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Natural gas and the Russia-Ukraine crisis: Strategic restraint and the emerging Europe-Eurasia gas network

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ABSTRACT

This article explicates the puzzle of strategic restraint in contemporary European-Russian gas relations. The first and second sections compare and contrast successive gas wars since 2006, detailing respective dimensions to restraint and costly paralysis experienced by upstream, downstream, and transit states alike. The third part presents an alternative understanding of energy power politics rooted in social network analysis. It probes the validity of new forms of power, influence, and vulnerability in Russia's evolving gas relations with Europe, as derived from betweenness centralityämong emerging infrastructure hubs and the quality of corporate alliances across subregions of Central Europe. This includes cursory examination of the credibility and costliness of disruption related to the flexibility and diffusion of gas relationships into/across the northern and southern parts of Central Europe, as well as the social capital within Gazprom's corporate eco-system that bound Russia's lasting prominence as a supplier in these subregions. The final section identifies practical guidelines for transcending the current knotty predicament to stabilize commercial trading and peaceful U.S./Euro-Russian energy governance

The ongoing crisis in Ukraine again foisted natural gas diplomacy to the forefront of great power politics. Successive threats and actual disruptions of Russian gas supply from late 2013 through 2015 seemed to epitomize Moscow's trump card for coercing Kyiv and cowing Europe. At the time, the fear of a protracted cut-off was palpable among Western policymakers and commentators—stoked by precipitous 80% prices hikes, Kyiv's lasting vulnerability while under siege, and Russian President Putin's open letter threatening to cut off deliveries to Ukraine and Europe. The anxiety surrounding the prospects for a physical cut-off of Russian gas galvanized support for an EU Energy Union to harmonize, integrate, and diversify the internal market; as well as prompted U.S. congressional legislation aimed at expediting U.S. liquefied natural gas (LNG) exports to demonstrate immediate resolve and limit long-term damage to European energy security.[1]

For some, what was at stake was more than Ukrainian and European energy security. As was the case during the 2006 and 2009 gas wars, the asymmetric trading relationships, political salience,

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[1] On the perceived credibility and potency of Russia's threats to cut-off supply and wield the gas weapon among Western policymakers, experts, and commentators during this period, see especially Paying the Price, *The Economist* (April 29, 2014), http://www.economist.com/blogs/easternapproaches/2014/04/donald-tusks-energy-union; Alan Neuhauser and Paul D. Shinkman, Europe, Russia Ensnared in 'Energy Cold War,' *U.S. News and World Report*, (April 11, 2014), http://www.usnews.com/news/articles/2014/04/10/europe-russia-ensnared-in-energy-cold-war-experts-say; Jan Kalicki, Peace and Energy in Ukraine. . .and Russia, *Kennan Cable* 6: (March 2015); Margarita M. Balmaceda, Will Cheap Russian Gas Save Ukraine? *Problems of Post-Communism* 61:2 (March-April 2014), pp. 61–67; Jason Bordoff and Trevor Houser, American Gas to the Rescue? *Columbia/SIPA Center on Global Energy Policy* (September 2014), http://energypolicy.columbia.edu/sites/default/files/energy/CGEP_American%20Gas%20to%20the%20Rescue%3F.pdf; Paul Kirby, Russia's Gas Fight with Ukraine, *BBC News* (October 31, 2014), http://www.bbc.com/news/world-europe-29521564; and Agnia Grigas, Legacies, Coercion, and Soft Power, Russian Influence in the Baltic States, *Chatham House Briefing Paper* (August 2012), https://www.chathamhouse.org/sites/files/chathamhouse/public/Research/Russia%20and%20Eurasia/0812bp_grigas.pdf. Although recognizing mutual commercial interests in averting a protracted crisis, others were not sanguine that the Russian leadership could rise above political acrimony or narrow strategic ambitions to avoid a gas war. See Sergei Aleksashenko, Is There a Solution, *Carnegie Moscow Center* (July 22, 2014), http://carnegie.ru/commentary/?fa=56209; and Leon Aron, The Political Economy of Russian Oil and Gas, *American Enterprise Institute for Public Policy Research* (Spring 2013), http://www.aei.org/publication/the-political-economy-of-russian-oil-and-gas/. On how such fear fueled congressional acts to expedite U.S. LNG exports, see especially Brittney Lenard and Yevgen Sautin, Time for Natural Gas Diplomacy, *National Interest* (4 February 2014), at http://nationa-linterest.org/commentary/time-natural-gas-diplomacy-9825; and Mackubin Thomas Owens, Using Energy for Geopolitical Leverage, *Washington Times* (October 24, 2013).

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resentment of U.S. infringement, and state control over the gas monopoly, Gazprom, seemed to present the Putin regime with both strong motivation and a credible resource nationalist stranglehold to advance a broad neo-imperial agenda. Concerns about the geopolitical consequences of Moscow's market power extend beyond Russia's controlling development of energy fields off the coast of Crimea or exerting pressure on rival Eurasian energy suppliers. They include fears that the Kremlin will exploit the coercive potency of the gas weapon to stem the strategic drift of energy dependent former satellites, manipulate divisions among unevenly dependent European consumers, play-off Europe and Asia with construction of pipelines capable of delivering from similar fields, and buttress a "hybrid" approach to warfare in a run-up to Cold War 2.0.[2] Viewed in this light, Moscow's abrupt dumping of the much-maligned South Stream pipeline in December 2014 and subsequent ambivalence in pursuing an alternative route through Turkey – in favor of expanding gas sales directly into Germany without assuming obligations for building new pipelines on European soil—constitutes a deft strategic maneuver. In addition to bypassing Ukraine and bolstering Gazprom's competitive advantage at landing gas in established German and Czech markets, Nord Stream II threatens to displace future delivery of U.S. gas and to stoke rivalry among some of Europe's largest customers as they are constituting an Energy Union and building out the Southern Gas Corridor, all while remaining at the margin's of the EU's regulatory reach.[3]

For others, the tectonic shift in the global gas landscape—capped by the burgeoning liquefied natural gas (LNG) trade, changing political geography of supply and demand, and booming unconventional production in North America—fundamentally reduces Moscow's coercive gas leverage and augurs well for more aggressive responses to Russia. Sensing propitious market conditions and that Moscow now has much to lose from a gas showdown amid depressed oil prices and a listing economy, Western pundits and policymakers herald the merits of mounting a strategic counter-offensive. The latter includes slapping comprehensive sanctions on Russia's energy sector, forging European collective purchasing power and sub-regional cooperation, diversifying import routes and suppliers, implementing new strategies for gas storage and LNG, and accelerating transition to a low carbon energy sector to free Europe from Russia's steel umbilical cord.[4] The EU, in particular, is encouraged to practice "soft power with a hard edge," leveraging the attraction of its gas market and reinvigorated regulatory instruments to induce Gazprom to play by its rules.[5] Even modest American LNG exports are projected to create the flexible supply needed to tame Moscow's predation among otherwise dependent Baltic states. As put by former U.S. Energy Secretary Ernest Moniz, Moscow's belligerence gives "additional weight to the geopolitical criterion" in U.S. decisionmaking on fast-tracking LNG exports going forward.[6] Buoyed by the apparent success of oil sanctions at bringing Iran to the nuclear bargaining table and appalled by Moscow's truculence at reeling in pro-Russian insurgents in eastern Ukraine, a broad consensus among American and European policymakers is coalescing to support a *realpolitik* corrective that includes ratcheting up coercive pressure on Russia's energy sector.

Upon close inspection, however, the contending narratives on energy power politics fail to account for the conspicuous restraint that characterizes the gas crisis that has paralleled the conflict in Ukraine since 2013. This restraint on gas is especially curious. On the one hand, none of the central parties to the conflict acted rashly to provoke a sustained disruption in the supply of natural gas or to otherwise blunder into uncontrolled escalation between 2013 and 2015, even as each wielded natural gas as an instrument of political gamesmanship in acrimonious commercial haggling over prices and volumes. Unlike the gas wars in 2006 and 2009, Russian deliveries to Ukraine and transit onto European markets were not arbitrarily disrupted at the apogee of the recent political conflict. Gas continued to flow through mid-June 2014, notwithstanding the annexation of Crimea, unraveling of political authority in Ukraine, and *de facto* flow of Russian fighters and weapons across the border. The tempered gas diplomacy contrasted starkly with the kinetic dimensions to the "gray zone" conflict in Eastern Ukraine, as well as Moscow's provocative military encounters with U.S. and NATO forces across the globe throughout 2014–2015.[7] The gas cut-off eventually imposed by Russia occurred after negotiations began, substantive differences narrowed, and (to date) without causing protracted arbitrary transit shortfalls to Europe. As the worst part of winter neared and demand for gas to heat homes mounted, the parties stepped back from the brink in October 2014 to reach temporary agreement on Ukraine's partial debt repayment and prepayment for new Russian deliveries through the end of June 2015.[8] Similarly, the cessation of Russian supply to Ukraine again in July 2015 marked a pause in the haggling over terms for renewal of the contract, came largely at Kyiv's behest, and was not accompanied by a cut-off of Russian gas transited to Europe. With the aid of EU mediation, the parties reached a second compromise package by October 2015 that renewed gas purchases from Russia (at lower prices) to ensure vulnerable customers in Ukraine and East and Central Europe sufficient stocks through that winter season into early 2016.[9]

On the other hand, the strategic restraint in gas diplomacy has been precarious, seemingly vulnerable to discretionary disruption

[2] Ryan Maness and Brandon Valeriano, *Russia's Coercive Diplomacy: Energy, Cyber, and Maritime Policy as New Sources of Power* (New York: Palgrave Macmillan, 2015); Fiona Hill and Clifford G. Gaddy, *Mr. Putin: Operative in the Kremlin* (Washington, DC: Brookings Institution Press, 2015); and Michael Rule and Julius Grubiauskas, Energy as a Tool of Hybrid Warfare, *NATO Research Paper* 113 (April 2015), http://www.files.ethz.ch/isn/190791/rp_113.pdf.

[3] Jean Arnold Vinois and Thomas Pellerin-Carlin, Nord Stream-2: A Decisive Test for EU Energy Diplomacy, *Natural Gas Europe* (16 December 2015), http://www.naturalgaseurope.com/nordstream-2-eu-energy-diplomacy-expert-27171.

[4] Robert D. Blackwill and Meghan L. O'sullivan, America's Energy Edge: The Geopolitical Consequences of the Shale Revolution, *Foreign Affairs* (March/April 2014); R. James Woolsey and Anne Korin, How to Hit Putin Where it Hurts, *Wall Street Journal* (May 14, 2014). See also U.S. State Department International Security Advisory Report, *Report on Energy Geopolitics: Challenges and Opportunities* (July 2, 2014).

[5] Andreas Goldthau and Nick Sitter, Soft Power with a Hard Edge: EU Policy Tools and Energy Security, *Review of International Political Economy* 18:23 (August 2015).

[6] Zach Coleman, Energy Secretary Ernest Moniz: Geopolitical Concerns will Matter in Natural Gas Exports, *Washington Examiner* (March 21, 2014), http://www.washingtonexaminer.com/energy-secretary-ernest-moniz-geopolitical-concerns-will-matter-in-natural-gas-exports/article/2546062. On the projected strategic impact of U.S. gas exports, see especially Bud Coote, Surging Liquefied Natural Gas Trade: How US Exports Will Benefit European and Global Gas Supply Diversity, *Atlantic Council Report* (January 2016), http://www.atlanticcouncil.org/images/publications/Surging_LNG_Trade.pdf.

[7] For summary of Russia's provocative military action following the annexation of Crimea, see especially Thomas Frear, Lukaz Kulesa, and Ian Kearns, Dangerous Brinkmanship: Close Encounters Between Russia and the West in 2014, *European Leadership Network Policy Brief* (November 2014), at http://www.europeanleadershipnetwork.org/medialibrary/2014/11/09/6375e3da/Dangerous%20Brinkmanship.pdf, accessed November 15, 2014; and Roger McDermott, Myth and Reality- A Net Assessment of Russia's 'Hybrid Warfare' Strategy Since the Start of 2014 (Part One), *Eurasia Daily Monitor* 11:184 (17 October 2014), http://www.jamestown.org/single/?tx_ttnews%5btt_news%5d=42966&no_cache=1#.VQDyjGTF-tt.

