International News Coverage and Foreign Image Building
– Agenda Setting, Persuasion, and Framing in the Formation of
Public Image toward Foreign States in Japan, 1987-2015 –
(POL290A Research Paper)

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March 4th, 2016

1   Introduction

Domestic citizens often have difficult time building images of foreign countries. Especially in country like Japan, where foreigners consist only 1.6 percent of population (as of 2013)[1], ordinal people rarely have a chance to communicate with foreigners. Nevertheless, Japanese people transform their image toward foreign states, sometimes drastically. According to monthly public opinion poll by *Jiji-Press* (*Jiji-Poll*), which asks about the importance and favorability of various foreign countries and regions for Japan, people do change their opinions toward the same countries or regions over time. If Japanese people rarely have any "real experience" to update their foreign images, then what explains these changes?

Potential short answer would be the international news coverage of media. For example, on May 30th 1996, FIFA selects Japan and South Korea to jointly host 2002 FIFA World Cup. Japanese media, even when the World Cup hosting selection process had been continued for a long time, start to cover this issue intensively from late May to early June in 1996. This sudden intensive coverage seems to signal Japanese public about the importance of Japan-Korea relationship: In response to the coverage, Japanese public salience towards Korea booms up: According *Jiji-Poll*, which asks respondents to choose three most important foreign states and regions for Japan, percentage of respondents choosing South Korea has drastically increased from 21 percent in May to 28 percent in June. At other times, from late 2001 to 2002, negative articles on terrorism and Afghanistan war dominated the Japanese media coverage toward United States. In this period, on *Jiji-Poll*, percentage of Japanese people who favor United States declined from 49 percent in September 2001 to 38 percent in September 2002. As the above example illustrates, media coverage seems to be the important factor to explain public image toward foreign countries. People rely on the signals from media for *what* foreign countries to think about and *how to* think about those foreign countries, because they often do not have direct experiences with foreign countries to form opinions based on their own experiences.

The first in previous example is an illustration of *agenda-setting effect*. It is the idea that more an object is covered by the media, the more it is perceived important by people (McCombs and Shaw 1972). It argues that, the intense media coverage of an issue make people more accessible (i.e. highly salient) to that issue: media influences people by signalling *what* issues *to* think about. This is one of the three major functions of media that are discussed in the previous literature, along with *persuasion* and *framing effect*. Other two functions imply the media's power to influence *how to* think about an issue. *Persuasion* suggests that media coverage directly "alters one's evaluation of the proposal on one of those dimensions" (Chong and Druckman 2007*b*, 115), while *framing effect* implies indirect media influence on one's opinion by making one to apply the evaluation of particular dimensions of an issue than ones of other dimensions to think about overall evaluations of the issue (Scheufele and Tewksbury 2007). In the second example in the previous paragraph, people are likely to be *persuaded* by negative coverage toward United States, and it may be the case that people apply national security *frame* more than other frames when thinking about the overall favorability towards United States.

Each of the above three media functions have been widely, but separately, studied in the past literature; few studies attempt to differentiate each type of effects in one study. This study intends to integrate and test three types of media effects into one research design to explain Japanese public perception towards foreign states. Utilizing the novel data of monthly public opinion polls that have been conducted over twenty years period, it will capture the impact of media coverage on aggregated public perception of importance and favorability toward foreign countries. As independent variables for the study, I use first-page headline coverage from two major daily newspapers in Japan: *Asahi Shimbun* and *Yomiuri Shimbun*. To gauge three type of media effect, I quantify the coverage in three ways. First, agenda-setting effect is captured by the overall count of relevant headlines (i.e. involves relevant texts of particular foreign state). I test the impact this total coverage measure on public perception of importance toward foreign states. Second, persuasion effect is captured by the count of positive and negative headline towards relevant foreign state. This measure is tested on the perception of favorability toward foreign states. Finally, framing effect is captured by the coverages on sub-issue frames relevant to each foreign state. Specifically, I focus on two major frames that are prevalent in foreign media coverage: defense and economy.

This paper is structured as follows. The following section reviews previous media effect studies and derives hypotheses from theoretical expectations. Section 3,4 and 5 focus on the analysis of agenda-setting effect, persuasion effect, and framing effect. Each section starts from introduces the data to test hypotheses, and section then shows the results of the time-series analysis. Section 6 concludes with implications and suggestions for future research.

2   Theories

Under the democratic society, opinions of the people inevitably affect public policies. Media, in this sense, is considered to be a critical source those opinions. People, with the limited ability and opportunity to directly experience outer-world, are expected to "rely on the media to explore the world around us and construct our 'reality' " (Lippmann 1922, 18). But how and in what extent media can influence public opinion? For "how" question, three major types of effect – agenda-setting effect, persuasion, and issue framing effect – have been suggested. For "what extent" question, studies have been utilizing two measures of the strength of media effect – size and

durability. This section first overviews three types of media effects, then discusses the supposedly the central measure of effect strength: durability.

