The Ties that Bind:

A Data-Driven Analysis of Oceania's Dependency on China

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Successive U.S. Presidential administrations have raised alarm about an impending and gravely challenging period of Great Power Competition, posed by geopolitical revisionist threats from the Russian Federation and the People's Republic of China. This competition clearly has critical military components. This is true not merely because of the need to preserve strategic deterrence in the face of Russia's development of new nuclear weapons – perhaps even including space-based weapons – and China's extraordinary nuclear and conventional weapons buildup. It is also true because of other military (or potentially military) challenges that are both broader and more specific. Russian President Vladimir Putin, for example, claims to feel the Kremlin is at war with "Satanic" Western powers in a broad spiritual and civilizational struggle in which the ongoing fighting in Ukraine is merely "a local conflict … one phase in a global confrontation." For his part, Chinese ruler Xi Jinping has reportedly instructed his People's Liberation Army (PLA) to be ready to take Taiwan by force as early as 2027.

The strategic competition challenges the United States faces today are multi-faceted and involve far more than merely military confrontation. Indeed, the Chinese Communist Party (CCP) explicitly considers itself to be in a competition across *every* aspect of what it has termed "Comprehensive National Power" (CNP), a conception (and contest) of composite national strength aggregating a range of economic, military, technological, political, and even cultural battlespaces.

In fact, PRC strategists assume that the outcome of this global competition will be *decided* by CNP, with victory ultimately going to the country able to generate the most of it, and with that victor able –

if its CNP is great enough – to reshape the entire global system around itself. In what one of the authors of this essay has described as "a stunningly ambitious project of world-building," Chinese strategists intend, if they can, to make *their* country that victor, permitting Beijing to forge a Sinocentric new order in place of the architecturally pluralist international system of the present day.

In the face of this full-spectrum challenge in what the Biden Administration has called a "strategic competition to shape the future of the international order," U.S. policymakers and thought leaders sometimes speak of the need to respond to China's "all-of-nation long-term strategy" with some kind of "whole of government" or "whole of nation" (WON) response of our own. What is less clear, however, is precisely *how* our leaders should approach these challenges on such a comprehensive basis, especially in a democratic policy where government officials (thankfully) cannot dictate priorities and simply *command* mass societal obedience, as our adversaries attempt to do.

Also daunting in the context of the need for counter-strategy is the question of *on what basis* to expect our leaders' decision-making to occur. In light of the staggering volume and complexity of available information, U.S. government leaders face challenges synthesizing and making sense of all this information to ensure well-informed decision making. It should be a high priority to develop and deploy effective decision-support tools and other analytical support for U.S. and other Western leaders engaged in competitive strategy policymaking.

This paper aims to help point a way forward in this latter respect. In the following pages, we will suggest – and begin to illustrate – some of the potential value that can be derived from using quantitative research methods to understand strategic competitive strategy vis-à-vis China.

In particular, we will describe the following data-driven insights from our study:

- China's relationships with the countries of Oceania (excluding Australia and New Zealand) – and the trends

visible in those relationships – are notably different than those of other major countries with those same Oceanian states.

- Especially during the last two decades, the small states of Oceania have increasingly become dependent upon China, and this dependency has been more significant and has developed more rapidly and consistently than with other partners, even if one considers periods during which those non-Chinese countries were themselves enjoying periods of significant export-led growth analogous to what China has enjoyed in recent years.

- Where other countries' relational trends with the small states of Oceania show a degree of variability and volatility over time, these countries relationships with China are remarkably consistent, and trend always – and rapidly – toward increasing dependence.

- Indeed, China is almost unique in the consistent degree to which its relationships tend quickly to make its dyadic partners dependent upon it. Beijing gets more dependency "bang for the buck," as it were, out of increases in its relational "bandwidth" with other countries than does essentially anyone else, and China maintains almost *no* relationships that do not produce such dependency.

- These trends are most dramatic in the period since the year 2000.

These conclusions based upon our analysis of the database compiled by the Pardee Institute at the University of Denver on "Formal Bilateral Influence Capacity" (FBIC). On top of the above insights, the FBIC data point toward some further, albeit necessarily tentative, *policy* conclusions. Specifically, the stark trends and remarkable consistency in the data characterizing China's dyadic relationships – and the contrast between these relationships and equivalent data for other countries – suggest the possibility that this

Chinese consistency is not accidental, but rather the result of a deliberate grand strategy.

The data suggest that Beijing may seek out, build, and maintain relationships with other countries in significant part precisely *because* of the degree to which these ties make its partners dependent upon – and hence potentially manipulable by – China. The notable way in which these trends dramatically accelerate during the last 20 years, moreover, suggest the possibility that China's admission to the World Trade Organization (WTO) in 2001 may have provided Beijing with a critical opportunity to implement such a strategy of *relational weaponization*, enabling it to supercharge this approach over the subsequent two decades.

Relationships and Dependency

Weaponizing interdependence, of course, is hardly new.[1] Yet while the United States has long attempted to leverage the topology of global financial networks in order to disincentivize specific forms of comparatively objective wrongdoing – such as by imposing costs on narcotraffickers, weapons of mass destruction (WMD) proliferators, military aggressors, and human rights abusers – China approaches such leverage differently, and with more blatantly political, even strategic, ends. Beijing uses economic and trading relationships for everyday political leverage in conditioning habits of conformity with CCP policy positions, employing what one of us has termed "leverage webs" to constrain the autonomy and independence of foreign persons, companies, and even entire countries. Beijing does this by bestowing rewards or inflicting punishments on the basis of whether or not entities take positions – or sometimes even use *phrasing* – of which the CCP disapproves.

There is a growing understanding, moreover, that China's weaponization of interdependence in these respects is not simply adventitious – that is, this manipulable dependence is not merely something that arose essentially by chance or as a result of other dynamics, but of which Beijing is now doing its best to take advantage. To the contrary, it seems increasingly clear that the deliberate

cultivation of dependency relationships for political leverage has been a part of CCP strategy for a long time.

The scholar Elizabeth Economy, for instance, has noted the degree to which China's "Belt-and-Road Initiative" (BRI) infrastructure project and investment relationships are invariably asymmetrical, forming a skein of bilateral relationships between China and smaller partners in the developing world rather than a system that facilitates cross-cutting relationships between such smaller players. One of the authors of the essay you are reading, moreover, has described China's networks of dependency relationships as reflecting CCP theories of social control that aspire to "train" both Chinese citizens and those in the outside world into habits of "harmonious" congruence with CCP preferences. Indeed, Anastas Vangeli has described how even the *diplomatic* formalities of Chinese-managed BRI relationships tend both to create and to manipulate subtle narrative frameworks that help socialize other diplomats into, and normalize, what are in effect quasi-tributary relationships with Beijing.[2]

Nor would it be in any way surprising for China to have a strategy of deliberate dependency-building in its global relationships, developing them at least in part for purposes of political manipulation and control. After all, influenced by the work of Qian Xuesen – a Chinese scientist who studied at MIT and worked for a time at Caltech before going back to China to help the CCP develop the atomic bomb and intercontinental ballistic missiles, and who brought concepts of cybernetics back with him – CCP leaders have focused for many years upon using systems theory as a "technology of organizational management" and of social control. In fact, one of Qian's disciples back in China, Song Jian, rose to head the State Science and Technology Commission and was appointed to the State Council in 1986. In his work, Song used cybernetics and systems theory to help Beijing develop its "one-child" policy, make state planning consistent with reliance upon private markets, and pioneer the sinister technology-facilitated surveillance-and-control mechanisms that the CCP uses today to maintain its vice-like grip upon the Chinese people.