[8] For summary, see Adam N. Stulberg, *Out of Gas: Russia, Ukraine,E urope, and the Changing Geopolitics of Natural Gas* 62:2 (2015), 112–130.

[9] Although deliveries between Russia and Ukraine were stopped again at the end of November 2015, both parties vied to take credit for initiating the disruption and confined their claims to commercial issues.

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at any moment. Although they avoided an outright gas war, the parties settled on costly and risky commercial compromises amid ongoing warfighting in the Donbass and reciprocal sanctions that carried looming threats of precipitous cut-offs in supply or transit. Seasonal packages provided unstable stopgaps to "on again, off again" disputes that did not resolve fundamental threats each posed to the others' energy security. Surprisingly, gas relations between Russia, Ukraine, and the EU entered 2016 much as they were at the onset of the Fall 2013 Ukraine crisis; the parties were locked in a co-dependent but strategically volatile predicament that surprisingly avoided uncontrolled escalation in contrast to the high intensity of the broader political and strategic conflict in the triangular relationship. As lamented by the Ukrainian Minister of Energy and Coal, "the whole story of this war is very strange" with continuous energy deal-making amid the arbitrary and costly political stand-off and bloodshed surrounding the future of the country and Europe's relations with Russia.[10]

What explains the seemingly precarious mutual restraint in contemporary Russian, Ukrainian, and European gas relations? Is it indeed doomed to lapse into another punctuated political showdown or protracted cut-off? Or, is restraint sustainable? Can the parties contain incentives for escalation, thus averting a costly gas war even as fighting persists and they impose sanctions on each other across non-energy dimensions to the conflict in Ukraine? Will they be able to extract themselves from this knotty predicament to stabilize Euro-Russian gas trading, if not parlay respective interests on gas issues to re-ground otherwise deteriorating strategic relations?

Answers to these questions require moving beyond a fixation on Russia's past record of heavy-handedness; or falling oil prices, new production, and changing global supply and demand to appreciate fundamental structural changes associated with the emergence of regional gas networks. The gas infrastructure in Europe, for example, is marked by unprecedented integration of cross-border trunk lines, interconnectors, reverse flow pipelines, LNG facilities, and storage depots. This complements the growing internationalization of diverse strategic business partnerships among state and private entities in the energy sector. Together, these trends are creating physical and social network relationships that are re-making power, influence, and leverage in transatlantic-Eurasian gas relations at the national and corporate levels across supplier-, transit-, and customer-states.[11] They are changing the characteristics of energy statecraft from traditional measures of "point-to-point" resource nationalism, market power, or asymmetric dependency in gas flows in favor of network dimensions directly related to the prominence of respective infrastructure hubs and quality of corporate investment and affiliation. This presents both new opportunities and constraints on coercive energy diplomacy. If embraced, the increasingly dense and diversified European infrastructure can afford new avenues for Western leaderships to coordinate and sustain pressure on Russia, while offering possible off-ramps for future commercial engagement. Yet, the evolving European gas network retains inefficiencies and stranded capacity, as well as preserves Russia's prominence as a commercial supplier, that cut against the disruption of commercially pragmatic exchange. The density of transnational knowledge transfer and business ties across East-Central Europe also reinforce the commercial appeal and trust in Russian supply – nothwithstanding non-energy dimensions of strategic and economic conflict – that, in turn, raise risks of non-commercial escalation and blowback by precipitous political intervention for all sides. Accordingly, it is in the best interests of policymakers in Washington and Brussels (and Russia) to jettison anachronistic memes of pipeline politics, energy independence, or market complacency in favor of carving out a new strategy for energy diplomacy and cooperation attuned to leveraging network hubs and lasting corporate relationships in the changing Europe-Eurasia gas landscape.

This article explicates the puzzle of strategic restraint in contemporary European-Russian coercive gas diplomacy. The first and second sections compare and contrast successive gas wars since 2006, detailing respective dimensions to restraint and costly paralysis experienced by upstream, downstream, and transit states alike. The third part presents an alternative understanding of energy power politics rooted in social network analysis. It probes the validity of new forms of power, influence, and vulnerability in Russia's evolving gas relations with Europe, as derived from "betweenness centrality" among emerging infrastructure hubs and the quality of corporate alliances across sub-regions of Central Europe. This includes cursory examination of the credibility and costliness of disruption related to the flexibility and diffusion of gas relationships into/across the northern and southern parts of Central Europe, as well as the social capital within Gazprom's corporate eco-system that bound Russia's lasting prominence as a supplier in these sub-regions. The final section identifies theoretical implications for network statecraft and conflict management, as well as practical guidelines for transcending the current knotty predicament to stabilize commercial trading and peaceful U.S./Euro-Russian energy governance.

1. Restraint amid warfare

Historically, Russian gas deliveries into the EU have flowed through cross-border pipelines.[12] The latter constitute physical-commercial ventures for moving natural gas that are subject to economies of scale and distance, long-life cycles, large upfront investment, and natural monopolies. As a fixed infrastructure prone to market failure, the commercial value of a pipeline is directly affected by the dedicated upstream supply, price of throughput, availability of alternative supply options, and form of state intervention.[13] Construction and operation of cross-border pipelines – which are on the rise due to the increased use of natural gas; proliferation of land-locked suppliers; and shift in relations among Eurasian states following the Soviet collapse – require contracts that stipulate property rights falling under different national jurisdictions and that distribute profits and rents among respective suppliers of throughput, owners of pipelines, host transit governments, and importers. These unique, physical, and fixed attributes of cross-border pipelines effectively "lock in" relationships of deep dependency among supplier-, transit- and customer-states that create opportunities for both rent extraction and extra-commercial bargaining leverage.[14] Hence, multiple public and private stake-

[10] Patti Domm, How Sanctions are Hurting Russia's Energy Sector, *CNBC.comCNBC.com* (24 April 2015), http://www.cnbc.com/2015/04/24/how-sanctions-are-hurting-russias-energy-sector.html.

[11] For a related but distinct discussion of how changes to structure of the global oil stream is fundamentally altering the potential for energy coercion, see especially Llewelyn Hughes and Austin Long, Is There an Oil Weapon?: Security Implications of Changed in the Structure of the International Oil Market, *International Security* 39:3 (Winter 2014/15), pp. 152–189.

[12] Although liquefied natural gas (LNG) terminals in the UK and Western Europe were developed in the 1990, by 2003 LNG gas imports accounted for only 7% of all gas consumed in Europe. Although EU member states possess nearly 200bcm/year LNG regasification capacity, in 2013<22% was utilized owning to cost constraints, regional pricing differentials, and infrastructure limitations on delivering LNG to those states heavily dependent on Russian gas.

[13] On pipeline economics, see Cross-Border Oil and Gas Pipelines: Problems and Prospects, *Joint UNDP/World Bank Energy Sector Management Assistance Program (ESMAP)* (June 2003).

[14] Brenda Shaffer, *Energy Politics* (Philadelphia, University of Pennsylvania Press, 2009), 47–65; and Richard E. Ericson, Eurasian Natural Gas Pipelines: The Politi-

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holders are left to their own devices to resolve conflicts of interests, protect vulnerable infrastructure, reconcile different national legal regimes and norms, and locate mutually rewarding outcomes for the reliable delivery of strategically important throughput.[15]

Viewed as a product of strategic interaction, physical disruptions in Russian gas supply to Ukraine and Europe have been seemingly over-determined. As summed up by one observer, the shift from the Soviet Union's single ownership and control of the vast gas reserves and pipeline system stretching to the borders of Europe, to a situation where Russia and key newly independent states must coordinate gas supply and delivery to downstream European customers has opened the door for conflict.[16] This has been compounded since the Soviet collapse by Kyiv's asymmetrical (up to 60–80%) dependence on subsidized imports from Russia, Ukraine's role as a transit state for 50–80% of Gazprom's deliveries to Europe, and Europe's willingness to construct new pipelines that bypass Ukraine while deepening its co-dependency on Russian gas (30% of EU imports) since the collapse of the Soviet Union. Coupled with volatile political relations, informal trading practices, and questionable commercial soundness of specific deals, this trilateral relationship remains an exceptional case for illustrating the potency of natural gas as a foreign policy instrument.[17] Moreover, as discussed elsewhere, Soviet legacy pipelines and pervasive regulatory opacity accentuate non-commercial risk-taking and credible commitment problems in contracting for all related stakeholders.[18]

Yet, both the bargaining contexts and strategic outcomes of Russia's successive gas showdowns with Ukraine have varied significantly. In 2006 and 2009, the stakes were primarily commercial with undeniable political risks that drove the parties over the brink. The former situation was especially conducive for the Kremlin and Gazprom to gamble on exacting discretionary terms of supply, given significant subsidies and non-payments in dealings with Ukraine amid rising European gas prices. Kyiv, too, was poised to take a hardline in light of the new government's pro-Western orientation and Gazprom's reliance on transit across Ukraine to meet growing European demand. The result was uncontrolled escalation of a commercial crisis into a four-day reduction of Russian deliveries to Ukraine. The related siphoning of transit gas produced knock-on interruptions for Central European customers during the cold of winter. A compromise was quickly reached that provided Kyiv with temporary price discounts and Gazprom with direct access to the Ukrainian retail market, while empowering an opaque constellation of intermediaries at the center of the regional gas trade.[19] The die was cast for conflict, however, as Russia's coveted reputation as a reliable supplier took a hit and Gazprom actively pursued alternative pipelines to Turkey and Germany to mitigate future vulnerability to Ukraine's coercive or disruptive transit policies.

The incentives for risk-taking again spiraled in the lead up to the 2009 crisis. This time, Gazprom could ill-afford Ukraine's default on a rising gas bill while it was committed to covering expensive Central Asian supplies as world prices, domestic production, and downstream European demand were falling. With immediate political and economic conditions worsening, the leadership in Kyiv also became more acceptant of taking risks. Hoarding earlier Russian deliveries and poised to re-route stored gas to domestic consumers, as well as facing downstream EU customers determined to pursue bypass delivery options, Kyiv had less to lose from both extorting Brussels' support for its energy security and disrupting the transit of Russian supply. What ensued was a painful two-week interruption of Russia's gas supply to Ukraine and 17 European countries, again during the depths of winter. Gazprom, too, paid dearly, losing over $1 billion in uncollected export revenue. The gas war also prompted concerted EU action aimed at diversifying supply from rival Eurasian producers, as well as strengthening ownership unbundling of transmission assets and third party access to pipeline capacity that presented significant regulatory complications for future Russian exports to Europe.[20]

The energy posturing surrounding the 2013–15 crisis, however, took a conspicuously different turn. At first glance, lingering disputes over gas prices, volumes, and rents seemed doomed to precipitate a gas war by Fall 2013. The likely outcome threatened to be more dire than in previous episodes as national sovereignty, regime survival, territorial integrity, and strategic orientation lied at the core of what was shaping up to be the gravest confrontation between Moscow, Ukraine, and the West since the Cold War. As the stakes elevated, political leaders on all sides conditioned mutual benefits of the gas trade more prominently on political and energy security concessions by the other. Gazprom arguably enjoyed greater leverage to deal assertively with Kyiv and insulate itself from European blowback in the lead up to the current crisis. This was due largely to the combined effects of a 6 percent drop in revenues from EU sales (compared to 2009), as well as the opening of the Nord Stream bypass pipeline to Germany in 2011. The latter simultaneously reduced the overall percentage of Gazprom's exports transited via Ukraine, while it raised Russia's share in total EU gas imports. The generally pro-Russian leadership in Kyiv at that time, too, was better poised to break the onerous 2009 gas contract with national storage facilities flush and demand met going into a projected milder winter. By the same token, the availability of re-routed gas owing to the boom in North American production, together with successive regulations passed by the EU—specifically those aimed at bolstering national emergency planning and deepening interconnectivity between energy and grid systems – increased the resilience and opportunity of downstream customers to arbitrarily renegotiate long-term contracts and play hardball with Gazprom. Coupled with a regulatory assault by the EU Commission on Russia's monopoly control of onshore links from the Nord Stream pipeline and oil-indexed long-term pricing, these initiatives threatened to strike at the heart of Gazprom's strategy for dominating the European market.[21]

In contrast to the showdowns in 2006 and 2009 and amid the ratcheting up of political pressure, none of the central players unleashed an open gas war since the end of 2013. Rather, in their own way, each side demonstrated remarkable restraint. At critical junctures throughout the crisis, each refrained from undertaking

cal Economy of Network Interdependence, *Eurasian Geography and Economics* 50:1 (2009), 28–57.