2.1 Agenda-Setting Effect

Agenda-setting effect (first proposed by McCombs and Shaw 1972) is one of the most straightforward and powerful function of media. It suggests that "the more coverage an issue receives, the more important it is to people" (Coleman et al. 2009, 147). For example, it expects that when media starts to extensively cover economy, public salience towards economy goes up[2]. In line with this logic, previous studies find significant agenda-setting effects on election issues (e.g., McCombs and Shaw 1972, Kiousis 2011, Takeshita and Mikami 1995) and more general policy issues (e.g., Palmgreen and Clarke 1977, Behr and Iyengar 1985, Iyengar and Kinder 1987, Neuman 1990, Watt, Mazza and Snyder 1993, Brulle, Carmichael and Jenkins 2012). On foreign perceptions, using cross-sectional public opinion data and TV-news coverage in United States, Wanta, Golan and Lee (2004) find the positive relationship between quantity of coverage and perceived importance of foreign states for American public.

Many studies confirm the presence of agenda-setting effect, however, several studies suggest that the effect is not equally strong across different issues. Generally, two aspects of issues are considered to be influential in explaining the strength of agenda-setting effect across issues: familiarity and information availability. First, it is discussed that agenda-setting effect is weak for highly familiar issues. In this case, people are already salient about those issues, thus less likely to be influenced by media coverage. Different researchers take different ways to operationalize familiarity. Neuman (1990), for example, compares the effect of TV news coverage on crisis and symbolic crisis issues. Crisis issues, such as Vietnam War, racial unrest and energy crisis are temporal issues that have clear-cut beginning and end; symbolic crisis issues, such as drugs, pollution and poverty have been prevalent in society for long period of time. He finds that the agenda setting effect is weaker for symbolic crisis issues than for crisis issues. Other studies operationalize familiarity as "obtrusiveness" of an issue (Zucker 1978, Watt, Mazza and Snyder 1993, Coleman et al. 2009); if an issue is obtrusive, people have "information sources other than media that influence the level of salience" (Coleman et al. 2009, 412), therefore their issue perceptions are less likely to be influenced by the media coverage. On that, Palmgreen and Clarke (1977) finds that the agenda setting effect is weaker for local – more obtrusive – issues than for national – less obtrusive – issues.

Second, at least some relevant information need to be available for people's memory to comprehend what they receive from media. If no issue relevant information is available people's long-term memory, short-term increase in media issue coverage cannot have significant agenda-setting effect, because people may not have enough information to understand or rationalize why it is important. This effect is more prevalent across issues than individuals, as Iyengar and Kinder (1987) find that for unemployment issue, the agenda setting effect is larger for those who are unemployed – who have problem relevant information directly available – than for those who are employed (51). In the aggregated level, one can expect that agenda-setting effect is weak for those issues which relevant information is available for only a limited group of people.

The combination of the above two factors may have an interesting implication. If an issue is already familiar, media cannot exercise strong agenda-setting effect. However, media also cannot have a strong effect on those issues that are trivial and only small a group of people are accessible

to relevant information. Then, the strongest agenda setting effect by media should be observed when an issue is not highly familiar to all people, but familiar enough to significant amount of people.

2.2 Persuasion and Issue Framing Effect

In contrast to agenda-setting effect, which suggests the relationship between the simple quantity of media coverage and public salience, persuasion and framing effect imply that the content of media coverage can influence how people think about an issue. Persuasion suggests that media can directly guide people to think about an issue in particular way. Relevant studies often measure the tone of media coverage by positive, neutral, and negative dimension of an object issue, and test if those tones directly influences the positive, negative public perceptions toward that issue. The logic of framing (also called as emphasis framing) effect is more indirect: it argues that the content of media coverage can influence opinions by changing the applicability of directional arguments (Scheufele and Tewksbury 2007, 15). For example, Baumgartner, Boef and Boydstun (2008) argues that, when arguing against the death penalty in United States, innocence frame – focusing on the unfairness of criminal court system – is more powerful than other frames such as constitutionality frame – emphasizing the cruelty an immorality of death penalty – to move public opinions and policies toward the direction of anti-death penalty, generally because innocence frame is more convincing and applicable for broader public than such frame as constitutionality frame. From this illustration, framing effect can be illustrated as to interact with persuasion: the directional argument with more applicable frame can persuade people more strongly than those arguments with less applicable frame.

Numbers of study confirm the direct impact of tones and contents of media coverage on public opinions. Here, some studies directly test the impact of media tones on public perceptions toward political leaders Kepplinger et al. (1989), economy (Hester and Gibson 2003, Ju 2008) and foreign states (Wanta, Golan and Lee 2004, Besova and Cooley 2009). Many studies, however, fail to differentiate persuasion from framing effect. Those studies tend to equate two concepts by defining issues themselves as being negative or positive (e.g., Wu, McCracken and Saito 2004) or treat persuasion as a part of framing effect. On this point, being negative on the issue should be distinct from issues themselves as being negative. For example, discussing economy issue from unemployment frame is not equal to being negative about economy. Here, unemployment frame itself is independent from the direction of coverage, given that one can also make positive argument about economy by using unemployment frame when, for example, unemployment rate is low. Of course, some frames fit better with (is more applicable to) particular direction (e.g., negative) of argument than other directions (e.g., positive), but it does not necessarily mean that a frame has the direction within it.