Given this strong tradition of aspiring to ensure Party control of complex socio-political systems through approaches grounded in

systems theory, it is not surprising that Chinese strategic thinking often tends to emphasize not direct linear control but rather the setting of conditions that gradually shape and influence others' decision-making. In the words of Francois Jullien, the objective is to "set the conditions such that 'the process that leads to victory is determined so far in advance (and its development is so systematic and gradual) that it appears to be automatic rather than determined by calculation and manipulation.'"[3] In the context of this CCP enthusiasm for cybernetics-inflected management strategies in areas ranging from population management to public security, what would be more natural than for the Party also to see foreign economic, trade, financial, commercial, diplomatic, cultural, and security relationships at least in part as mechanisms for building social and political control?

So far, however, most discussions of these phenomena have been primarily *qualitative* in nature. Accordingly, this paper seeks to contribute to the Western policy community's understanding of such questions – and to catalyze additional research – by demonstrating that such dynamics (and their potential implications) can be explored with the help of *quantitative* analysis as well.

Our Approach

The analysis recounted in this essay was undertaken by a team at the Johns Hopkins University's Applied Physics Laboratory in mid-2024 – led by the authors – in order to explore how quantitative methods might help provide insight into the geopolitical environment and improve the understanding of leaders engaged in U.S. competitive strategy. This essay helps demonstrate how quantitative methods – and just such constructive teaming and intellectual cross-pollination across the analytical space – can put further flesh on the bones of the growing body of qualitative analysis of these issues that is already underway, and can inform public debate, policy community consideration, and academic exploration of competitive strategy.

Our approach builds on the seminal work done at the Pardee Institute on "Formal Bilateral Influence Capacity" (FBIC). They explain what they mean by the phrase "Formal Bilateral Influence" as follows:

> "**Formal** *indicates the state-sanctioned or state-sponsored and publicly acknowledged nature of the leverage we seek to measure. This includes interactions like diplomatic exchange, arms transfers, and goods trade but excludes actions like state financing of violent non-state actors or covert attempts to disrupt foreign elections.* **Bilateral** *highlights the country-to-country nature of the measures we examine. Multilateral and network effects can be examined by analyzing a collection of bilateral connections together, highlighting patterns such as spheres of influence. However, these are byproducts of the collections of bilateral interactions rather than explicit components of our measures of influence capacity. By* **influence**, *we intend to measure relational power between countries, where power refers to one country's ability to get another country to do what it otherwise would not do (or to refrain from doing what it otherwise would do). In other words, influence can play into strategies that involve both compellence and deterrence. Finally,* capacity *emphasizes the material-based foundation of our measures of influence, which exclude policymakers' willingness or ability to act."*

The FBIC index the Pardee Institute compiles and makes available to other researchers consists of a weighted aggregate of a range of data sources that together – they posit – provide useful insight into the influence potential of one country over another. As they recount, the data elements captured in this index include, for any given pair of national relational partners:

- Bilateral foreign aid (*i.e.*, official development assistance) as a share of the recipient country's GDP;
- Bilateral foreign aid as a share of the recipient country's total inward aid;
- Total bilateral goods trade as a share of the recipient country's GDP;
- Total bilateral trade as a share of the recipient country's total goods trade;
- Arms import stock as a share of the recipient country's total arms trade stock;

- Arms import stock as a share of the recipient country's total military stock;
- The average level of diplomatic representation between the two countries;
- The shared weighted IGO membership count between the two countries;
- Trade agreement between the two countries; total trade between the two countries;
- A military alliance index for the two countries; and
- The total arms stock transferred between the two countries.

Together, these variables are said to permit one to "characterize influence dimensions covering economic dependence, security dependence, political bandwidth, economic bandwidth, and security bandwidth." And indeed, the Center's analysis of this information has begun to receive wide attention. The British magazine *The Economist*, for example, cited the Pardee Institute's work in concluding that

> *"America has been the country with the most influence over the [countries of the "Group of 77" (G77) developing nations] since the 1970s. Its 'influence capacity' has been more or less constant even as the allure of Britain and France has waned. But it is increasingly rivalled by China, which after 40 years of relative insignificance saw its influence grow from around 2000."*[4]

To explore what FBIC reveals about global interdependence with China, we decided to dig a bit deeper in the relationship over time between what the FBIC data calls "dependency" and "bandwidth," focusing on data for a number of smaller countries in their relationships with a larger one, particularly (though not exclusively) China. As used in the FBIC data, as the Pardee Institute explains,

> "**Bandwidth** *measures the volume of interactions between countries, such as the amount of economic activity that flows across borders in a given year. Two countries that interact more frequently and across more dimensions of activity are more likely to have opportunities to exert influence on one another. All*

bandwidth values are the same for the 'sender' and 'receiver' in a dyad.

"**Dependence** *measures how reliant one country is on another for their economic activity or security services by measuring levels of trade as a share of total trade or as a share of GDP. Countries with high levels of dependence can be more easily manipulated. Dependence values differ within a dyad, where values depend on which is the 'sending' country and which is the 'receiving' country."*

Our analysis began by looking at such bandwidth and dependency relationships for the smaller and less developed countries of Oceania, excluding Australia and New Zealand. We recognize that these states of Oceania may be in some ways an idiosyncratic analytical target, given the diminutive size of their economies and populations in comparison to those of most developed countries. Nevertheless, we judged that it was precisely their small size and the stark asymmetry of more or less *all* their relationships with the rest of the world – and hence, presumably, the relative simplicity and manageability of the available data in comparison to what would be needed to evaluate larger and more complex relational dyads – that may make Oceania a useful region for which at least to *begin* developing quantitative analyses to inform competitive strategy.

Despite (or perhaps because of) their small size, moreover, the countries of Oceania have been increasingly the subject of competitive rivalry in recent years. Press accounts and think tank studies, for example, now commonly discuss jockeying and maneuvering for influence there between larger states such as China, on the one hand, and the United States, Japan, and Australia on the other.[5] Such signs of current contestation, too, increased the attractiveness of using these countries as our jumping off point. Perhaps, we reasoned, our application of quantitative methods could shed light on some of the dynamics behind and associated with this competition.