[15] Cross-border and transit pipelines are treated synonymously here to include the those that deliver throughput from a supplier that cross the territory of third parties (transit states) to get to a foreign market.

[16] James Henderson, Russia's Changing Gas Relationship with Europe, *Russia Analytical Digest* 163 (24 February 2015).

[17] Brenda Shaffer, Natural Gas Supply Stability and Foreign Policy, *Energy Policy* 56 (May 2013), pp. 114–125, accessed at http://www.sciencedirect.com/science/article/pii/S0301421512010178.

[18] Adam N. Stulberg, Strategic Bargaining and Pipeline Politics: Confronting the Credible Commitment Problem in Eurasian Energy Transit, *Review of International Political Economy* 19:5 (December 2012), pp. 808–836.

[19] Ibid.; and Jonathan Stern, The Ukrainian Gas Crisis of January 2006, *Oxford Institute for Energy Studies* (January 16, 2016), *http://www.oxfordenergy.org/wpcms/wp-content/uploads/2011/01/Jan2006-RussiaUkraineGasCrisis-JonathanStern.pdfhttp://www.oxfordenergy.org/wpcms/wp-content/uploads/2011/01/Jan2006-RussiaUkraineGasCrisis-JonathanStern.pdf*.

[20] Adam N. Stulberg, Strategic bargaining and pipeline politics; Simon Pirani, Jonathan Stern, and Katja Yafimava, The Russo-Ukrainian Gas Dispute of January 2009: A Comprehensive Assessment, *Oxford Institute for Energy Studies* (February 1, 2009), http://www.oxfordenergy.org/2009/02/the-russo-ukrainian-gas-dispute-of-january-2009-a-comprehensive-assessment/.

[21] James Henderson Russia's Challenging Gas Relationship with Europe.

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impulsive escalatory behavior that was within its capacity, as well as extended conciliatory gestures to ease pressure on the others. In stark contrast to the outbreak of fighting and failure of an effective cease-fire to take hold among Ukrainian regular forces and Russian-backed insurgents into 2015, the parties succeeded at stepping back from the brink when it came to gas delivery.

Moscow, most conspicuously, refrained from hastily shutting-off supply or coercing equity stakes in Ukraine's national gas company from increasingly indebted and enfeebled leaderships in Kyiv well into early 2014.[22] Amid repeated threats of imposing a cut-off of supply until Ukrainian debts were cleared, Gazprom pre-paid $5.5 billion for transiting gas to Europe through 2014 (and again in 2015), and offered to extend loans to facilitate payment for new imports. The Russian gas monopoly also refunded over $3.5 billion to compensate European consumers for adjusted price terms just as the crisis began to heat up. By September 2015, Gazprom demonstrated flexibility by selling 1.2 bcm via an initial export auction outside of long-term contracts, with a commitment to raise spot sales in Europe to 10% by 2016.[23] Even as it cut-off direct supply in mid-June 2014 (and again in summer and late fall 2015) and demanded re-payment and pre-payments from Kyiv, Moscow offered binding price discounts via lowered export duties for the duration of a future contract, as well as accepted international mediation to settle the amount and terms of outstanding debt recovery.[24] By signing onto successive 2014 and 2015 compromise packages, Moscow defied popular expectations by temporarily adjusting prices downward during respective winter seasons in concert with falling global oil prices.

Similarly, neither the embattled interim or subsequently elected governments in Kyiv nor diverse non-state actors (e.g. organized criminal elements, regional oligarchs, or corrupt officials) with opportunity to step into the widening power vacuum across Ukraine, arbitrarily disrupted transit of Russian gas to Europe, even as their options narrowed and stakes mounted. Although Kyiv fell deeper into arrears, unilaterally abrogated the "take-or-pay" terms of the standing contract with Gazprom, faced direct cut-offs, balked at Moscow's calculation for settling the debt and demands for pre-payments, and endured repeated violations of the Minsk Accords, it did not openly exploit Russia's dependency on European markets by withholding transit through 2015. The new government also went out of its way to protect the cross-border pipeline infrastructure from threats of sabotage by Ukrainian nationalists, as well as from shelling by Russian-backed militants. Even as it arbitrarily stopped purchasing gas from Gazprom – in November 2013, July 2015, and November 2015 – Kyiv took care both to distance the moves from political motivations and to avoid disrupting the transit of Russian gas to Europe. With storage facilities nearly flush and confident in a mild winter and residual reverse flow supply from Europe, the Ukrainian Prime Minister boasted that "it is not that they are not delivering us gas, it is that we are not buying any." Notably, this competitive gesture was directly linked to extracting lower prices from Gazprom through the first quarter of 2016, and contrasted with a parallel decision to ban Russian aircraft from using Ukrainian airspace that was explicitly characterized as "an issue of national security as well as a response to Russia's aggressive actions."[25]

The same restraint characterized EU reaction to the hostilities unfolding between Russia and Ukraine. The EU Commission, for example, delayed announcing the findings of its 2013 anti-trust investigation until April 2015, partially to avoid compounding tensions during the height of international anxiety over the annexation of Crimea. The EU also consistently refrained from imposing sectoral sanctions aimed at getting Russia to reverse its policies in Ukraine. Unlike with oil, the Russian gas sector was not directly targeted in successive rounds of sanctions. Brussels made a point of avoiding sanctions on current contracts for the delivery of gas to Europe, as well as distinguished its policy from that of the U.S. by limiting the specific number of Russian gas interests directly affected by capital and technology transfer restrictions imposed on exploration and new production through January 2016.[26] Furthermore, the EU persistently played the role of mediator during the gas crisis. In addition to providing good offices, the EU offered unprecedented financial assistance to Ukraine and conceded to the latter's right to draw on this support ahead of schedule to meet pre-payment obligations in successive compromise packages with Russia.

In short, all sides pulled punches throughout the protracted gas crisis. Energy ties effectively deepened from Fall 2013 through Spring 2014. Whereas Russia posted historical highs of gas supply to Europe by the end 2013, Ukraine received temporary energy discounts and advanced payment of transit fees through 2015. European companies, too, finalized international equity swaps and joint commercial ventures with Gazprom and other Russian energy companies just as Washington and Brussels imposed asset freezes, visa bans, and targeted sanctions. This mixed bag of gas diplomacy poses problems for contending *realpolitik* and market-oriented narratives, especially when considering previous behavior, respective capabilities, and deterioration in Russia's overall strategic relations with Kyiv and the West during the same period.

2. Costs and risks of restraint, 2013–2015

Successive compromise packages through the end of 2015 were temporary, and failed to resolve fundamental differences over terms of trade or to arrest competition for preferential bypass or diversification options. The first "winter package" in October 2014, for example, was unstable and sowed the seeds of ensuing acrimony.[27] For Ukraine, that Moscow's $100 discount came in the form of an export tariff exemption- rather than a formal amendment to the high price stipulated by the 2009 contract (in force until 2019)—left open the possibility of arbitrary cancellation at any time. Alternatively, with Kyiv free to reduce the rate of new

[22] Adam N. Stulberg, Out of Gas? Russia, Ukraine,E urope, and the Changing Geopolitics of Natural Gas, *Problems of Post-Communism* 62:2 (2015), pp. 112–130.

[23] Elena Kropatcheva, EC's Anti-Trust Inquiry into Gazprom's Practices: Its Significance and Meaning for Gazprom's Role n the EU Market, *Russian Analytical Digest* No. 174 (26 October 2015).

[24] Although Gazprom moved to stop sending gas to Kyiv and warned that subsequent Ukrainian desperation would risk another transit disruption in November 2015, the executive leadership continued to consider granting discounts on future exports closer to the end of the year when the prices for the first quarter of 2016 would be clear. Russia May Consider Issue of Discount on Gas for Ukraine Later This Year, TASS (16 November 2015), http://tass.ru/en/economy/836870.

[25] Shaun Walker, Ukraine Closes its Airspace to Russia as Gas Supply Dispute Erupts, *The Guardian* (25 November 2015), http://www.theguardian.com/world/2015/nov/25/ukraine-closes-its-airspace-to-russia-in-latest-escalation#img-1; and Vitaly Grabar, Ukraine Won't Buy Russian Gas Until Yearend-Minister, TASS (23 November 2015), http://tass.ru/en/economy/838579.

[26] Ibid; and EU Restrictive Measures in Response to the Crisis in Ukraine, http://www.consilium.europa.eu/en/policies/sanctions/ukraine-crisis/.

[27] By the end of October 2014, all sides formally stepped back to seal a winter package compromise. Brokered by the EU, this agreement obliged Ukraine to pay-off a $3.1 billion gas debt in two installments by the close of 2014, as well as to pre-pay for up to 5 bcm in new supply through March 2015. In return, Moscow granted a temporary price discount, and then adjusted prices downward in response to falling oil prices during this period. Gazprom also agreed to pre-pay transit fees for 2015. Although the EU rejected providing an explicit financial bridge to ensure Kyiv's commitment, it did offer unprecedented financial assistance to Ukraine and conceded to the latter's right to draw on this support ahead of schedule to meet obligations to Russia. Both Moscow and Kyiv signed on to press outstanding counter-claims regarding the amount of full debt repayment or compensation for undelivered gas, respectively, in the Stockholm international arbitration tribunal.

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imports amid falling oil prices, Gazprom risked delegitimizing its preferred "take-or-pay" terms and locking in significantly lower volumes and prices for future deliveries. The instability of political transition within Ukraine, coupled with the failure to secure a cease-fire on the ground, effectively sapped the credibility of commitments extended by both Kyiv and Moscow. By the same token, EU member states—which continued to rely on Russian gas to meet 30% of aggregate demand while locked into long-term contracts for over 70% of these imports—remained susceptible to arbitrary disruption in cross-border gas transit. This was underscored by the subsequent escalation of fighting around the strategic energy transport hub in Debaltseve and ensuing threats of non-payments for gas deliveries by Kyiv.[28] Not surprisingly, the deal was abrogated by July 2015.