As agenda-setting effect, the strength of persuasion and framing effect of media vary across different dimensions. For persuasion, the direction of coverage matters: It is argued that the persuasion is stronger for negative coverage than for positive or neutral coverage. Psychological studies have long been discussing the existence of "negativity bias:" when a person is forming an impression towards an obeject, "negative information is more important than comparable positive information" (Lau 1982, 355). They discuss that it is resulted from the infrequency of negative information in generally-positive world and people's sensitivity towards cost avoidance (Lau 1985, Ledgerwood and Boydstun 2014). Several studies of media persuasion show results consistent

with the above expectation. For example, Wu and Coleman (2009) finds, by studying the media coverage of candidate traits in 2004 US presidential election, that the coverage of negative traits has strong impact on people's voting intention, while the coverage of positive traits has no significant impact. The same tendency is observed for foreign perceptions of US public (Wanta, Golan and Lee 2004): only negative coverage has the significant relationship with cold feelings toward foreign countries.

For framing effect, there are two dimensions to explain the strength of effect. First, strong frames should have stronger framing effect. This may sound like a tautology, but it just indicate that the quality of logical and emotional contents in the frame matter. For example, Chong and Druckman (2007*a*) introduce two frames to support the hypothetical proposal of urban growth management, which intends to regulate the development in part of the city. The strong frame is called "open space" frame, suggesting that it would conserve natural landscape and open-space in the city; the weak frame is called "stronger communities" frame, suggesting that it would strengthen community tie. They find that "open space" frame has a statistically significant power to predict opinion change, while "stronger communities" frame does not. Second, several studies argue the potential impact of frame repetition Klar, Robinson and Druckman (2013), Chong and Druckman (2013) to strengthen framing effect. Here, they generally find that frame repetition strengthens framing effect by making the response opinion to persist for a longer time, but only when the initial frame is proved to be effective. Without effective first frame, repetition does not have a significant impact to increase the strength of framing effect.

2.3 Capturing the Dynamic Strength of Media Effect: Durability

Most of the past studies concern with the effect size (i.e., whether it is significant or not, units increase in dependent variable given a unit increase in independent variable) to capture the strength of media effect. However, considering the dynamic nature of media effects, there is another important aspect of the strength of effects: durability. Here, one of the critical research design problems in the media effect research is the selection of appropriate time windows – "optimal effect span" – to collect the data of media coverage (Winter and Eyal 1981). Given that many of those studies use cross-sectional polling data, the selection of media coverage time windows crucially changes the observed size of the effect. In other words, the size of effect is dependent upon time windows chosen by the researcher. In the past, without strong theoretical background, studies select the time span arbitrary from weeks to years immediately prior to the time point of the public opinion poll (Watt, Mazza and Snyder 1993, 409-410). In those analyses, one cannot differentiate the effect size from duration: it is unclear that observed large or small effect is the representation of immediate effect size or the consequence of long- or short- duration of effects. Nevertheless, some empirical studies attempt to assess duration of effects.

First, there are three major streams of observational studies dealing with the durability of media effects. One line of studies use multiple time windows to collect media coverage, and compare effect sizes. For example, Winter and Eyal (1981) compares the correlations between media coverage and the salience of civil right issue in US by using 27 Gallup polls conducted between 1954 and 1976. They find that, for civil right issue, media coverage time windows beyond two months preceding to the survey do not contribute to the improvement in the prediction of public issue salience. Watt, Mazza and Snyder (1993) use more sophisticated method to model the memory decay of the received information. They construct the models of memory decay of varying extents

and durations, and consider which model is going to best represent the agenda-setting effect in the real world. The study models 95 percent memory decay of media coverage in 3 days to 3000 days, and predict the American public salience on the issue of inflation, Iran and Soviet Union. Their results show that, for Iran issue, the effect size is maximized by just accumulating 30 days of coverage, while inflation issue, more than 600 days of coverage is needed to maximize the effect size. Here, the duration of media effects varies across issues.

Another line of observational studies, though few, use longitudinal data to assess the durability. The time-series design of the analysis makes it possible for the researchers to assess the question of durability and causation at the same time. Here, (Blood and Phillips 1995) find that the impact of recession headlines on consumer sentiment persists longer than the impact of consumer sentiment on recession headlines.

Other researchers use experimental approach to capture duration of media effects: They interview respondents in multiple different time-points to see if media effects go away over time. This is an effective approach to assess "relative" durability of media effects, however, due to the arbitrary selection of the time spacing and lack of sufficient time points, it is difficult for experimental approach to assess the "absolute" durability (Chong and Druckman 2013).

To theoretically differentiate two aspects – size and duration – of media effects strength, there are some theoretical frameworks that are useful. First, the amount of accessible issue relevant information matters for the immediate size of media effects. Here, if people are already highly accessible to the issue relevant information before the media exposure, new information from the media make little difference to the overall perception about the issue. This is called inertial resistance (Zaller 1992), and media is less likely to have influence. On the other hand, if people are not accessible to the issue content at all before the media exposure, media coverage cannot exercise the strong immediate influence, because people have high uncertainties over forming *any* attitudes toward the issue. Therefore, immediate effect size is expected to be large for the issues with medium level of accessible information.