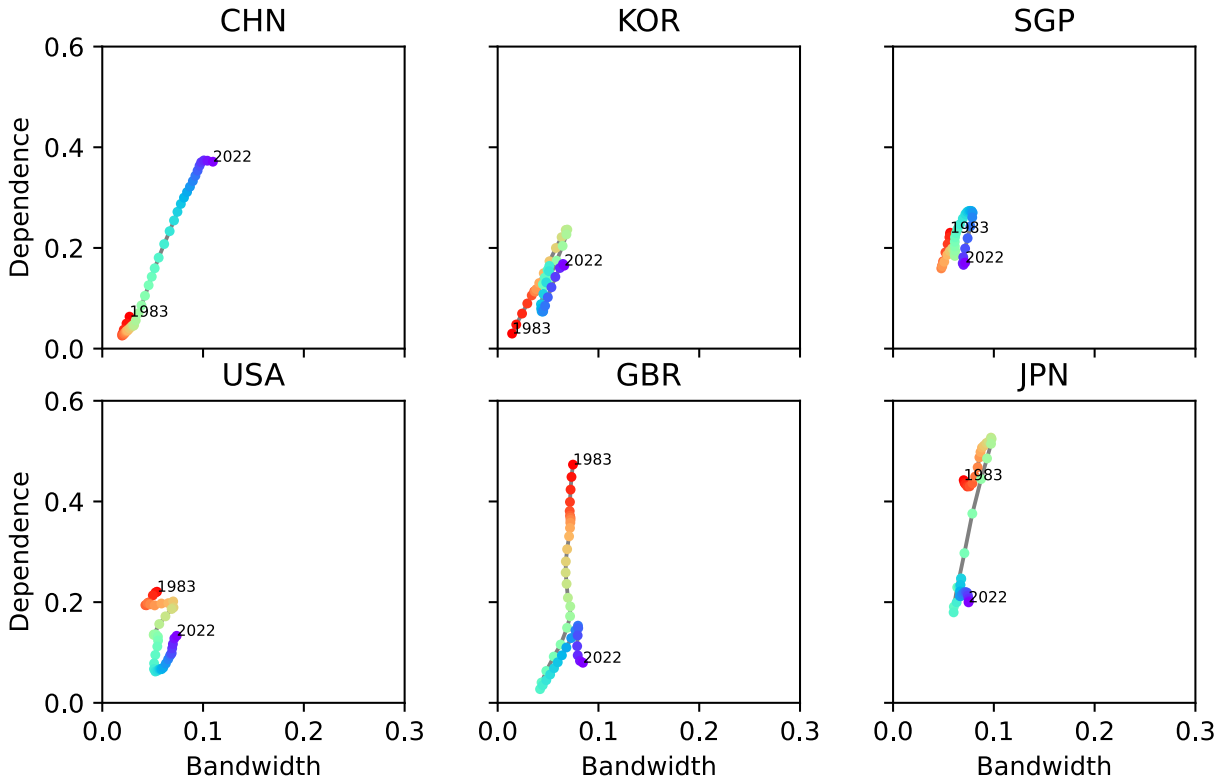

Figure 1. Dependence vs. Bandwidth. Influence capacity of selected countries over Solomon Islands, using a five-year rolling average. The color reflects the year.

Discussion

In any event, our team analyzed the FBIC data by focusing upon Oceania and its relationships. In our view, it suggested some interesting tentative conclusions, as will be explained below.

Our look at the FBIC data for Oceania began by simply trying to see what that data suggested about trends over time at a level far more granular than the Pardee institute's overall findings (noted above) about growing Chinese influence vis-à-vis the G77 countries overall.

Influence Trajectories

One example of this visualization can be seen in Figure 1. It shows the "trajectory" over time of the relationship between "bandwidth" an "dependency" – as understood by the coders of the FBIC database, at least – in the dyadic relations between the Solomon Islands (our first illustrative sample country) and a set of six major trading partners denoted by three-character trigraphs: China (CHN),

Korea (KOR), Singapore (SGP), United States (USA), Great Britain (GBR), and Japan (JPN).[6] We selected the six trading partners as follows:

- **CHN, KOR, and SGP**: To compare China to other fast-growing economies, we include two of the so-called "Asian Tigers": Korea and Singapore;

- **USA, GBR, and JPN**: To compare the United States to other established economies with historical global trading relationships, we include Great Britain and Japan.

We use this set of six countries throughout this paper to illustrate our analysis.

In the plot, movement along the horizontal axis indicates a greater degree of "bandwidth" in the relationship between the countries in question. To wit, movement to the right indicates a "thicker" (that is, higher-bandwidth) relationship. Similarly, movement along the vertical axis indicates a greater degree of dependence – movement up signifying a more "dependent" relationship, meaning that the country in question (here, the Solomons) is more dependent upon the developed economy in each small graph. The curves displayed cover the period between 1983 and 2022 – these dates being selected on the basis of data availability – with points on those curves shifting in color from red (1983) through to dark blue (2022) so the reader can track chronological progress visually despite the small size of the chart.[7]

By way of example, the U.S. graphic in Figure 1 shows relatively low scores, both for the bandwidth of the Solomon Islands' relationship with America and for their dependency upon the United States. It also shows a good deal of volatility in that dependency. Whereas bandwidth does not appear to change much, the Solomons' dependency upon the United States declines significantly for many years before turning around sharply in the mid-2000s. As of 2022, it was still rising.

The China portion of Figure 1 shows changes in the bandwidth of the Solomons' relationship with and their dependency upon Beijing from 1988 to 2022. In contrast to the U.S. graph, however, this curve is quite straight, rising sharply and consistently over time both in bandwidth and dependency. As another point of comparison, the graphs for Britain and Japan show, on the whole, dramatic *reductions* in both bandwidth and (especially) dependency with the Solomons, though the islands became for a time more dependent upon Japan for a time into the 1990s, and their plunging bandwidth with and dependency upon Britain seems to have begun to turn around several years ago.

In any event, the reader can thus see how sorting and plotting the Pardee Institute's FBIC data can yield insights into – and help one visualize – potentially significant trends over time. Comparing such curves to event timelines, for example, may help depict and understand the impact of major events such as the global oil price shock of the 1970s, Britain's handover of Hong Kong to Chinese control in 1997, Japan's economically "lost decade" of the 1990s, regional natural disasters such as typhoons or tsunamis, the Vietnam War, the negotiation of free trade agreements or security arrangements with major powers, and so forth. Conversely, intuitively unexpected or surprisingly dramatic patterns brought out by such analysis may to point the researcher toward new insights by throwing a spotlight on issues warranting further investigation.