The temporary compromises also masked more profound instability with the current *status quo* faced by each party. Russia paid a heavy price for its role in the conflict, losing over $100 billion and 10% in gas export revenue alone in 2014 owing to shortfalls in sales, sanctions, and reduced prices. The gas trade with Europe and Ukraine fell from a post-Soviet high at the end the end of 2013, to a low since 2003 without having substitute customers abroad or at home to recoup partial revenues losses or absorb locked in production.[29] Gazprom, which relies on sales to Europe to generate two-thirds of its revenues, incurred a 35% drop in net profits, 44% loss in overall sales to Ukraine, 27% reduction in transit gas to Europe, and 9% overall reduction in gas exports to Europe in 2014. Russian gas exports through the Nord Stream pipeline – once touted as an insurance policy against transit troubles presented by Kyiv – dropped more than 50% in February 2015 as compared to the previous year. Although Gazprom's share price began to recover by the end of 2015 to the level before the annexation of Crimea, it remained far below 2012-13 stock prices with dim prospects for climbing further as the company struggled with reduced volumes and prices in its largest markets, downgraded credit ratings, and sanctions on capital expansion.[30]

In short, exogenous shocks owing to the sustained drop in oil prices and sanctions widened loss-making across the gas sector, forcing Moscow to confront binding trade-offs between budgetary outlays for social/pension programs and military spending by Fall 2015.[31] In addition to the emerging buyers-market in Europe, spare capacity in the existing Nord Stream pipeline, Putin's abrupt cancellation of South Stream at the end 2014, competitive pricing and acrimony with the leadership in Ankara, and lingering problems with securing Chinese financing for long-term eastward projects combined to compromise the commercial and political viability of Gazprom's strategy for bypassing Ukraine. Brussels, in particular, resolved to oppose Russia's transit diversification projects, underscoring a commitment to maintaining Ukraine's status as a transit hub and compounding the regulatory challenges presented to Gazprom and related intergovernmental agreements for new pipeline projects. Although not foreclosing transit of Russian gas across Ukraine beyond 2019 contractual arrangements, the cumulative effect of the protracted crisis has been to sow uncertainty and costly improvisation in pursuit of Moscow's long-term export diversification strategy.[32]

For all of the posturing and temporary compromises with Moscow, Ukraine too has been caught in a difficult vice. Notwithstanding calls for reducing dependence on Russian deliveries and diversifying supply, Kyiv faces painful steps breaking Gazprom's near-term stranglehold over domestic consumption. First, the state gas monopoly has remained vulnerable to the illegal seizure of investments in Crimea and off-shore in the Black Sea.[33] Second, confidence in weathering future Russian supply shortfalls remains pegged to demand and performance indicators that assume very mild winter conditions and related consumption patterns. Although gas demand fell by an average of 21% over 2015 across all categories of consumption, the largest percentage drops compared to 2014 were registered in the war-torn eastern regions and due to curtailed service into Crimea.[34] Third, projections of immediate substitution of Russian supply – via the combination of increased domestic production, ramped up reverse flow deliveries, enhanced storage capacity, and domestic belt tightening – seem extremely optimistic. Kyiv, for example, approached winter 2015/16 with shortfalls in gas storage. Still dependent on Gazprom for over 80% of imports and unable to lock in a full 19 bcm for storage, Kyiv was forced to rely on auctions (without Russian participation) to cover any emergency shortfall.[35] Kyiv can fill less than 50% from domestic and European supplies compared to previous practice based on Russian deliveries, as well as will have to borrow an estimated $1 billion to upgrade its emergency gas reserves necessary to provide long-term relief.[36] Fourth, the December 2014 decision by Chevron to terminate an estimated $10 billion contract to extract shale gas in western Ukraine—following moves by Royal Dutch Shell and ExxonMobil to freeze operations for tight gas in eastern Ukraine and offshore gas in the Black Sea – struck a direct blow to Kyiv's strategy for long-term energy independence. Finally, perpetual political instability has complicated implementation of rationing programs. It has confounded the political will and capacity to introduce fundamental market and institutional reforms (e.g. unbundling packages) needed to unlock foreign investment and domestic efficiency for insulating the country from Russia's short-term discretionary gas supply policies.[37]

[28] Katy Golubkova and Vladimir Soldatkin, Russia may ease Ukraine's gas terms, but Kiev must settle its bills, *Reuters* (11 March 2015), http://www.reuters.com/article/2015/03/11/us-russia-crisis-novak-gas-idUSKBN0M70IQ20150311.

[29] Gazprom website.

[30] By mid-2014, Russia's state oil company, Rosneft, too showed signs of paying a heavy price, as it renounced earlier plans to increase production by 4–5% by 2020.

[31] According to the Russian Finance Ministry, the external shocks to the economy resulting from the decline in oil prices and sanctions totaled roughly $200 billion by Fall 2015. This came at a time when oil and gas constituted 70% of Russian export and 50% of federal budget revenues. This necessitated at least a 10% cut in federal social spending, as well as put the Russian government on trajectory to deplete its massive reserves within two years, absent a significant recovery in global oil prices and sanctions relief. Allan Cullison and Andrey Ostroukh, Russia Plans Deep Budget Cuts as Revenues Drop, *The Wall Street Journal* (14 January 2015), http://www.wsj.com/articles/russia-facing-budget-cuts-on-oil-price-western-sanctions-1421223776.

[32] Simon Pirani and Katja Yafimava, *Russian Gas Transit Across Ukraine Post-2019; Pipeline Scenarios, Gas Flow Consequences, and Regulatory Constraints*, NG 105 (Oxford Institute for Energy Studies, February 2016); and James Henderson and Tatiana Mitrova, *The Political and Commercial Dynamics of Russia's Gas Export Strategy* NG 102 (Oxford Institute for Energy Studies, September 2015).

[33] William Powell, Ukraine Complains to Russia Over Crimea Assets Seizure, *Natural Gas Europe* (18 February 2016), http://www.naturalgaseurope.com/ukraine-complains-to-russia-over-crimea-assets-seizure-28239.

[34] Ibid., Ukraine Sees Gas demand Down 21% in 2015, *Natural Gas Europe* (2 February 2016), http://www.naturalgaseurope.com/ukraine-gas-demand-down-21-percent-2016.

[35] Alexander Ryumin, Gazprom Won't Participate in Tender for Gas Supplies to Ukraine via Western Border, *TASS* (28 October 2015), http://tass.ru/en/economy/832388.

[36] Ukraine Gas deadline Heighten Threat of Shrinking Storage, *Bloomberg* (February 2, 2015), http://www.bloomberg.com/news/articles/2015-02-03/ukraine-gas-deadline-heightens-threat-of-shrinking-stockpiles; and Andrew Kravchenko, Ukraine to Borrow $1 Billion to Create Strategic Gas Reserve, *Reuters* (February 15, 2015), http://www.themoscowtimes.com/business/article/ukraine-to-borrow-1-billion-to-create-strategic-gas-reserve/515928.html.

[37] Ed Chow, Energy Reform: The Clock Has Struck Midnight, *Kyiv Post* (25 September 2015), http://www.kyivpost.com/opinion/op-ed/edward-chow-energy-reform-the-clock-has-struck-midnight-398688.html. In May 2016, for example, the EU Energy Community Secretariat requested substantial amendments to the Ukrainian gas unbundling plan that was assessed as insufficient at meeting the requirements of the EU's Third energy Package.

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Similarly, Europe remains frustratingly tied to Gazprom. BP alone experienced an 18% drop in revenue for 2014, due mostly to losses incurred from its Russian energy portfolio. Although fully replacing natural gas imports from Russia within a year is conceivable for European consumers—given spare capacity, alternative suppliers, and current declining demand – the costs of doing so would be significant. These costs would fall disproportionately on Central and South European states, adding to intra-EU political divisiveness that, in turn, threatens to undermine the very regulatory measures behind liberalization of the internal gas market that keeps Gazprom's predatory practices at bay. With political tensions over Greece's Eurozone bailout and Turkey's bid for EU membership (and the latter's growing market demand for gas), Brussels also has little sway over decisions to redirect the flow of Russian gas into Europe via new Turkish or Greek hubs, as well as other non-EU Energy Community Treaty states (e.g. non-EU Balkans, Ukraine, and Moldova). Intense competition over priority infrastructure projects and alternative diversification routes, divergent approaches to establishing an EU Energy Union, and the signing of commercial MOUs with Gazprom in 2015 for asset swaps and development of the Nord Stream II pipeline project continue to undermine the EU Commission's credibility for tightening sanctions on gas and overall bargaining power vis-à-vis Russia and Ukraine.[38] Furthermore, Moscow's gas pivot to deliver as much as 68 bcm to China and strategic designs for East Asia to constitute 31% of overall gas exports stand to limit the non-commercial pressure that the EU can bring to bear. The impact of the latter, in whatever capacity that materializes, is slated to hit just as the projected upswing in European demand for gas will begin to materialize by 2030.

3. An emerging Eurasian gas network

Although the symptoms are clear, the sources of strategic restraint in trilateral gas relations are not obvious. Which factors perpetuate the mutually costly and risky predicament short of a prolonged disruption in gas supply? Undoubtedly, the global gas sector has experienced fundamental change over the past several years that, in turn, carry direct implications for international energy security. But which aspects can account for the difficulty confronted by all sides at leveraging extra-commercial advantages to force favorable concessions in the terms of delivery, as well as at extracting from the mutually undesirable risk of precipitous escalation to a protracted gas cut-off?

The conclusion of the 2009 Russia-Ukraine gas crisis corresponded with structural change to the global gas landscape. This transformation was marked by the rise of the LNG trade, unconventional gas boom in North America, shifting global demand and supply, and post-Fukushima recalibration in the nuclear sector.[39] Together these developments increased the supply of gas, freed up deliveries between regional markets, created flexible options to deliver gas closer to large consumers in Europe, and expanded the share of spot-priced gas supplies that put pressure on long-term, oil-indexed contracts for Russian deliveries. This was coupled with the build out of cross-border interconnections, LNG regasification facilities, and storage facilities that converged to increase the density of hubs and links, as well as the flexibility for redirecting flows across the European market and into those sub-regions most directly reliant on gas imports from Russia. What began to take shape, in effect, were a series of regional sub-networks of interdependent gas infrastructure hubs and commercial arrangements that altered the value of specific "point-to-point" pipeline relationships and available trading options among established Europe-Eurasian partners (state and private).[40]

The strategic restraint and paralysis amid growing interdependence of Europe-Eurasian gas relations, however, poses a challenge for conventional explanations of energy coercion. In short, there has been either more energy disruption or more cooperation than classic theories can explain. For example, the neoliberal body of literature—which underscores the constraining and transformative effects of established supply relations and the cushioning impact of market mechanisms – struggles to account for costly episodic cut-offs, reputational costs, and persistent failure to institutionalize mutually rewarding and stable commercial cross-border gas relations.[41] Conversely, resource nationalist arguments – that more explicitly root the sources of energy coercion in asymmetric dependence—stumble on the episodes of restraint. Realists of different stripes cannot account for why the Kremlin or Gazprom precipitated a cut-off in 2009 at the moment that Russia retained the lowest market share in Europe since the Soviet collapse, while refrained from stranding vulnerable downstream European customers (especially during the depths of winter) to escalate pressure on Ukraine when its market standing recovered to 30% by late 2013. At the same time, market power arguments struggle to depict Moscow's continued hardline posture and resort to temporary cut-offs to Ukraine through 2015, just as Kyiv reversed its import dependency on Gazprom. This not only elevated the reputational and financial costs to the latter for little return, but opened the door for future competition with other suppliers for residual opportunities.[42] Similarly, resource nationalist theories cannot readily explain the variation in support for gas sanctions and development of non-Russian pipeline options among EU member states that were the most import dependent on deliveries from Gazprom, such as Bulgaria, Slovakia, Poland, and the Baltic States.[43]

While many theoretical models of interdependent energy relationships and networks exist, most assume that power and influence derive from the market power associated with existing contracts or extant volumes of gas that flow across any one segment, or the revenue tied to specific transactions. Threats of disruption need to be credible and sufficiently costly to carry political weight, thus rendering asymmetric dependency the key metric

[38] Simon Pirani and Katja Yafimava, *Russian Gas Transit Across Ukraine Post-2019*, pp. 21–27.

[39] *BP Statistical Review of World Energy* (June 2015), https://www.bp.com/content/dam/bp/pdf/energy-economics/statistical-review-2015/bp-statistical-review-of-world-energy-2015-full-report.pdf.

[40] The European gas network can be sub-divided in many ways. For the purposes of analyzing the strategic influence of Eurasian gas, the focus here is on the northern (Germany, Norway, Finland, Poland, Baltic States) and southern (Austria, Bulgaria, Croatia, Czech Republic, Greece, Hungary, Italy, Romania, Slovakia, and Slovenia) sub-regions of Central Europe. For description of the emerging European gas network, see especially Peter C. Evans and Michael F. Farina, *The Age of Gas & the Power of Networks* (GE Report, 2014), http://www.ge.com/stories/age-of-gas; Rui Carvalho, Lubos Buzna, Flavio Bono, Marcelo Masera, David K. Arrowsmith, Dirk Helbing, Resilience of Natural Gas Networks During Conflicts, Crises, and Disruptions, *PLoS ONE* 9:3:e90295 (March 2014); Nana De Graaff, A Global Energy Network? The Expansion and Integration of Non-Triad National Oil Companies, *Global Networks* 11:2 (2011), pp. 262–283.