Second, the familiarity of an issue is expected to influence the durability of media effects. Familiarity here means that people have direct and reliable sources of their attitudes other than media coverage. For highly familiar issue, media effects may have a strong immediate effect, but eventually disappears (or be updated); since the issue is familiar, people are likely to receive information about the issue from sources other than the media, so the effect cannot last long (Baden and Lecheler 2012, 371). Finally, when an object is not familiar, persistent effect would occur. In this case, since the issue is not familiar, the information provided by the media stay in the long-term memory but less likely to be updated by non-media information source.

From the above theoretical discussion, I simplify the logic in their model and summarize implications in Table 1. In the table, effect types are described by the size (small or large) and duration (short or long). Here, information accessibility first functions as to define the immediate size of effects, and familiarity functions as to define the duration of effects.

The table implies that the immediate effect size is the largest for the issues with the medium level of information accessibility, and the duration of effect is longer for less familiar issues.

2.4 Hypotheses: Foreign Perception and Media

With the rapid globalization in every aspects of society, foreign perception is one important area of the media-effects research. In that, several studies show the power of media coverage in shaping

Table 1: **Theoretical Framework for the Strength of Media Effects**

		Availability of Relevant Knowledge		
		Low	Medium	High
Issue Familiarity	High	*Small;Short*	*Large;Short*	*Small;Short*
	Low	*Small;Long*	*Large;Long*	*Small;Long*

Created by the author, the original idea comes from Baden and Lecheler (2012).

cross-sectional difference in public salience and sentiment across foreign states. Using data from United States, they find that the overall quantity of media coverage correlate with the importance of an object foreign state and the negative coverage correlate with the negative perception of an object foreign state (Wanta, Golan and Lee 2004, Kiousis and Wu 2008, Besova and Cooley 2009, Lee and Hong 2012)[3].

Nevertheless, none of the above studies differentiate three different types of media effect. Also, by the use of cross-sectional data, they fail to capture the durability dimension of media effect. Therefore, this study constructs hypotheses to differentiate agenda-setting effect, persuasion and framing effect, capturing strength by both size and durability. First, it begin with the hypothesis on agenda-setting effect.

> *H1a. As an foreign state receives more news coverage, the more important the state is to be perceived by people. (agenda-setting effect)*

Second, persuasion hypotheses state the relationship between media tone and public foreign perception.

> *H2a. As an foreign state receives more negative news coverage, the more unfavorable it is to be perceived by people. (persuasion effect: negative)*

On the other hand, it is not clear that positive or neutral coverage leads to favorable feelings. Thus:

> *H2b. Positive or neutral news coverage of an foreign states does not necessarily influence the favorable feelings toward the state. (persuasion effect: positive/neutral)*

For framing effect, I argue that it functions as to interact with agenda-setting and persuasion effects. Here, the sizes of agenda-setting effect and persuasion are expected to be dependent upon how each country is framed in the coverage. In particular, I focus on two major frames in foreign states coverage: economy and defense. First, I expect economy frame to have a strong agenda-setting effect, because economic interdependence is probably the most important factor to explain the bilateral relationship between two countries (as many IR studies suggests). On the other hand, I expect that defense frame has a strong negative persuasion effect. When making the negative argument towards foreign countries, the arguments with national security frame (e.g. military threats to the territory) may be more persuasive than arguments with economy frame (e.g. pressures of tariff cuts), because, while most people would be convinced by national security threat, some people may argue against economic threat argument by noting the different side of the argument (e.g., merits from tariff cuts).

H3a. Agenda-setting effect of economy framed coverage is larger than the agenda-setting effect of defense framed coverage. (issue framing: economy)

H3b. Persuasion effect of defense framed coverage is larger than the pesuasion effect of economy framed coverage. (issue framing: defense)

Here, from the previous discussions, the size of media effects is expected to be the strongest for objects that have the medium amount of relevant information available and are not familiar. To start with, information availability is expected to be captured by the average level of media coverage over the years; even when the media provides intensive short-term coverage on foreign regions or states that are rarely (or almost never) covered in the long-run, people have no prior-information available to comprehend short-run new information. Next, high familiarity implies the high frequency of direct contacts between domestic people and foreigners; by that, people can form foreign image by direct interactions independent of indirect information from media. For example, tourism can be one of the major source of direct interaction with people in foreign countries; thus, in case of Japan, familiarity increases as more Japanese tourists visit foreign states or regions and more tourists from those places come to Japan. From the above illustrations, conditional hypotheses for media effects are constructed as follows.

H4. The size of agenda-setting effect for foreign states is small for those states receiving the high or low level of long-run coverage, and large for those states receiving the medium level of coverage. (information availability)

H5. The duration of agenda-setting effect for foreign states becomes shorter as the direct interaction with those foreign states increases. (familiarity)

3 Analysis 1: Agenda-Setting Effect

3.1 Data

To assess the agenda-setting function of media on foreign perception of Japanese people, this study focus on twelve different states and regions in the world: United States, China, South Korea, North Korea, Russia, Europe, Middle/Near East, Taiwan, South East Asia, Middle/South America, Oceania, and Africa. Each variable in the analysis is collected or constructed for every month between April 1995 and March 2015. The following paragraphs explain the detailed structure of the variables of interest in this study. It also shows the distributions of the dependent variable – foreign perceptions – and independent variables – foreign news coverage – to make sense of the characteristics of the data.