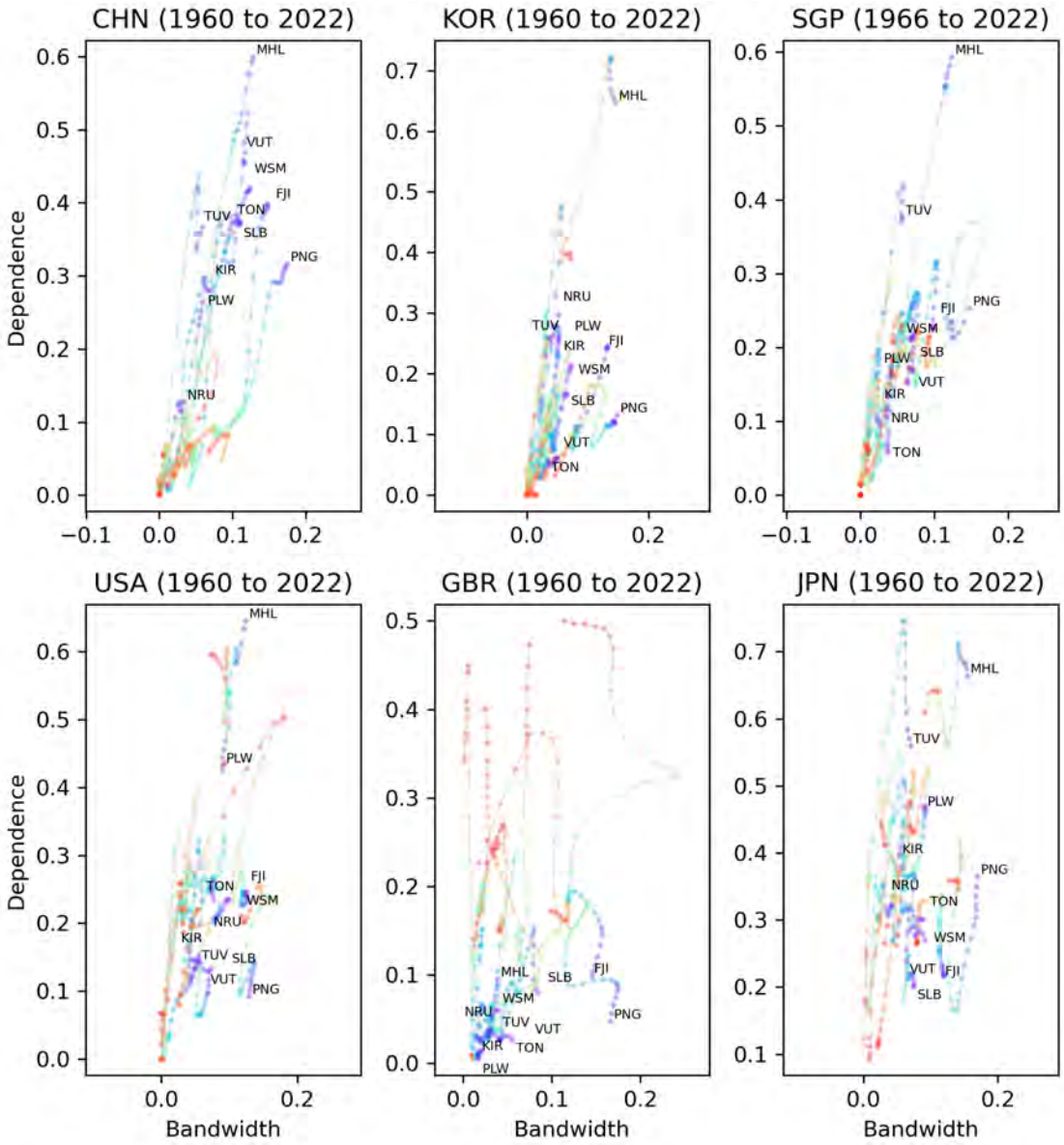

Figure 2. Bandwidth vs. Dependency for all of Oceania, using a five-year rolling average. The color reflects the year (red=earlier years and dark blue=later).

A further example of how one might sort the FBIC data in looking at Oceania's relationships with a selection of more developed economies can be seen in Figure 2. In the figure, we plot each such country vis-à-vis Oceania as a whole – with the various specific dyadic partner countries *within* that region each denoted by a separate curve. Note that we have fixed the horizontal and vertical axes on these charts in Figure 2 at a 1:1 aspect ratio, so that these displays – *e.g.*, the slopes of each curve – can be more easily compared to each other.

This visualization allows insight into the "dependency versus bandwidth" performance of individual countries in Oceania vis-à-vis each major power listed from 1960 to 2022. The individual curves for specific countries in Oceania are denoted here by their trigraphs: Fiji (FJI), Kiribati (KIR), Marshall Islands (MHL), Nauru (NRU), Tonga (TON), Palau (PLW), Papua New Guinea (PNG), Solomon Islands (SLB), Vanuatu (VUT), and Western Samoa (WSM). Even the limited breakout images of Figure 2, therefore, convey a great deal of information, and demonstrate how the FBIC data can be used to visualize country-specific trajectories across the region.

And indeed, the patterns traced by these trajectories seem to vary considerably for the United States, China, and Japan. The U.S. patterns, for instance, show a considerable degree of volatility, with essentially all the tracks for individual states in Oceania each having periods of steep rise and precipitate fall in ways that – to the naked eye, at least – show little overall consistency.

The Japanese patterns are somewhat more consistent, particularly in that many of them display a very sharp period of rising Oceanian dependency for many years, but they too also show some volatility, as even here such ascent is still often followed by a turnaround. These turnarounds, moreover, seem to occur at varying points along the timeline, rather than coinciding in ways that would suggest some kind of overall exogenous shock to dyadic relations. Rather, each relationship seems to travel along its own rather independent course.

The data for the United States and Japan, however, differ even more dramatically from those for China. For Beijing, in Figure 2 there is essentially no such volatility. The curves for each country of Oceania show, vis-à-vis China, steady increases in bandwidth and even more dramatic steady increases in dependency over time. Nor is this phenomenon limited solely to China's impressive period of export-driven growth since the late 1970s, for these patterns appear to go back to 1960. The smoothness of this curve is to some degree affected by our use of 5-year rolling averages, though they affect the plots for all countries equally. China's pattern of relations with Oceania therefore