[41] Elena Kropatcheva, He Who Has the Gas Calls the Tune? Russia's Energy Power Against the Background of the Shale 'Revolutions', *Energy Policy* 66 (2014), pp. 1–10; Steve A. Yetiv, *Crude Awakenings* (Ithaca: Cornell University, 2010); and Andreas Goldhau and Jan Martin Witte, Back to the Future or Forward to the Past? Strengthening Markets and Rues for Effective Global Energy Governance, *International Affairs* 85:2 (March 2009).

[42] By the end of 2015, Ukraine reversed its import dependency, purchasing over 60% of gas (Russian origin) from Europe and surviving the winter season without any Russian gas imports. See discussion in Agata Loskot-Strachota, Winds of Change: Challenging Future for Russia's Gas, in Silvia Colombo, Mohamed el Harrak, and Nicolo Sartori, eds., *The Future of Natural Gas: Markets and Geopolitics* (The Netherlands: Lenthe Publishers/European Energy Review, 2016), pp. 167–171.

[43] See especially Marshal I. Goldman, *Petrostate: Putin, Power and the New Russia* (New York, Oxford University Press, 2010).

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of strategic vulnerability.[44] However, control over prices or market and import shares offers only limited insight into strategic resilience in case of a crisis. Not only do such measures typically change on an annual basis, they do not reflect the re-trading of gas, volumes of unused gas (stored), spare capacity, or alternative options (e.g. concentration of supply) available to customers that otherwise purchase large volumes from a single suppler.[45] Yet, it is precisely the availability of such options that policymakers look to for relief when confronting a disruption, irrespective of commercial cost effectiveness or efficiency considerations. In addition, because of the huge sunk costs, price volatility, and regionally-defined nature of gas markets, the vast majority of gas exports to Europe are sold on long-term contracts varying from 10 to 35 years. Although the specific terms (e.g. take-or-pay, timing of delivery) of these legally binding contracts can be renegotiated, amendments to volumes and duration of contracts are subject to international arbitration. Moreover, the contracts themselves are reflections of the "norms of trust" and reliability built up over decades among corporate partners within the energy sector.[46] Accordingly, looking at the structural position within the gas network and nature of relationships, as opposed to the attributes of individual states and companies or the market power or volume of gas delivered between suppliers and customers, allow for analysis of influence among interdependent gas entities. In this regard, the character of infrastructure networks, which shapes the margin of flexibility and options confronting decisionmakers; and character of alliances among energy companies, which form the durability of corporate ties, directly affect the credibility and severity energy statecraft.

Social network analysis tells us that power derives from location and character of a specifically delineated set of relationships. Influence among mutually reliant actors stems not from material advantages in any one dyad, but from relative position in lasting patterns of association, both direct and indirect, within the broader social structure that bounds the interaction. In the context of physical energy networks, this can come from the centrality of a hub. Here, centrality broadly conveys the reach of a node in terms of access or brokerage to other important nodes within the network, as opposed to common definitions rooted in the volume of gas traded at any one point. The integration of hubs that receive piped gas from Russia and other Eurasian suppliers, import and distribute LNG, and concentrate vertical integration with other power and transportation sectors effectively alters the prominence and prestige of respective actors. The changing centrality of these emerging hubs – measured in terms of either connections or gatekeepers to pairs of other hubs (betweenness) or links to other prominent networks (eigenvector)—adds flexibility, resilience, and diversification to intra- and inter-network markets.[47] As observed, these structural features carry different implications for diffusing power and influence across the European gas system.[48] By inference, the more central the hub to other exchange relations within the network, the more it can subject the latter to its policy discretion and credibly threaten to coerce favorable outcomes, irrespective of the actual flows at any one time.[49] This can either reinforce the market power of a central node, or provide an alterative dimension of influence throughout the prescribed infrastructure network.

Such trends are complemented by well-established, deep, and cross-cutting commercial relationships. The latter constitute the grist for building trust and securing access to energy markets and resources across the network that transcend diverse company ownership types and formal institutional and regulatory voids at the national and EU-levels.[50] Here, too, the network approach to power politics underscores the relevant dimension to extra-commercial influence. What matters are not only relative material power and position, or even ownership type of energy firm, but the quality or strength of social ties that comprise the web of corporate partnerships. Disaggregating the latter reflects not simply the volume of trade or degree of "transnationalization" within a prescribed element of the gas sector, but the level of social capital—i.e. collective understanding, goodwill, and shared knowledge – that is exchanged and built up over time between interdependent partners. In this regard, the accumulated stock of social capital reflects the quality of the relationship between transacting parties.

This is noteworthy because the trust and social capital that flow between large energy companies can vary depending on the type of foreign direct investment exchanged between partners, with implications for coercive diplomacy.[51] Corporate alliances and joint R&D, for example, convey deeper exchanges of social capital among respective companies than do contracts and licensing agreements. The former entail longer gestation periods, denser ties, greater knowledge transfer, higher levels of inter-firm trading, and higher costs of divestment that significantly raise the material and social costs of disruption of exchange to the parent company. Similarly, those companies that enjoy dense ties and strong social capital in relationships with other companies that are also engaged in important exchange relationships within the network, are best positioned to exert influence across the corporate network. These same companies, whose assets and ties are more specific and less flexible, are more likely to lobby the home government to preserve favorable corporate strategic alliances or to circumvent adverse policies. Conversely, because gas supply contracts involve little more than

[44] See especially Brenda Shaffer, Natural Gas Supply Stability and Foreign Policy; and Rui Carvalho, et al. Resilience of Natural Gas Networks During Conflicts, Crises, and Disruptions.

[45] In the EU context, see critique in Simone Tagliapietra and Gerg Zachmann, Rethinking the Security of the European Union's Gas Supply, *Bruegel Policy Contribution* 2016/01 (January 2016), http://bruegel.org/wp-content/uploads/2016/01/Simone-Tagliapietra-Rethinking-Security-of-Gas-Supply-Bruegel-Presentation.pdf; and Ralf Dickel, Elham Hassanzadeh, James Henderson, Anouk Honore, Laura El-Katiri, Simon Pirani, Howard Rogers, Jonathan Stern & Katja Yafimava, Reducing European Dependence on Russian Gas: Distinguishing Natural Gas Security from Geopolitics, *OIES Paper/NG 92* (October 2014), https://www.oxfordenergy.org/wpcms/wp-content/uploads/2014/10/NG-92.pdf.

[46] Dickel, et al; and Rawi Abdelal, The Profits of Power: Commerce and Realpolitik in Eurasia, *Review of International Political Economy* 20:3 (2013), pp. 421–456.

[47] For general discussion of social network analysis and alternative measures of centrality, see especially Stanley Wasserman and Katherine Faust, *Social Network Analysis: Methods and Applications* (New York: Cambridge University Press. 1994); John Scott, *Social Network Analysis*, 3rd Edition (los Angeles, SAGE, 2013); and John Scott and Peter J. Carrington, eds., *The Sage Handbook of Social Network Analysis* (Thousand Oaks, CA: SAGE Publications, 2011).

[48] See for example discussion in Peter C. Evans and Michael F. Farina, *The Age of Gas & the Power of Networks* (GE Report, 2014), http://www.ge.com/stories/age-of-gas; Rui Carvalho, Lubos Buzna, Flavio Bono, Marcelo Masera, David K. Arrowsmith, and Dirk Helbing, Resilience of Natural Gas Networks during Conflicts, Crises, and Disruptions, *PLOS ONE* 9:3 (March 2014), www.plosone.org; and Philipp M. Richter and Franziska Holz, All Quiet of the Eastern Front? Disruption Scenarios of Russian Natural Gas Supply in Europe, *Energy Policy* 80 (2015), pp. 177–189.

[49] For a related discussion on international power in networks, see especially Emilie M. Hafner-Burton and Alexander H. Montgomery, Globalization and the Social Power Politics of International Economic Networks, in Miles Kahler, ed., *Network Politics: Agency, Power, and Governance* (Ithaca: Cornell University Press, 2009), pp. 28–31.

[50] See discussion especially in Nana De Graaff, A Global Energy Network? The Expansion and Integration of Non-Triad National Oil Companies, *Global Networks* 11:2 (2011), pp. 262–283.

[51] This derives from insights from James E. Alt, Fredrik Carlsen, Per Heum, and Kare Johnson, Asset Specificity and the Political Behavior of Firms: Lobbying for Subsidies in Norway, *International Organization* 53:1 (1999), pp. 99–116; Dong-Hun Kim, Coercive Assets? Foreign Direct Investment and the Use of Economic Sanctions? *International Interactions* 39 (2013), pp. 99–117; Richard Caves, *Multinational Enterprise and Economic Analysis*, 3rd Edition (Cambridge: Cambridge University Press, 2007); Michael Woolcock, The Place of Social Capital in Understanding Social and Economic Outcomes, *Canadian Journal of Policy Research* 2:1 (2001); and Mark Granovetter, Economic Action and Social Structure: The Problem of Embeddedness, *American Journal of Sociology* 91 (1985), pp. 481–510.

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meeting the terms of a specific deal, they can be replaced when substitutes or other competitive contracting options arise. These corporate relationships are simply less sticky. Consequently, even though a firm may enjoy market power, sell a significant volume of gas to a foreign customer, or have a licensing agreement in place, the former may be more vulnerable to the disruption owing to lower social capital transaction costs to searching out rival partners. Because there is less trust and social capital at stake, it is less costly for the parties to reconstitute new trading relations, irrespective of asymmetries in extant point-to-point flows or market-based exchange and power.

3.1. Sub-regional infrastructure networks

While it is premature to unpack decisionmaking in contemporary Russia-Ukraine-EU gas relations, a distinguishing feature is that events continue to unfold as multiple large-diameter cross-border pipelines, LNG import facilities, interconnectors and reverse flow options, new gas storage facilities, and strong cross-border commercial ties are converging to constitute a European gas network. Yet, the density of this infrastructure varies across sub-regions, marked by the interaction of mature and new hubs where gas is produced, traded, and re-routed to various locations of demand across Europe. Social network analysis offers insights into the relative influence and optionality afforded by emerging infrastructure hubs that are embedded in these interdependent sub-regional gas-trading relationships. In some cases this reinforces Russia's market power; in other instances such network power attenuates the coercive potential of Gazprom's market standing altogether.

Using geo-coded data from *Gas Infrastructure Europe Capacity Map (2014–16)*, the cross-border gas delivery infrastructure in Central Europe can be divided into north and southern sub-regional networks.[52] Hubs are defined by the geographic concentration of cross-border pipelines, LNG facility, and storage depots, and are distinguished by the capacity of each element (e.g. reverse flow capacity, diameter of pipelines, volume of storage and LNG facility). Within these physical networks, undirected betweenness centrality measures the influence, via shortest and most efficient connections, of a gas hub to other relationships within the sub-network, irrespective of the current volume or directional flow of gas or location of the infrastructure within the network. Alternatively, undirected eigenvector centrality can capture the prominence of a hub relative to other important nodes and connection points both inside and outside of the specific sub-network. The latter, therefore, can account for the ability of a hub to connect to other nods within the network that can leverage access to global supply via LNG. These networks are mapped using a Force Atlas layout that balances repulsion and attraction among nodes, thus highlighting similar types and close relationships within dominant sub-clusters within the geographically defined gas network. Moreover, these metrics are distinguished from static measures of asymmetric dependence that infer influence directly from control over flows or price derived from the market power of specific suppliers and customers.