Importance of Foreign States and Regions. As the dependent variable of a foreign perception, this study uses monthly public opinion poll conducted by *Jiji Press*[4]. This poll asks question on the perception of importance of the relationship with each state or region. The question is asked from April 1995 through March 2015, so the analysis with this variable is limited the this period.

Specifically, the question ask respondents to list up to three countries or regions that they think the relationships with them are important, offering 15 categories (See Appendix A for the wording detail). Figure 1 shows the distribution of importance perception for each state and region[5].

Looking at the boxplots, United States and China are two states that are perceived to be most important for Japanese people. While China has more variances in the importance, over 60 percent of respondents generally lists those two countries as one of the most important countries for Japan. Next, South East Asia, South Korea, Europe, Russia, and North Korea are perceived moderately important: about 10 to 20 percent of respondents list those countries and regions as important for Japan. Then, Middle,Near East and Taiwan often scores 10 percent or less, and Central, South America, Africa and Oceania are one of the least important regions.
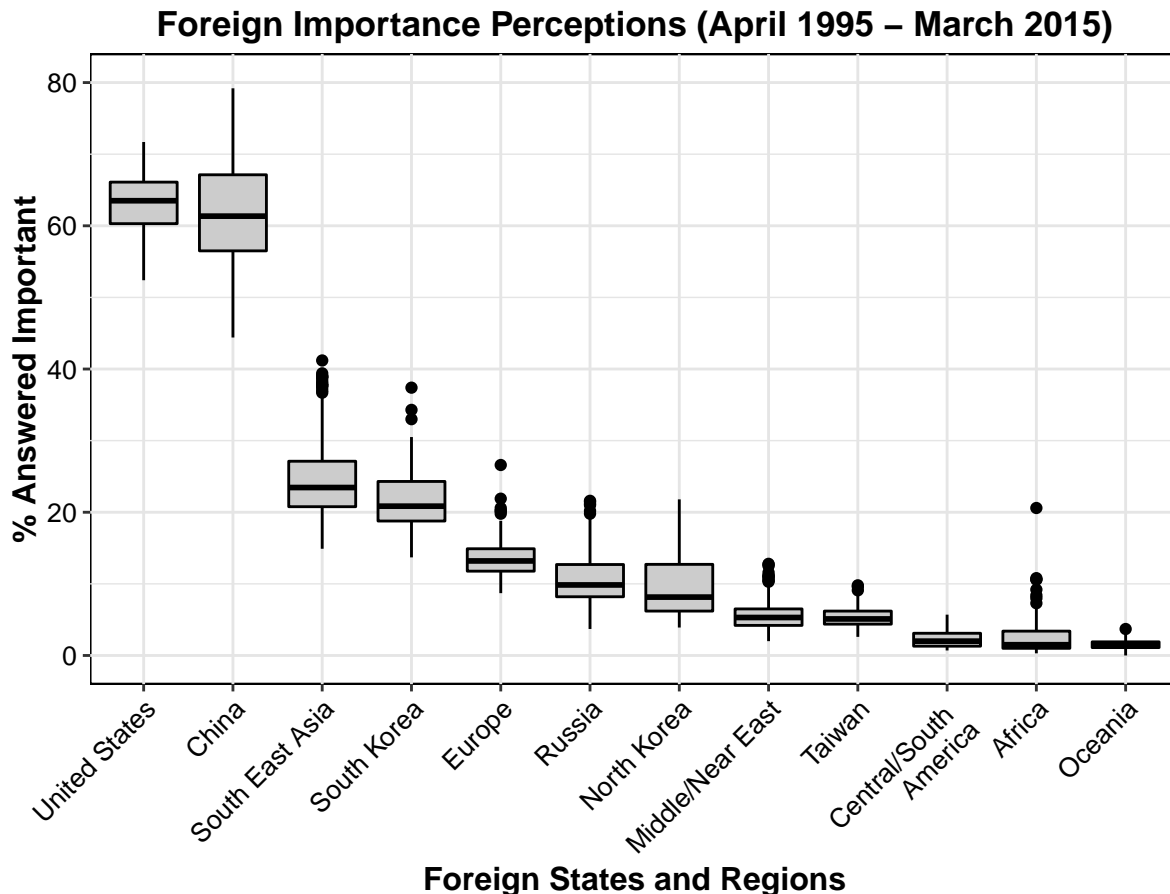

Figure 1: Boxplots on Distribution of Foreign Importance Perceptions

Total Foreign News Coverage (TC). As the independent variable of media coverage, this study utilizes headlines from first pages of daily morning newspapers in Japan. There are three rationales for this operationalization. First, I select newspaper as the target media. Some studies conducted in US claim the merits of using TV news coverage, based on the its popularity and accessibility for general public (Behr and Iyengar 1985, Watt, Mazza and Snyder 1993). Nevertheless, Japanese newspapers have the world's largest circulation by far, and more than 70% of adult Japanese read newspapers[6]: Japanese newspaper is one of the most popular domestic media in the world. In addition, major national TV stations in Japan have close financial and information ties with major

national newspaper companies ([Freeman 2000](#), 13-21), thus the newspaper coverage is expected to coincide with TV news coverage[7].