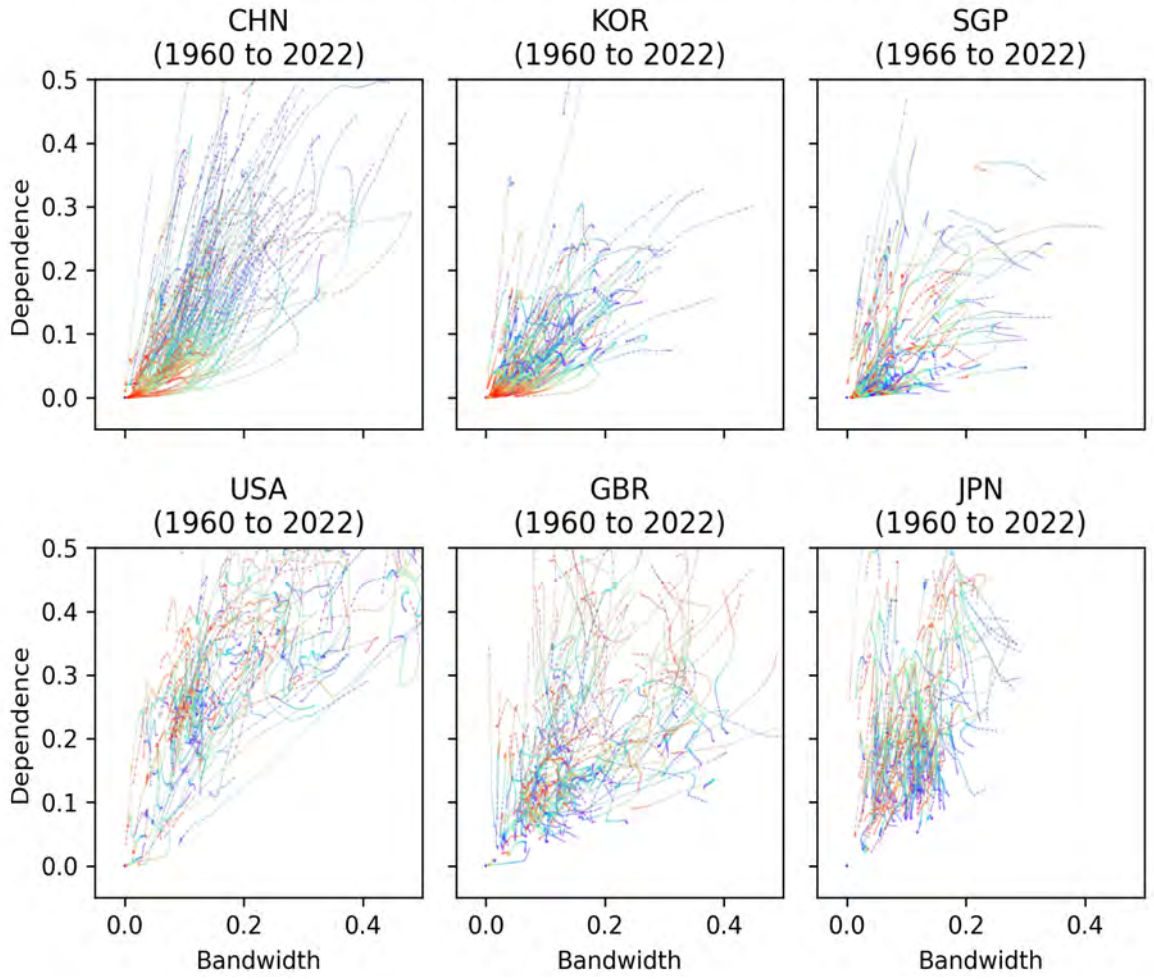

Figure 3. Bandwidth vs. Dependency for all countries of the world, except those in North America and Europe, with a twenty-year rolling average. The color reflects the year (red=earlier years and dark blue=later).

seems to be quite different from those of most of the other countries depicted in Figure 2.[8]

Control and Uniformity in Trajectories

Broadening our view beyond Oceania, in Figure 3 we plot trajectories for all countries in the world except Europe and North America. Despite the large number of trajectories plotted in the figure, the pattern of linearity in the trajectories for China are still visible, with the trajectories appearing as a large number of nearly parallel straight lines. Figure 4 offers an additional way to visualize such information, this time using a scatter-plot approach to depict the degree of linearity between dependency and bandwidth. This figure plots every state *in*

the world against each other on the basis of the linearity of their bandwidth-versus-dependency relationships with other states. Each point in Figure 4 depicts an average of *all other countries' curves* vis-a-vis the country depicted by that dot. The color of each point reflects the average bandwidth of each country.

In order to permit an "apples-to-apples" comparison between what are, of course, a great many highly individualized underlying curves, Figure 4 displays the Pearson correlation coefficient for each country. This is intended to convey the degree to which there is (or is not) a linear relationship between the bandwidth and dependency variables.

From the set $C = (c_1, c_2, \ldots c_N)$ of all N countries in the FBIC data, we form pairs $(c_i, c_j) \in C \times C$, e.g., $(USA, Solomon\ Islands)$. For some pair (c_i, c_j), FBIC provides two time series $(b_1, b_2, \ldots, b_T)$ and $(d_1, d_2, \ldots, d_T)$ for bandwidth and dependency, respectively. The number T of available years of data vary by country pair. With those time series we calculate correlation as usual:

$$r_{i,j} = \frac{\sum_{t \in T}(b_t - \bar{b})(d_t - \bar{d})}{\sqrt{\sum_{t \in T}(b_t - \bar{b})^2}\sqrt{\sum_{t \in T}(d_t - \bar{d})^2}}$$

Then for each country $c_i \in C$, we calculate the correlation mean

$$m_i = \frac{\sum_{j \in C \setminus i} r_{i,j}}{|C| - 1}$$

which we plot as the horizontal axis of Figure 4. We calculate standard deviation (the vertical axis) with a similarly conventional method.

To simplify considerably but still grasp the essence, the farther right one moves along the horizontal axis in Figure 4, the "straighter" is the underlying curve for the country represented by each locational dot. The horizontal axis also moves from negative to positive numbers. A location in the "negative" zone means that the underlying bandwidth-versus-dependency curves in that portion of the graph

slope "downward to the right" – that is, dependency tends to decrease as bandwidth increases. Conversely, a location more on the right, in "positive" territory, indicates bandwidth and dependency rising together, on an "upward slope to the right." (Dots in the middle of the graphic square indicate countries for which the underlying datapoints form more of a random cloud than a clear trajectory.) The vertical axis reflects the uniformity of correlations, with a low standard deviation reflecting high uniformity.

The top half of Figure 4 depicts all this information for FBIC data covering the years from 1960 to 2000. The bottom half uses the same display protocol, but displays *post-2000* information so as to allow insight into how the linearity of countries' bandwidth-versus-dependency curves may have changed over time.

From the perspective of assessing PRC strategy and China's changing role in the world, the most interesting aspect of Figure 4 would seem to be twofold. First, it is noteworthy just how much the location of the "China dot" *moves* when one factors in post-2000 data – that is, the period after Beijing was permitted to join the World Trade