Applying these metrics and insights from social network analysis illuminates the diffusion of extra-commercial power within Central Europe's sub-regional infrastructure networks. Within the northern sub-region, as depicted in Fig. 1A, Russia's long border gives it the highest undirected betweenness score, capped by cross-border hubs in Germany, Latvia, and Lithuania.[53] Notwithstanding the blows to Gazprom's monopoly position since 2014, Russia stands to remain a supply anchor within this sub-network for the foreseeable future, buttressed by the Nord Stream pipeline. Adding to Gazprom's advantages at landing cheap gas, Soviet legacy large-diameter cross-border pipelines and storage facilities effectively establish the largest single source of delivery to a string of infrastructure pairings across the sub-region. These few hubs provide Gazprom the highest capacity and direct access to markets across Belarus, Ukraine, Finland, Germany, Poland, and the Baltic States. This network power, therefore, complements projections of Russia's sustained market share in the sub-region in the face of growing U.S. LNG imports that will mostly replace declining domestic EU member production and drive out competitors other than Russia at lower prices.[54]

At the same time, the emergence of satellite hubs creates opportunity for incremental competition with Russian imports to offset the latter's non-commercial coercive advantages. As depicted in Fig. 1B, Germany enjoys the highest national prominence via eigenvector betweenness, owing to direct pipeline links to both Russian supply and Central and East European hubs (e.g. in Czech Republic, Austria, and the Netherlands). This network prominence affords Germany opportunities both to bolster supply diversity (notwithstanding Gazprom's prospects for increasing deliveries to Berlin), and to play an instrumental role in enhancing the flexibility of flows between other energy partners within the European sub-network. This layout also suggests the potentially significant impact of adding individual components, such as LNG facilities in Poland, the Baltic States, and Finland, notwithstanding the heavy import dependence on Gazprom for all of these states. The Baltic States and Poland, for example, constitute a north-central eigenvector hub with development of related LNG facilities and interconnectors southward. The operation since December 2014 of a floating storage and regasification unit, for example, creates new options for relieving Lithuania's dependence on Russian gas. Notwithstanding the 10% premium Vilnius is expected to pay for purchasing LNG from Norway and Australia (and possibly the U.S.), the mere opening of the new facility affords opportunity to link up to global suppliers that, in turn, strengthens Lithuania's bargaining position vis-à-vis Gazprom. As asserted by the Lithuanian Energy Minister, "from now until forever, our access to LNG puts a cap on what Gazprom can charge us." This is complemented by construction of LNG terminals in Poland and Croatia, with plans for a respective interconnector, that offer to both enhance flexibility and diversity of supply along a north-south corridor.[55]

[52] Author thanks Jeremiah Granden for conducting this analysis of the infrastructure network and generating respective figures. *Gas Infrastructure Europe*, http://www.gie.eu/(accessed May 2016).

[53] Top ranking cross border points, as measured by undirected betweenness centrality in the northern sub-region are Griefswald (Russia-Germany, Nord Stream land fall point), Belarus Transit, Korneti (Russia-Latvia), and Mallnoww (Poland-Germany cross border).

[54] Russia's marginal cost advantages at landing gas to northern Europe via established pipelines are expected to preserve its commercial market power amid lower prices. Tim Boersma, An Assessment of U.S. Natural Gas Exports, *Brookings Energy Security and Climate Initiative* (July 2015), https://www.brookings.edu/wp-content/uploads/2016/06/lng_markets.pdf; and Jason Bordoff and Trevor Houser, American Gas to the Rescue: The Ipmact of US LNG Exports on European Security and Russian Foreign Policy, *Columbia/SIPA Center on Global Energy Policy* (September 2014), http://energypolicy.columbia.edu/sites/default/files/energy/CGEP_American%20Gas%20to%20the%20Rescue%3F.pdf.

[55] Andrius Sytas, Lithuania to pay more for Norwegian LNG than Russian Gas, *Reuters* (13 November 2014), http://www.reuters.com/assets/print?aid=USL6NOT268X20141113. See also discussion in Bud Coote, Surging Liquefied Natural Gas Trade. Because new LNG contracts include tolling fees—whereby the purchaser pays a sunk cost to the supplier in return for negotiating future time, price, and volumes of a sale—the buyer has more incentive to follow through on future purchases of LNG deliveries amid a down turn on prices instead of purchasing otherwise cheaper Russian piped gas.

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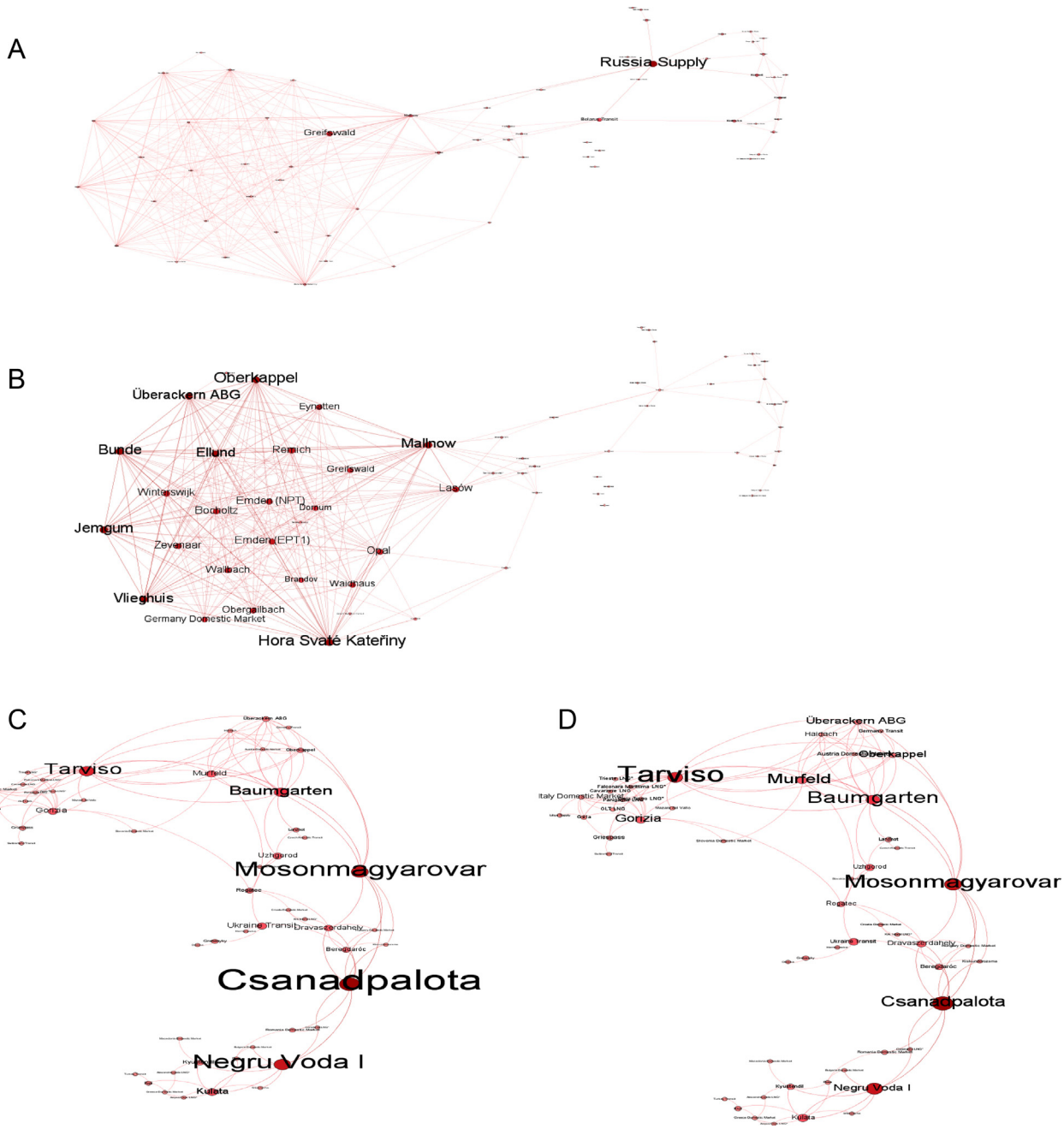

Fig. 1. (A) Undirected Betweenness Northern Europe (B) Undirected Eigenvector Northern Europe (C) Undirected Betweenness CESEC (D) Undirected Eigenvector CESEC.

A different dynamic characterizes the southern sub-regional gas network in Central Europe, as illustrated by Fig. 1C. Here, Russian border hubs are not prominent, even though states such as Slovakia, Bulgaria, Hungary, and Greece remain reliant on Russia for 65–95% of total gas imports. Rather, Austria, Romania, and Hungary are emerging as sub-regional gas hubs due to their direct and short connections to markets across southeast Europe, Ukraine, Moldova, and the Balkans.[56] The betweenness scores of respective cross-border hubs involving Romania-Hungary, Austria-Hungary, Romania-Bulgaria, Italy-Austria, and Italy-Slovakia rank highest for the sub-region. Conversely, Bulgaria and Greece score much lower in terms of national betweenness centrality because of fewer cross-border access points and connections to smaller infrastructure hubs across the network, notwithstanding prospects for development of respective inter-connectors.

As illustrated in Fig. 1D, Hungary, stands out as an emerging switching center of gas across the sub-region, with the highest eigenvector score. It enjoys multiple border crossings that allow it to efficiently receive and deliver gas in all directions. It maintains direct ties to important markets in Austria and Europe's gas sink, Italy; to gas flowing through Turkey and alternative Eurasian supplies; to deliveries from Russia; and to shipments flowing north-south, from the Baltics to the Balkans. With links to LNG facilities in Italy – as well as to future individual LNG projects in Romania and Croatia that stand to make a significant impact – Hungary also is well poised to leverage gas relationships that extend beyond

[56] The highest ranking cross-border points in terms of undirected betweenness centrality in the southern sub-region were Csanadpalota (Romania-Hungary), Negru Voda I (Romania-Bulgaria).

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Europe.[57] Slovakia, too, is becoming an important extension hub for alleviating pressure within in this most vulnerable sub-region. Although dependent on Russian gas supply for over 90% of national gas consumption, it is the EU member best situated to "reverse" the flow of gas to Ukraine, and to plug into Hungary's gas grid. It also is poised to link up to a newly constructed Polish LNG plant and connectors to Polish and Czech transmission systems. The latter offer opportunities to fundamentally reduce the strategic vulnerability posed by import dependence on Russia, as well as to serve as an integral connection across the East Central European sub-network.

3.2. Corporate ties that bind

The contemporary Ukrainian crisis illuminated the intensity of inter-state corporate ties between European and Russian gas entities. Leading energy companies across Europe—obliged to earn profits for their shareholders– rely increasingly on long-standing and trusted business partnerships with Gazprom and their experience of reliable supply to navigate the uncertainty of the changing landscape. As international tensions mounted and sanctions were imposed in the 2013–15 crisis, some of these largest multinational energy stakeholders "doubled down" on gas investments, staved off more stringent restrictions on existing projects, and forged closer business ties with Gazprom. For example, E.ON, Shell, and OMV—some of Gazprom's most intimate commercial partners—inked a shareholders agreement in June 2015 to build the Nord Stream-2 pipeline that effectively reinforced Russia's transit diversification strategy. This occurred over the staunch objections of national leaderships in the Baltic States, Poland, and Slovakia, as well as flouted policy initiatives promulgated in Berlin and Brussels. Conversely, other state and private companies with long histories of import dependence on Russia, including those in the Czech Republic, Slovakia, and Baltic States, lined up directly behind respective government policies in support of sanctions or to conduct reverse-flow operations, notwithstanding Gazprom's threat of costly retaliatory disruption.[58]

A more nuanced measure of the quality of these ties necessitates unpacking Gazprom's corporate ecosystem within Central Europe. The social capital costs to disrupting the gas trade with Russia can be discerned and visualized from the betweenness centrality of the quality of corporate relationships established with Gazprom and its subsidiaries operating within the respective sub-regions. The nodes constitute major firms operating in the natural gas sector (defined by standard industrial classification code), the edges represent multiple transactions between respective energy firms registered within the geographically defined space, and colors reflect the countries of registry within the sub-region. The edge thickness captures the strength of formal relations and intensity of knowledge transfer/social capital. The Thomson Reuters SDC Platinum database of corporate deal making allows for disaggregating, weighting by knowledge value exchanged, and coding (SIC) the quality of inter-firm relationships according to joint venture (highest), R&D and marketing, technology transfer, manufacturing, exclusive licensing, and contracted delivery. Node size and proximity are proportional to betweenness centrality. This illuminates the relative density and costliness of disruption to direct relationships and related knock on effects for other high quality relationships within the sub-regional corporate energy eco-system. Analyzing how these relationships respond to successive gas wars is suggestive of the strategic significance of social capital within these networks.[59]

Preliminary analysis of sub-regional dimensions to corporate strategic energy alliances reveal several emerging trends. First, Gazprom's social capital across both sub-regions increased since 2006, notwithstanding successive gas wars. For example, a search in the SDC database suggests that the aggregate number of corporate affiliations within the northern sub-region expanded by nearly 50% from 2006 to the end of 2015.