Second, I select first pages of daily morning newspapers as the sub-target of the analysis. Here, people should have various preferences of articles to read, while the first page is what is expected to be checked by every reader. The dependent variable in this study is an aggregated (or averaged) impression towards foreign states. Considering every article may bias the distribution of the variable by including articles that are read by only a small group of readers. Thus, by only using what every reader is expected to read, it is logical to limit scope of the newspaper coverage to the first page.

Third, I select headlines as the target of content analysis (Also used by [Blood and Phillips 1995](#), [1997](#)). This is valid from the similar reason as limiting the target to first pages. Previous studies show that headlines are quite influential in shaping public opinion ([Geer and Kahn 1993](#), [Pfau 1995](#)), while contents of headlines are not perfectly consistent with the contents of main texts ([Althaus, Edy and Phalen 2001](#), [Andrew 2007](#)). Thus, if an average person grows the impression out of an article by only reading a headline and does not bother to read detailed texts, including texts in the analysis may bias the variable distribution; headline is the adequate and unbiased target of the agenda-setting analysis.

Then, the raw data of all first page newspaper headlines of November 1987 through March 2015 are collected from the two most circulated national newspapers in Japan – *Yomiuri Shimbun* and *Asahi Shimbun*[8] (This follows the selection by [Ito and Zhu 2008](#)). Then, it extracts the relevant headlines for twelve object states and regions by searching for relevant words such as name of states and political leaders[9](See Appendix [B](#) for the detail.).

Using extracted headlines, I constructed monthly total coverage (TC) by adding up headlines (HL) with the weight of prominence, operationalized as the word count (W) of each article. Specifically, the monthly coverage is calculated by following equation[10]:

$$TC = \left(\frac{\Sigma(Asahi.Relevant.HL*W)}{\Sigma(Asahi.All.HL*W)} * \frac{4}{9} + \frac{\Sigma(Yomiuri.Relevant.HL*W)}{\Sigma(Yomiuri.All.HL*W)} * \frac{5}{9} \right) * 100$$

To represent the relative power of *Asahi Shimbun* and *Yomiuri Shimbun* to influence public, the coverage is weighted by the ratio of the circulations of two newspapers, which is roughly 4 to 5 from *Asahi Shimbun*[11].

The distributions of total foreign news coverage are shown in Figure [2](#). It shows relatively heavy coverage of US, which consists around 3-5 percent of all news coverage every month. China and North Korea has the second most coverage, and other states and regions often receives less than one percent of coverage every month. On the other hand, all the regions have some months that have particularly high level of coverage.

Trade Quantity. As control variables for the analysis, it includes *trade volume*.This variables is expected to capture strength and characteristics of the tie between Japan and an object states, which can become a different route to influence perception. The increase in the bilateral trade volume would raise people's salience toward an object state, since the contacts with the object state likely increase in the business. In addition increasing economic dependency to the object state should heighten the perception of importance towards it. In order to construct the variable, the monthly data of exports and imports with the object country are obtained from the website
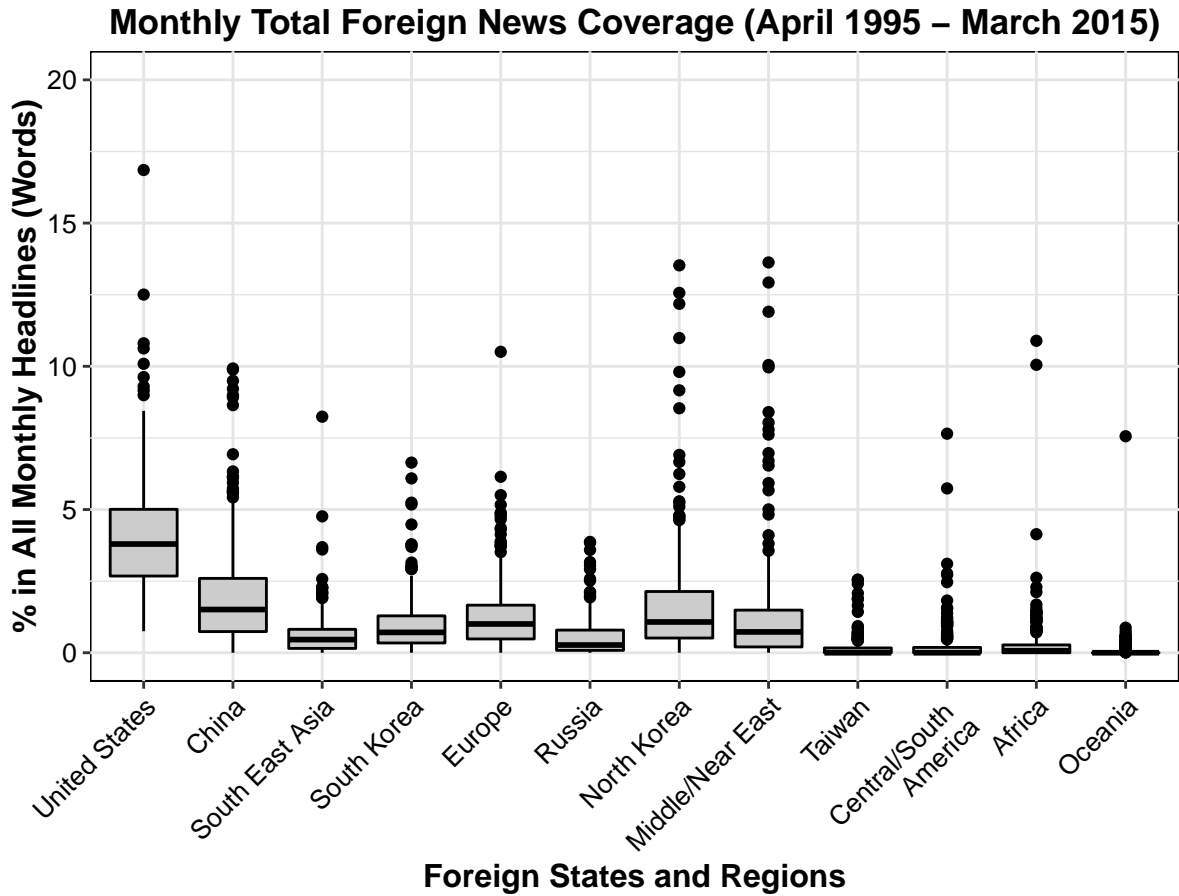
Monthly Total Foreign News Coverage (April 1995 – March 2015)