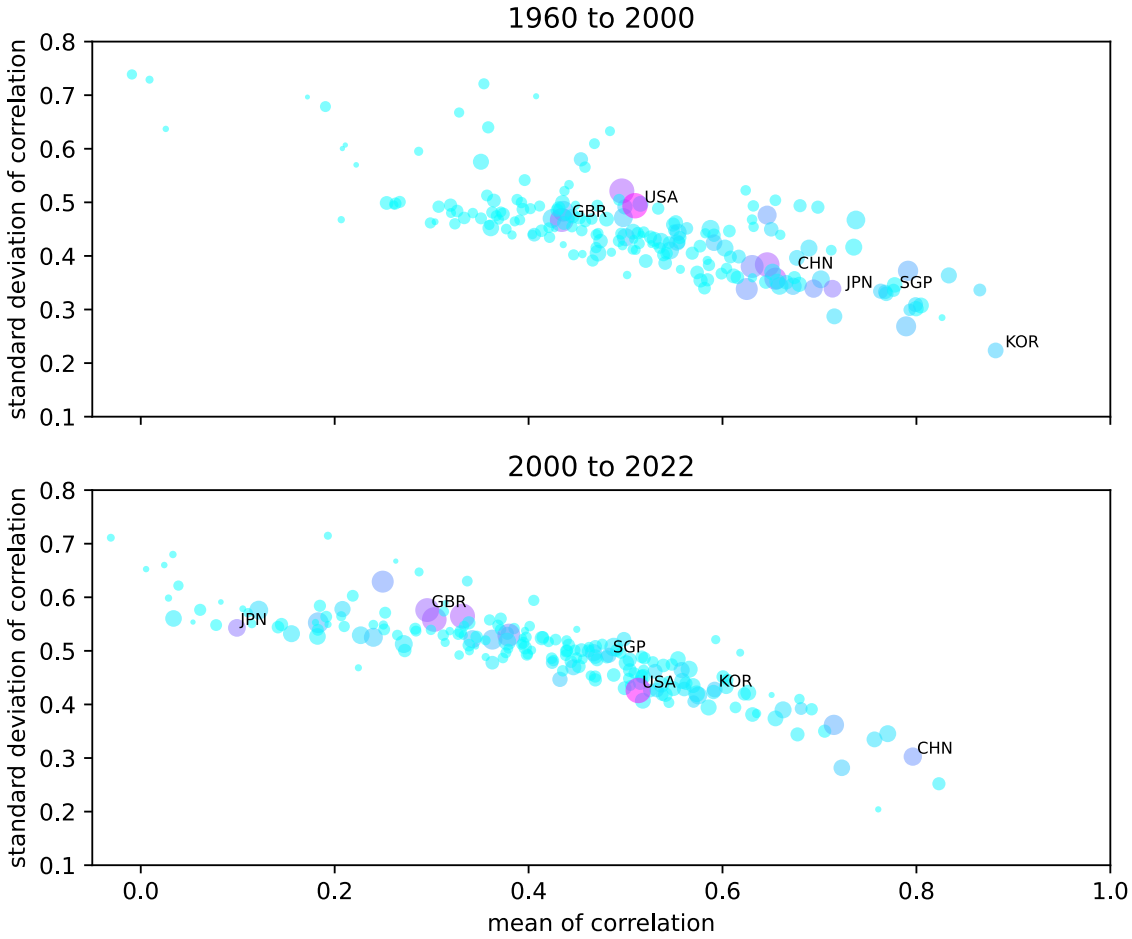

Figure 4. Correlation between Bandwidth and Dependence. Size reflects bandwidth and color reflects dependence (purple means high dependence).

Organization (WTO) in 2001. One can see this by comparing China's location in the chart on the top half of Figure 4 with its position in the chart on the bottom half.)

Second, Figure 4 is interesting in the degree to which, in the post-2000 period, China stands out as having an *extremely* high Pearson coefficient compared to almost all other countries. When one factors in data from the last two decades, therefore, China is truly exceptional in having consistently built up the "thickness" of its bandwidth relationship and the starkness of its dependency relationship with essentially *every other country* on the planet. It would seem to have done this, moreover, more significantly and with more control and uniformity than other countries, including those which themselves

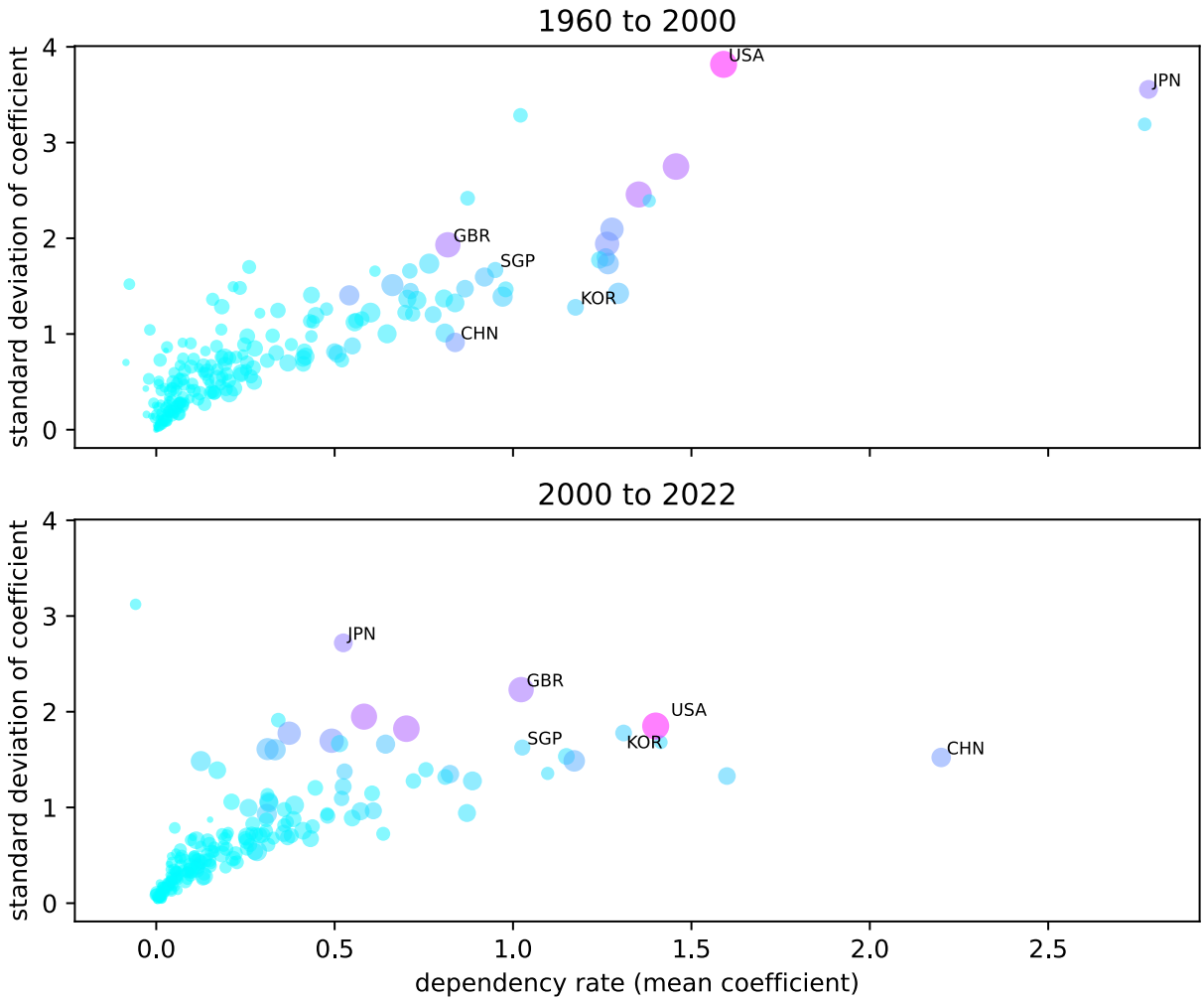

Figure 5. Coefficient between Bandwidth and Dependence. Size reflects bandwidth and color reflects dependence (purple means high dependence).

enjoyed – as has China – enormous periods of export-driven growth during the 1960-2022 period.