Second, and more revealing, the quality of Gazprom's corporate ties varies significantly. Fig. 2 A illustrates Gazprom's prominence within the northern sub-region following the 2009 gas war.[60] Clearly, Gazprom enjoys very strong corporate ties with leading German and Finish gas companies. This correlates with the high volume of contracted bilateral gas trade. Yet, given that Germany is not import dependent on Russia, the strong social ties may better account for the continued partnership and outspoken political support provided by senior executives from respective German companies to Gazprom throughout the recent crisis. Gazprom also maintains strong corporate affiliation with Norway, a supply competitor, as well as deepening strategic ties (via partnership with German firms) with the Polish national gas company. The latter would seem to accentuate to transaction costs of divorcing trusted corporate ties, suggesting potential limits to Warsaw's threats of an energy break from Russia.

However, what is most striking is what does not appear when probing the strength of corporate ties within the northern sub-region. Specifically, Gazprom lacks strong corporate relationships with the gas sectors across the Baltic states and with the Czech Republic, notwithstanding its market power and the large contracted volumes of deliveries with respective corporate customers.[61] Whereas the latter would suggest strong inhibitions and risks to disrupting extant gas supply contracts with Russia, the former correlate with the national political and corporate support for energy diversification, reverse flow, and infrastructure and inter-connector build out across the Baltic states. The absence of strong social ties effectively reduces the transaction costs of shifting to alternative supply options as they arise. This may account for why threats of marginal deliveries of imported LNG into this sub-region curtailed Gazprom's bargaining leverage and compelled it to reduce the price of contracted deliveries to Lithuania by 23% since 2015, irrespective of the continued marginal cost advantages at landing larger volumes of cheaper Russian gas.

Within the southern sub-region, Gazprom's corporate alliances constitute the basis for strong affiliation to augment Moscow's market power. Fig. 2B reveals that this is especially the case with leading Italian, Hungarian, and Austrian energy firms that provide Gazprom indirect influence over important corporate affiliations across the sub-region.[62] The very strong ties with the Italian firm ENI, for example, allow Gazprom to project influence indirectly across the country's energy sector, given the latter's direct affiliation with

[57] The cross-border hub, Csanadpalota, ranks highest by both betweenness and eigenvector scores that reinforce Hungary's importance as an emerging regional hub.

[58] See discussion in Rawi Abdelal, The profits of power: Commerce and realpolitik in Eurasia, *Review of International Political Economy* 20:3 (2013), pp. 421–456; Keith Johnson, Digging Themselves in Depper: Why Big Oil is Doubling Down on Putin's Russia, *Foreign Policy* (April 22, 2014), http://www.foreginpolicy.com/articles/2014/04/22/digging_themselves_in_deeper_big_oil_putin_russia; and Simon Pirani and Katja Yafimava, *Russian Gas Transit Across Ukraine Post-2019*, pp. 21–25.

[59] Author thanks Dr. Rahul Basole, in particular, for curating the data and creating the visualizations that informs this analysis.

[60] This figure depicts nodes (firms) and edges (transactions) among entities based in Germany, Norway, Finland, Poland, Lithuania, Latvia, Estonia, and Russia.

[61] Anne Neumann, Sophia Ruster, and Christian von Hirschhausen, *Long-Term Contracts in the Natural Gas Industry- Literature Survey and Data on 426 Contracts, 1965–2014* (Berlin: Deutsches Institut fur Wirtschaftsforschung, 2015).

[62] This figure depicts nodes (firms) and edges (transactions) among entities based in states defined as constituting the EU's Central and South Eastern Europe Gas Connectivity (CESEC) and Russia– e.g. Austria, Bulgaria, Croatia, Czech Republic, Greece, Hungary, Italy, Romania, Slovakia, and Slovenia.

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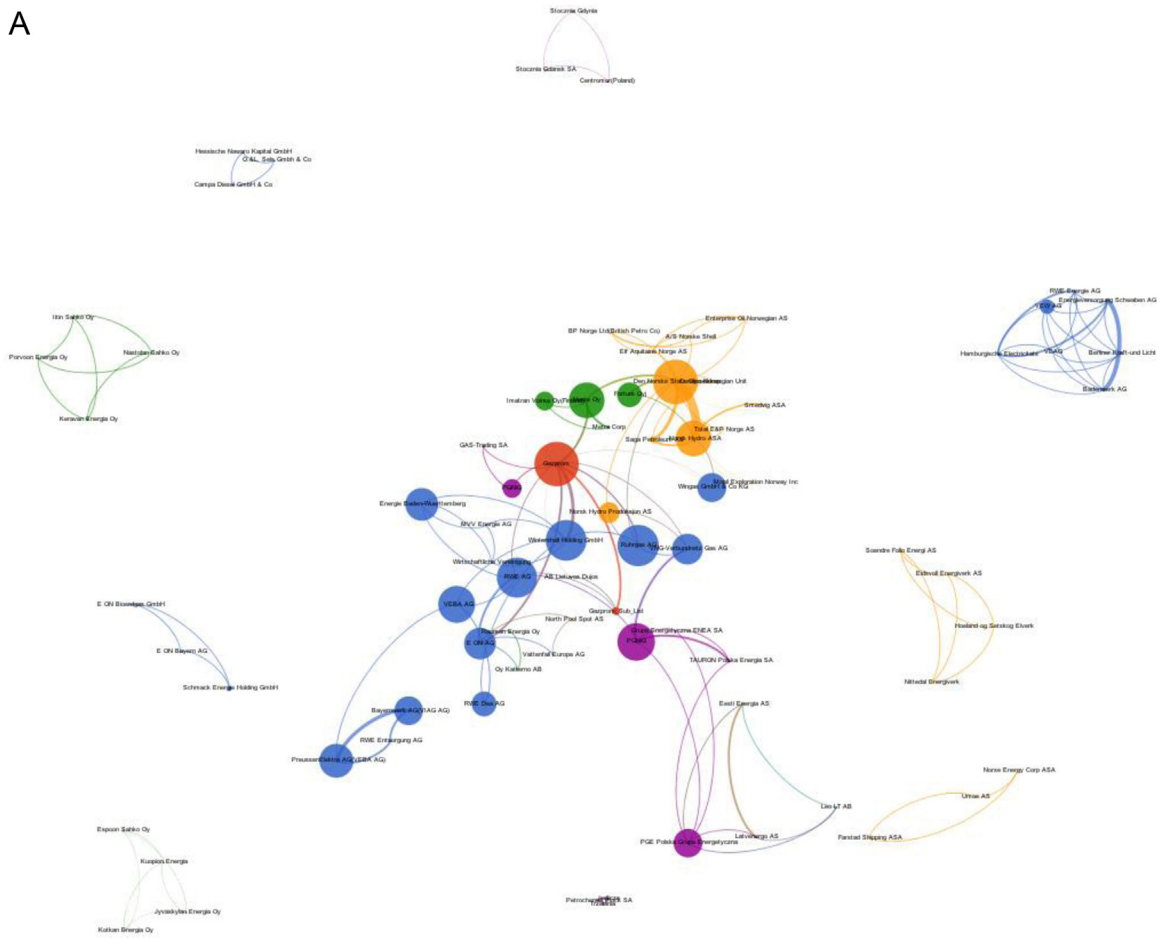

Fig. 2. Corporate Alliance Betweenness, Northern Europe. (B) Corporate Alliance Betweenness, CESEC. (C) Corporate Alliance Betweenness, Southern Gas Corridor.

numerous smaller firms. Similarly, the high level of social capital within corporate partnerships with Hungarian firms provides Gazprom with indirect influence over the emerging hubs discussed above.

Yet, when the focus shifts to the Southern Gas Corridor, Gazprom's social capital is significantly challenged. As depicted in Fig. 2C, Azerbaijan's national energy company, SOCAR, wields considerable social capital across this sub-region[63] Irrespective of the relatively small volumes of gas projected for delivery into the EU's Southern Gas Corridor from Azerbaijan's Shah Deniz gas field, SOCAR's corporate affiliations are situated at the center of the sub-regional network, with especially trustworthy relationships emerging with prominent Italian firms. Furthermore, Gazprom does not have deeply entrenched and rich corporate alliances with Turkish state or private gas firms, notwithstanding the significant volumes of gas sold to Turkey. This may explain the flexibility demonstrated by Ankara at doubling LNG imports from other suppliers in the face of Russia's gas cut-offs to Ukraine in 2009 that threatened delivery of nearly 60% of Turkish consumption. It also suggests that Gazprom has a lot less bargaining power to manipulate gas transit options or to otherwise threaten to withhold delivery for non-commercial reasons as Turkey pursues incremental supply and transit options and other dimensions to the bilateral relationship come under political strain.

In short, these two preliminary cuts at social network analysis reveal that transformation from predominantly point-to-point pipelines to sub-regional gas networks is changing the dimensions to extra-commercial power and influence, accentuating both market constraints on unilateral supply disruptions and indirect opportunities for political gamesmanship. Paradoxically, these physical and corporate network effects constrain the non-commercial value of Russia's market power while preserving its salience as a prominent commercial partner. They are empowering new hubs and clusters of trading that are insulating dependent customers from discretionary coercive behavior and bolstering resilience while discouraging defection from established transnational business ties.

4. Breaking the impasse

This analysis suggests that the incentives for strategic restraint are deepening and derive from the transforming Europe-Eurasian gas network. On the one hand, Ukrainian and European supply diversification does not reverse the tables for energy coercion. The changing political geography of global supply and demand, narrowing of regional price discrepancies, and added supply options provided by development of LNG terminals, new pipelines, and interconnectors are not fundamentally altering Russia's regional market share. As evidenced throughout the Ukraine crisis, the increased diversity and density within the European gas infrastructure are insufficient to trigger fundamental disruption in

[63] This figure reflects nodes (firms) and edges (transactions) among entities and states broadly associated with the Southern Gas Corridor (e.g. Austria, Azerbaijan, Bulgaria, Croatia, Czech Republic, Egypt, France, Georgia, Germany, Greece, Hungary,Iran, Iraq, Italy, Kazakhstan,Macedonia, Malaysia,Moldova, Norway, Romania,Russia, Serbia, Slovenia, Turkey, and the United Kingdom).