Figure 2: Boxplots of Total Foreign News Coverage (TC)

of Trade Statistics of Japan[12]. Trade volume is calculated as the sum of exports and imports. To control for the economy size of Japan at each time period, the variable is divided by the gross GDP of Japan of the month[13].

3.2 Model

Given the time-series structure of the data, this study utilizes several time-series analytic models of vector autoregressions (VAR). The following part briefly explains the structure and rationales behind the model used in the analysis.

When analysing the data with multiple time-series variables, one of the most frequently used method is called vector autoregressions (VAR). In VAR modelling, the current values of the dependent time series is regressed on the past values of the same series. By filtering away the effect from the past values, it can analyze the pure relationships among variables of interests (For more analytical details of VAR modeling, see Okimoto 2010, 74-103). VAR modelling often does not specify dependent varables, because all the variables included in the model can become independent and dependent variable at the same time, considering their dynamic relationships. However, for the purpose of this study, I treat foreign perception as a dependent variable and news coverage

as a independent variable in my interpretations.

In this study, I construct VAR model for each states and regions with maximum of twelve months lags[14] of three variables: foreign importance perceptions, total foreign news coverage (TC), and trade volume[15]. To assess the real effect of news coverage on importance perception, given the non-stationary variables included in the data[16], Granger causality test cannot be used in this model. Thus, I utilize impulse response function (IRF) analysis to assess the result. IRF visualizes the size of impact by showing the unit change in the dependent variable given the unexpected unit increase in independent variable, controlled for other variables.

3.3 Result

Figure 3 shows the result of IRF analysis. Vertical axis for each country shows the increase in the percentage of people choosing particular foreign states or region as one of the most important one for Japan, given that the TC of that state increase by 1%, controlling for trade volume and an exogenous variable. Horizontal axes indicate the months from 1% increase shock in TC, show how long agenda-setting effects persist. Dashed line indicates the 95% confidence interval, bootstrapped for 2000 times.

Generally, increase in TC is post-seeded by the increase in importance perception. In most of the countries, importance perceptions increase a month later the shock in TC, and eventually decays back to the former level in the long run. Comparing the size of effect, South Korea and Russia have particularly large effects that importance perception increase by more than one percent a month after the one percent increase in TC. Smaller but statistically significant (p<.05) agenda-setting effect can be observed in United States, North Korea, Middle Near East, Taiwan, and Africa. For South East Asia, Europe, Middle South America and Oceania, the data shows the slight increase in importance perception one to two months after the shock in TC, but it is not statistically significant (p>.05). In China, however, the importance significantly decrease by 0.69% three months after the shock in TC, and this is statistically significant. So, as the general tendency H1 is supported except in China.

Comparing durations of effects, even when the immediate effect is statistically significant, it disappears after 3 to 4 months in most of the countries[17]. Here, the effect in United States and North Korea persists to be statistically significant until 12 months after the shock. Especially, in North Korea, the effect size goes to its peak 6 months after the shock (0.90%), and stay in the almost same level even after a year from shock. In North Korea, the agenda-setting effect does not go away; it stays to increase the public salience toward the country in the long run.