High Dependency Trajectories

China also stands out among other countries in the FBIC data by having trajectories in which the dependency component is especially large. For example, in Figure 3, compare the trajectories for China (CHN) with two other countries that have experienced rapid growth: Korea (KOR) and Singapore (SGP). While all three have some relatively linear trajectories, a large proportion of the China trajectories have a steep slope, revealing that the dependency component is large compared to bandwidth.

In comparison, Korea and Singapore's trajectories have slopes that vary: some are steep like China's tend to be, while others are shallow, having relatively small dependence compared to bandwidth. To explore whether China stands out in this way compared to all countries, we summarize the slopes of global trajectories in Figure 5. Like Figure 4, these scatter-plot graphs plot every state in the world against each other on the basis of the characteristics of their bandwidth-versus-dependency relationships vis-à-vis other states. In this case, however, rather than comparing the linearity of curves by using a Pearson coefficient, we calculated a *regression* coefficient. That is, given the two time series $(b_1, b_2, \dots, b_T)$ and $(d_1, d_2, \dots, d_T)$ for some country pair (c_i, c_j), we fit a model

$$d_t = \beta_0 + \beta_1 b_t, t \in 1, \dots, T$$

for the purpose of associating the coefficient β_1 with pair (c_i, c_j). As we did with Figure 4 in the previous section, we calculate the mean and standard deviation of that quantity for each country c_i and plot them on the horizontal and vertical axes of Figure 5, respectively. This allows us to compare the *slopes* of the curves in question. (Data for the 1960-2000 period is given in the graph on the top half, and for the post-2000 period on the bottom.)

As one can see, China stands out in the years since 2000, shifting dramatically rightward on the chart in **Figure 5** for this time period compared to the previous one. We already know from Figure 4 that China has extremely straight bandwidth-versus-dependency curves in comparison to most other states, but this figure tells us that these Chinese curves are also notably *steep*. That is, when it comes to bringing other peoples into relationships of dependency upon it, China has had a "bang for the buck" ratio over the last two decades that is stunningly higher than that of any other country. Beijing, this data seems to show, gains more dependency over other countries per FBIC-coded unit of expanding relational bandwidth than do other states. In other words, in the last two decades, China makes its relational partners dependent upon it more rapidly and more "efficiently" than did anyone else.

Indicia of a Strategy?

With the caveat that additional analysis would be needed before one could draw strong or authoritative conclusions, this quick and illustrative look at China's bandwidth and dependency relationships suggests important possibilities that should presumably be investigated further.

First, it is hard not to be struck by the remarkable control and uniformity of China's bandwidth-versus-dependency curves for the small states of Oceania – and indeed, as suggested by Figure 4, the straightness of its curves with essentially *everyone*. This consistency over time stands in marked contrast with the curves of most other countries, which tends to have more fluctuations and more variability over time.

This is even true, by the way, for China compared to the "Asian Tigers" on whose booming economies in the 1960s and 1970s Deng Xiaoping's China modeled so much of its own approach to export-driven growth after 1978, during the period of "reform and opening" that kicked off after Mao Zedong's death. Those "Tigers," too, had many years of explosive growth in which they built much deeper trading relationships with other countries, yet their curves are still less hypertrophic than China's.

To our eye, this suggests the distinct possibility – though of course it does not yet "prove" the proposition – that the extraordinary consistency of China's increasing relational bandwidth with the rest of the world (Oceania included) and the rapidly increasing dependency

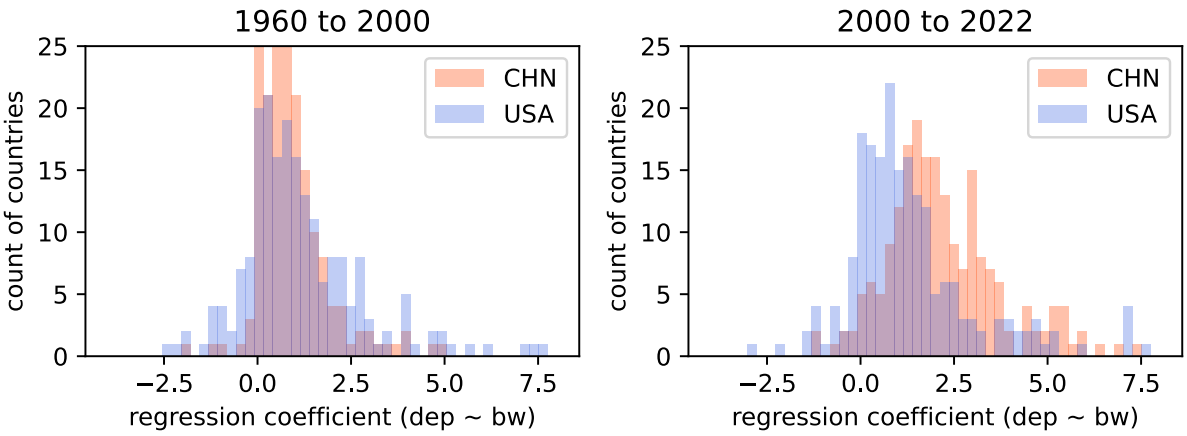

Figure 6. Distribution of Regression Coefficient

of other countries upon China is no accident. Instead, this consistency might be the result of a deliberate and systematic *strategy* of enmeshing the rest of the world in "leverage webs" that may be expected to expand the Chinese Communist Party's ability to influence and control other societies.

Where other countries' dependency-versus-bandwidth curves seem to display something of the kind of variability one might intuitively expect from the contingencies of heavily market-driven interactions, in other words, *China's* relationships point essentially in only one direction: toward ever-growing dyadic relationships of dependency. This consistency in the data cannot in itself *prove* the existence of a deliberate grand strategy, of course, but it is certainly suggestive.

Figure 6 offers a chance to look further at China's exceptionalism in these regards. As noted above, China seems to gain more dependency over other countries for each FBIC-coded unit of expanding relational bandwidth than do other states with their own dyadic partners. Figure 6 compares how the *distribution* of the regression coefficients for China across the range of its relationships compares to that for the United States.

This graphic plots the regression coefficients for all other countries' relationships with China (in orange) and with the United States (in blue) as a histogram. A country relationship having a regression coefficient plotted in "positive" territory (more towards the

right) is thus one in which there is a positive relationship between bandwidth and dependency, with the degree of this positivity being reflected in the size of the coefficient. (A very high-coefficient relationship far to the right, in other words, is one in which the addition of even a *little* bandwidth produces quite a *lot* of additional dependency.) Conversely, a coefficient in "negative" territory means that the trading partner in question actually becomes *less* dependent on the reference country as the bandwidth of the dyadic relationship increases. (That would be, in effect, a "*negative* bang-for-the-buck" situation.) In turn, relationships plotted in the middle are basically "neutral" with regard to the connection between bandwidth and dependency. To compare years before and after 2000, we again plot those data separately in the left and right plots, respectively.

