hostilities. This is not deterrence in the traditional sense, of one actor publicly threatening punishment in response to another actor’s unwanted actions. It is not deterrence by denial since the attacker is not damaged and may even achieve its objective. Nor is it deterrence by punishment because the debris itself does not threaten to punish the attacker’s country. But debris can increase the future costs to the aggressor, even if their initial attack succeeds, and thus it has a similar restraining effect on certain behavior. Like the automated response of the U.S. tripwire in West Germany, the threat that debris can pose to state interests acts as a form of deterrence, at least to prevent some actors from taking certain types of actions. Removing the danger of debris will weaken that restraint and thus weaken deterrence, making ASAT tests and hostile actions in space more likely.

Several factors may deter a state from launching kinetic tests or striking against an adversary’s interests in space. For one thing, if a state’s adversary has similar capabilities to destroy objects in space, deterrence would be a function of not wanting to escalate tensions. Although international law only explicitly prohibits states from placing weapons of mass destruction in orbit, international space law, like the Outer Space Treaty [30], does provide a framework for addressing the activities of one state that lead to the damage of another state’s property. Likewise, there are international norms (informal but expected rules of behavior) against the weaponization of space. But these norms seem to be in decline [31], and such norms only deter a state from engaging in certain types of behavior if the state cares about following norms, if it cares about how states perceive its behavior, or if it believes other states are willing to enforce the norms. The beauty of debris as a deterrent is that it does not rely on the enforcement of norms or the credibility of states to succeed.

**Multilat fails**

**Naim, 13** (Senior Fellow International Economics at Carnegie, 2-15-’13 (Moises, “The G20 is a Sad Sign of Our Uncooperative World” <http://www.carnegieendowment.org/2013/02/15/g20-is-sad-sign-of-our-uncooperative-world/fgvs>)

The reality is that, despite many commitments by national leaders, the capacity of nation-states to co-ordinate their responses has dwindled. Problems may have gone global but the politics of solving them are as local as ever. It is hard for governments to devote resources to problems beyond their national borders and to work with other nations to address these challenges – while painful problems at home remain unsolved. The changing landscape of global politics also plays a role. As the number and the interests of those sitting at the tables where agreements are negotiated have increased, the opportunities for consensus and concerted action have shrunk. Emerging powers such as the Brics (Brazil, Russia, India, China and South Africa), new international coalitions, and influential nongovernmental players are now demanding a say in the way the world handles its collective problems. Inevitably, when all these disparate and often conflicting interests need to be incorporated into any agreement, the resulting solutions fall short of what is needed to solve the problem. This is why global **multilateral agreements** in which a large number of countries deliver on co-ordinated commitments **have become increasingly rare**. When was the last time you heard that an agreement with concrete consequences was reached by a large majority of the world’s nations? I think it was 13 years ago – the Millennium Development Goals. Since then, almost all international summits have yielded meagre results, most visibly those seeking to advance the global agendas on trade liberalisation and curbing global warming. This gap between the growing need for joint international action and the declining ability of nations to act together may be the world’s most dangerous deficit. In economics, when demand outstrips supply prices go up. In geopolitics the inability of nations to satisfy the demand for solutions to problems that transcend national boundaries results in dangerous instability. Pirates hijacking ships off the coast of Somalia, financial crashes that spread internationally at great speed, overfishing, the exploitation of the rainforest and nuclear proliferation are just a few well-known examples on the long list of problems that need international co-operation.