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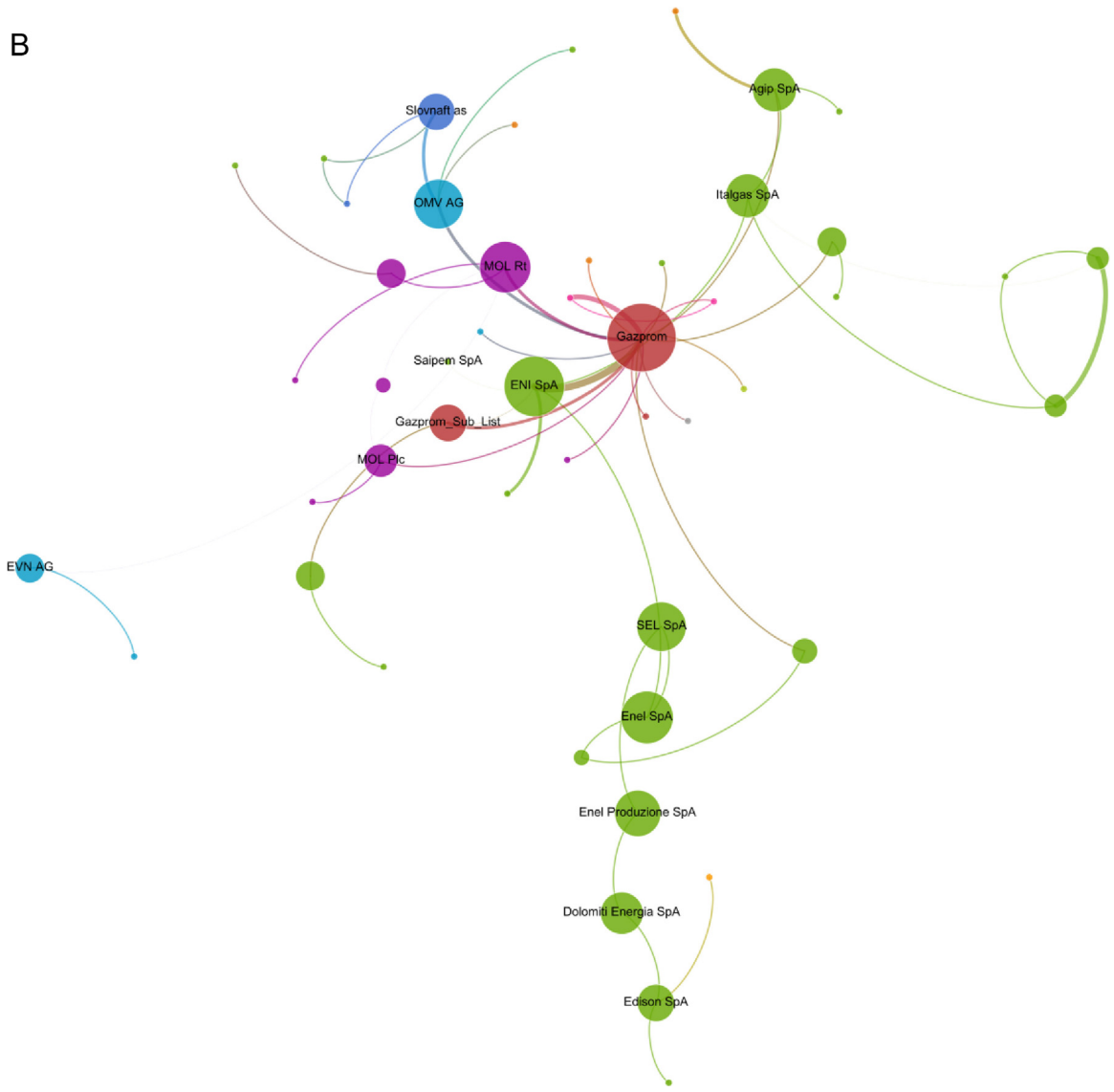

Fig. 2. (*Continued*)

established commercial trading relations. Neither Ukraine nor the most heavily dependent EU member states have broken pragmatic gas supply relations with Russia. At the same time, both the physical and social networks are still evolving. Since the onset of the conflict, for example, Europe has both enjoyed significant spare LNG capacity and contended with insufficiently connected transmission infrastructure. On the other hand, Russia's sustained asymmetric supply advantages do not confer the same coercive potential as in the past. New network nodes are emerging across European sub-regions to reduce the non-commercial dimensions to Russia's market power. Moreover, both the longstanding weakness of Gazprom's social capital among established import dependent customers and growing presence of trusted corporate rivals are reducing the transaction costs of seizing upon new supply opportunities. They also augur well for forging new strategic alliances to contain Gazprom's otherwise prominent market footprint. Together these countervailing developments in social and market power encourage restraint across the emerging Europe-Eurasia gas scene.

Of course, the gas dimension cannot be treated in a vacuum, divorced from the ongoing conflict in Ukraine and intensification of political acrimony in transatlantic-Russian relations. As noted, the temptation to leverage U.S. LNG exports, or support for specific non-Russian pipelines may be too strong to resist. Yet, policymakers in the West must realize the costs associated with their choices amid the changing gas landscape.

Leveling another round of harsher or more narrowly targeted energy sanctions, for example, is clearly one way to go to protest Russia's heavy-handedness across multiple policy domains. But given cross-cutting and deep-seated interests within the transatlantic community, there are real limits to what can be imposed without raising the prospects for blowback among affected states and firms. This is all the more so, given Gazprom's lasting marginal cost advantages at landing gas in established European markets for the foreseeable future. Accordingly, there will be real social and economic costs incurred by Western, and especially large European, gas firms from going down this path. Without sharing clear objectives and confronting a popular and consolidated leadership in the Kremlin determined not to give up its position in Ukraine while enduring economic hardship, the short-term effects of another round of sanctions most probably will be symbolic, if not feckless. In light of low to moderate oil prices, it is difficult to distinguish the value added of new sanctions in terms of imposing costs and

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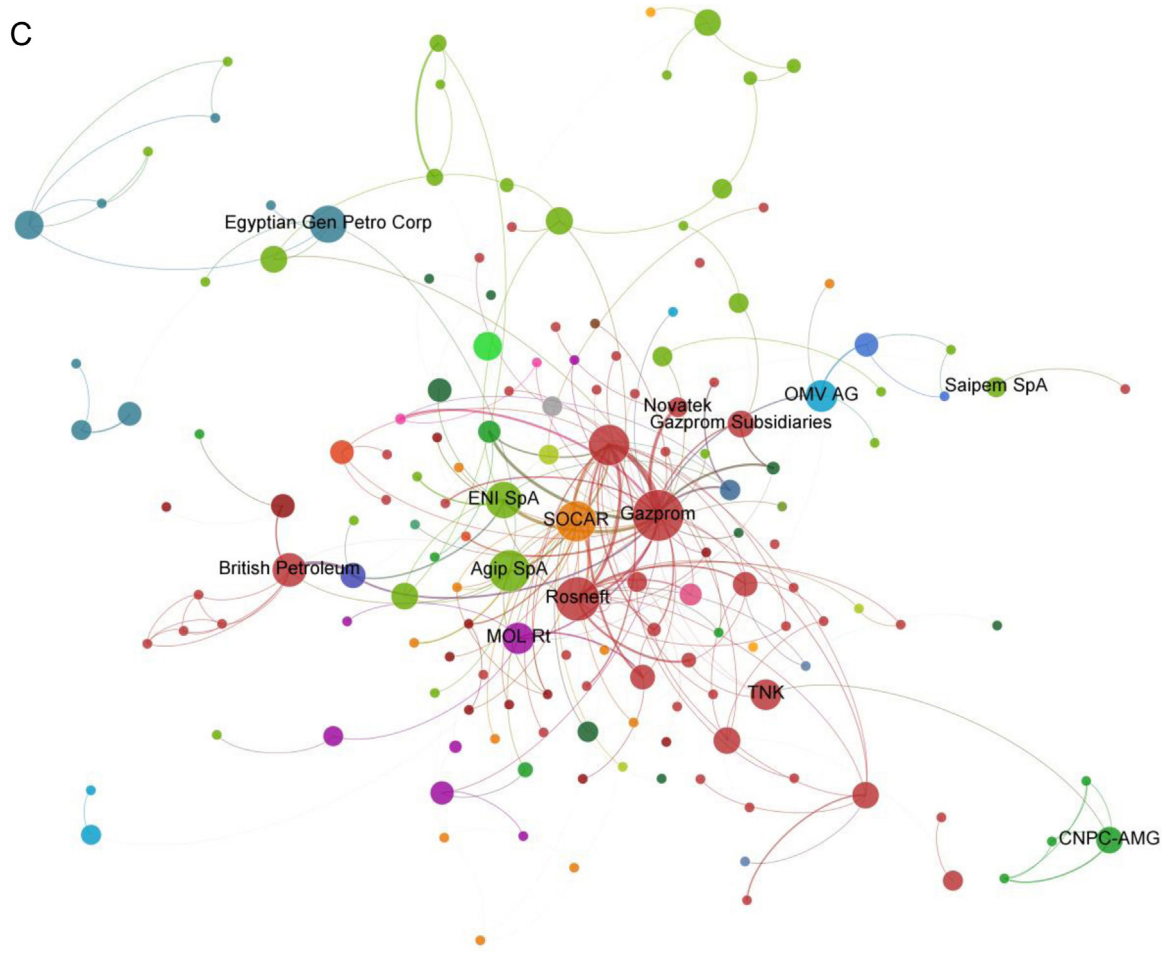

Fig. 2. (*Continued*)

changing Russia's behavior in the gas sector. But if sanctions are at a dead-end, what else is there to do?

Failure to appreciate the widespread restraint and changing European gas system that render anachronistic Cold War paradigms and sap the political impact of market power is strategically counter-productive; a recipe for uniformly escalating mutual pain, encouraging evasive counter-measures, and fueling the Kremlin's resolve. Instead, a network perspective on gas trading and diplomacy suggests new directions for pursuing a more nuanced, coordinated, and market-friendly grand strategy aimed at changing the situation "above ground" and bolstering Western resilience at ramping up pressure on Moscow. Such an orientation also would leave open the possibility for future constructive engagement with Russia.

Therefore, with sanctions already in place, the focus for Western policymakers moving forward should be on damage control that accentuates the density of the emerging European gas network. Promoting transparency, market reforms, as well as introducing targeted tax breaks and favorable lending terms and guarantees should be the guiding principles. This could facilitate price correlation across European hubs that the ongoing recession and market itself may be slow to deliver. Adopting such a posture could strategically attract the capital freed up by Moscow's reciprocal sanctions to bolster inter-regional flows and price efficiency for spot market trading. While this will not fundamentally threaten Gazprom's market share, it will add more flexible supply options to constrain non-commercial exploits. It also could allow Western governments to accelerate investment directly in the construction and integration of the currently incomplete European gas infrastructure network. Specific attention, in this regard, could be targeted at building up links from Italy and the Iberian Peninsula to central Europe, thus easing the flow of global LNG to Europe's most vulnerable sub-region and complementing the EU's Energy Strategy. This could, in turn, help to reanimate priority attention to both the North-South Energy Corridor and the Southern Gas Corridor that will be key to integrating and bolstering the resilience of emerging gas networks in the most vulnerable sub-regions.[64] Rather than confront the strong ties among Western and Russian firms with more severe sanctions, officials in Washington and across Europe should embrace market trends by promoting diversified and competitively priced deliveries both into and within the European sub-regional gas networks. Although these actions will necessitate extra-market government intervention and create additional surplus capacity, they will help to more closely align market and national security interests, especially in the face of future extraordinary attempts at arbitrary disruption.

At same time, policymakers should appreciate that ties continue to bind, even across increasingly poignant East-West borders. Accordingly, Western policymakers would be wise to make it clear that the door will be open for engaging commercially competitive Russian gas interests as tensions ease. Down the road as the Europe-

[64] For specific segment options, see *Completing Europe: From the North-South Corridor to Energy, Transportation, and Telecommunications Union* (Washington, DC : The Atlantic Council, 2014).

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Eurasian network gets built out, this can include working closer with Russia's rising gas independents to extend reciprocal influence forged out of historical relationships working with Moscow. Different Russian firms and their local partners/subsidiaries could be invited to join in the development of diversity via new LNG and storage facilities, Southern Corridor, decoupled pricing, access to transmission lines, and shale exploration. Such broadening and deepening of social capital could limit Gazprom's room to maneuver while increasing the standing of new Russian stakeholders in gas-on-gas competitive development across the continent. It also could facilitate, on the margins, the tough decisions needed in Moscow to reinvigorate liberalization of the gas industry at home. Together, these different facets of network diplomacy could ironically take us "back to the future," when the natural gas infrastructure and related ties constituted the bulwark for integration and cooperation between "Cold War Europe's main enemy camps."[65]

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[65] Per Hogselius, *Red Gas: Russia and the Origins of European Energy Dependence* (New York: Palgrave MacMillan Press, 2013), p. 233.

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