The Sino-American comparison, once again, is striking. On this histogram, the United States has a great many near-zero-coefficient relationships, whether before or after 2000. Indeed, its distribution of country relationships approximates very loosely a normal distribution almost – though not quite – *centered* on zero. (It has a peak in the middle – in "neutral" territory where there isn't a pronounced relationship between bandwidth and dependency – and smaller "tails" on both the "negative" and the "positive" sides.) This U.S. distribution looks and feels like an essentially "normal" one, the kind of pattern normally associated with a degree of random variation.

China, by contrast, shows a distribution that skews to the right in the years before 2000, along the horizontal axis, into positive-coefficient territory. Moreover, it is not merely that there are here, for China, a much larger number of positive-coefficient relationships, in which Beijing rapidly gains dependency over its relational partners as it increases the bandwidth of those relationships. It is also the case that China has extremely few *negative*-coefficient relationships. In years after 2000, the distribution for China's relationships shifts even *further* to the right, towards high dependency.

One possible interpretation is thus that China systematically seeks out and invests in relationships that make its partners maximally dependent upon Beijing and *avoids* relationships that do not provide high payoffs in terms of the rapidity of other countries' entanglement.

Once again, it would be too much to say that these figures alone prove the existence of a PRC strategy of enmeshing the rest of the world in relationships that are specifically tailored to maximize the CCP's leverage over other countries and thereafter perhaps influence their behavior. The patterns we have seen in the FBIC data, however, are at the least suggestive of this – and hence worrisome.

Another point worth making is suggested by referring again to the differences shown in Figure 4 and Figure 5 when one factors in data from after the year 2000. If indeed our suspicion is correct that the FBIC data contains the fingerprints of some sort of Chinese strategy, that data may also suggest the degree to which China's admission to the WTO that year gave Beijing an unprecedented opportunity to "weaponize" its foreign economic relationships in service of such a strategy – an opportunity about which some critics of that step worried at the time, and which Beijing may indeed have seized with gusto.

Definitive answers to such questions, however, must be left – if they can be had at all – for another day. For now, we hope merely that this essay will stimulate thought, offer a further demonstration that quantitative methods have the potential to provide real value to policymakers in competitive strategy, and encourage further inquiry.

Conclusion

This project was always intended to be more suggestive than definitive, aiming more to signal the *kind* of analysis that it is possible to do – and to offer some tentative observations – than to provide truly authoritative answers. There is surely a great deal more that can (and should) be done using more complex techniques and drawing upon the potentially much more comprehensive data that may be available from the wide range of open-source and fee-for-service data aggregators the today exist. The FBIC data upon which we have drawn here is only a comparatively modest subset of what can be had, but we think it a useful set nonetheless – and it has the great virtue of being both publicly available and free.

We hope that our work has helped suggest at least some of the kinds of analysis that can be done with such data, and that it has at least begun to shed additional light upon the dependency relationships that China may be deliberately and systematically cultivating, particularly among the countries of the Global South. Whether one wishes to understand the nature and depth of such Chinese relationships, to provide senior leaders with better decision-support tools in competitive strategy policy-making, or simply to understand the world with more fidelity, we submit that there's a great deal more interesting work to do.

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Notes

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(1) The idea of weaponizing economic interdependence, in particular, has also been thoughtfully explored at the theoretical level by Henry Farrell and Abraham Newman, beginning with a seminal 2019 article on the topic. *See* Henry Farrell and Abraham Newman, "Weaponized Interdependence: How Global Economic Networks Shape State Coercion," *International Security* 44, no. 1 (2019): 42-79.

(2) *See* Anastas Vangeli "Global China and Symbolic Power in the Era of the Belt and Road,'" in *Soft-Power Internationalism: Competing for Cultural Influence in the 21st-Century Global Order*, ed. Burcu Baykurt & Victoria de Grazia, (Columbia University Press, 2021), 226-33.

(3) Kyle Marcrum, "Propensity, Conditions, and Consequences: Effective Coercion Through Understanding Chinese Thinking," China Aerospace Studies Institute (July 2022), 9, https://www.airuniversity.af.edu/Portals/10/CASI/documents/Research/Other-Topics/2022-07-18

Coercion and Propensity.pdf (quoting Francois Jullien, *A Treatise on Efficacy: Between Western and Chinese Thinking*, trans. Janet Lloyd, University of Hawai'i Press (2004), 26).

(4) "Who's the big boss of the global south?" *The Economist*, April 8, 2024, https://www.economist.com/international/2024/04/08/whos-the-big-boss-of-the-global-south.

(5) In recent years, there has been a great deal of work looking at such competition. *See, e.g.*, Meg Keen and Alan Tidwill, "Geopolitics in the Pacific Islands: Playing for advantage," Lowy Institute Policy Brief (January 31, 2024), https://www.lowyinstitute.org/publications/geopolitics-pacific-islands-playing-advantage; Ben Westcott, "Why US and China Compete for Influence With Pacific Island Nations," *Washington Post*, September 25, 2023, https://www.washingtonpost.com/business/2023/09/25/how-us-china-seek-influence-with-solomons-and-other-pacific-island-nations/b8e2b832-5b74-11ee-b961-94e18b27be28_story.html; Mihai Sora, "Geopolitical Competition among the Larger Powers in the Pacific," *Columbia Journal of International Affairs* 74, no. 2 (Spring/Summer 2022), https://jia.sipa.columbia.edu/content/geopolitical-competition-among-larger-powers-pacific; Tarcisius Kabutaulaka, "China-Solomon Islands Security Agreement and Competition for Influence in Oceania," *Georgetown Journal of International Affairs* (December 2, 2022), https://gjia.georgetown.edu/2022/12/02/china-solomon-islands-security-agreement-and-competition-for-influence-in-oceania/; Shane Bilsborough, "The South Pacific Influence Challenge: Sage Dragon Game Report," MITRE Corporation (September 2023), https://www.mitre.org/sites/default/files/2023-09/PR-23-1169-Sage_Dragon_Game-Report_0.pdf.

(6) The trigraphs are ISO 3166 country codes.

(7) Note that we have attempted to make these graphics easier to read by plotting the results not on the basis of raw data for each year, but rather using 10-year rolling averages. A data point given for 2020, for instance, is thus the result of the raw data for that year averaged with every *other* year back to 2011. One could do this for varying "rolling" time periods – the Pardee Institute, for instance, apparently tending to use three-year rolling averages – but we have chosen 10 years here in order to make the curves as "clear" as possible for purposes of this essay. More detailed research focusing on some particular question would presumably wish to shorten the "rolling" period in order to provide more granularity, or even work with raw data, but for present purposes we have stuck with the simplification involved in plotting on the basis of a 10-year average.

(8) Vietnam and Korea would seem to be exceptions in the respect – both showing country-by-country Oceanian relationships in **Figure 2** that look somewhat more like the China pattern of consistently growing bandwidth and (especially) dependency. Even Vietnam and Korea, however, still display a degree of greater volatility over time than does China, whose patterns seem quite unique here. (Note also that the Vietnam data only begins in 1977, *after* the end of the Vietnam War and the unification of South Vietnam and North Vietnam.)

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