In summary, the analysis in this section confirms the general function of agenda-setting effect (H1) except for China, but it varies across countries. Comparing the size of effects, the large effect for South Korea and Russia is consistent with the expectation from H4, since Russia and South Korea are one of those countries receiving middle level coverage in the long-run (see Figure 2). However, null effect in South East Asia and Europe may go against the expectation from H4. I suspect this is because they are grouped as a region in *Jiji-Poll*, so people may have heard time matching the media coverage of specific country and importance toward regions. For duration, North Korea having the persistent effect is consistent with the expectation from H5, because Japan has no official relationship with North Korea and Japanese almost never have the opportunities to directly contact with the people in North Korea.
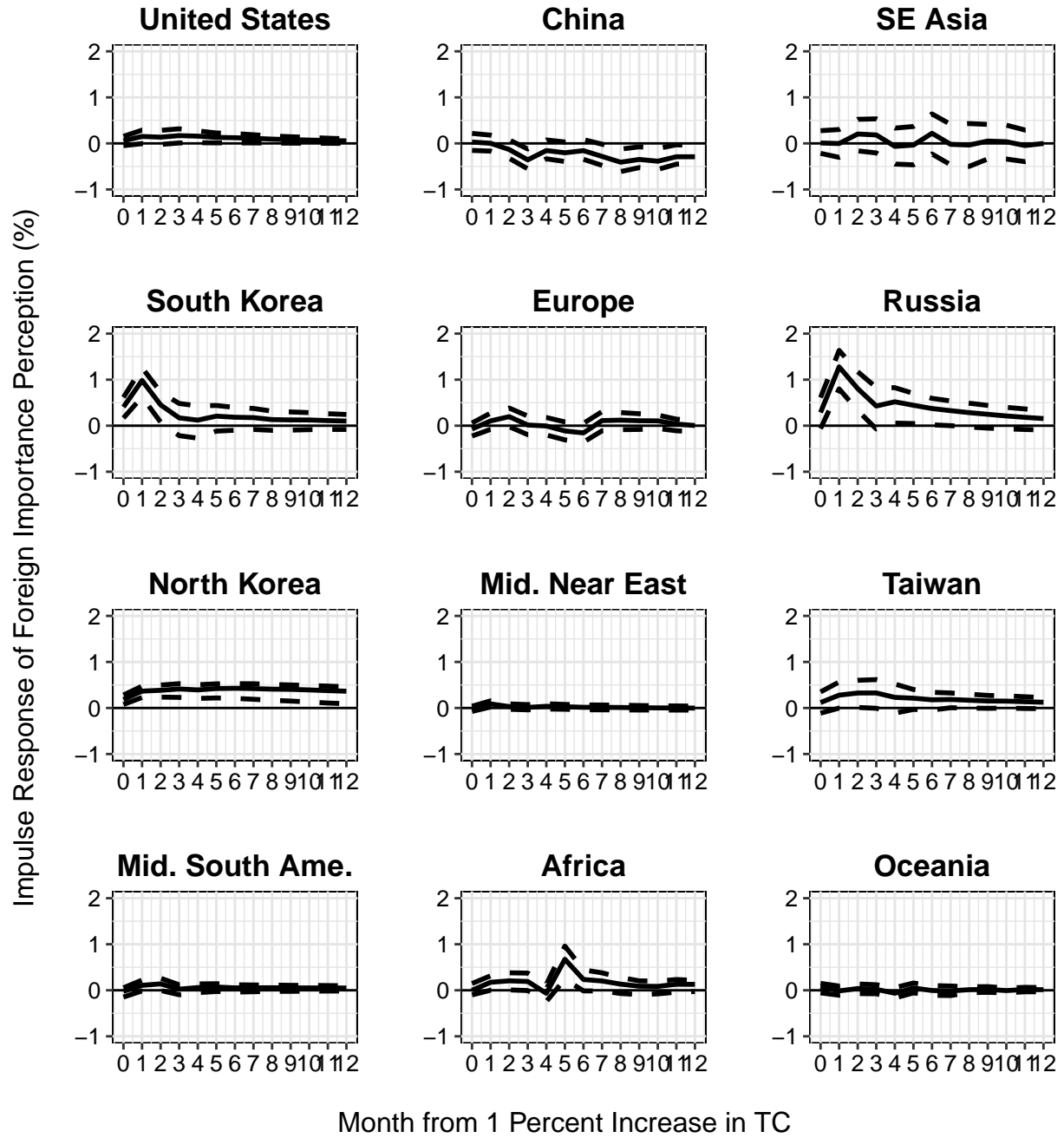
Figure 3: Percentage Increase in Foreign Importance in Response to 1 Percent increase in TC (with 95 Percent Confidence Interval)

4 Analysis 2: Persuasion

4.1 Data

Upon the selection of target samples (i.e. foreign states and regions), for the persuasion and framing effect, it is argued that "[a]ttention to messages may be more necessary for a framing effect to

occur than an agenda setting effect" (Scheufele and Tewksbury 2007, 14). Thus this study limit the persuasion and framing effect analysis to United States, China, South Korea and North Korea. Due to geographical closeness and historical tie, the relationships with four countries are often considered to be important in Japan[18]. Each variable in the analysis is collected or constructed for every month between November 1987 and March 2015. The following paragraphs explain the detailed structure of the variables of interest in this study.

Foreign Directional Perceptions. As the dependent variable of a foreign directional perception, this study uses two questions from monthly public poll conducted by *Jiji Press*[19]. It asks two questions about the perceptions of favorability and unfavorability towards different foreign states, including United States, China, South Korea, and North Korea[20](See Appendix A for the wording detail).

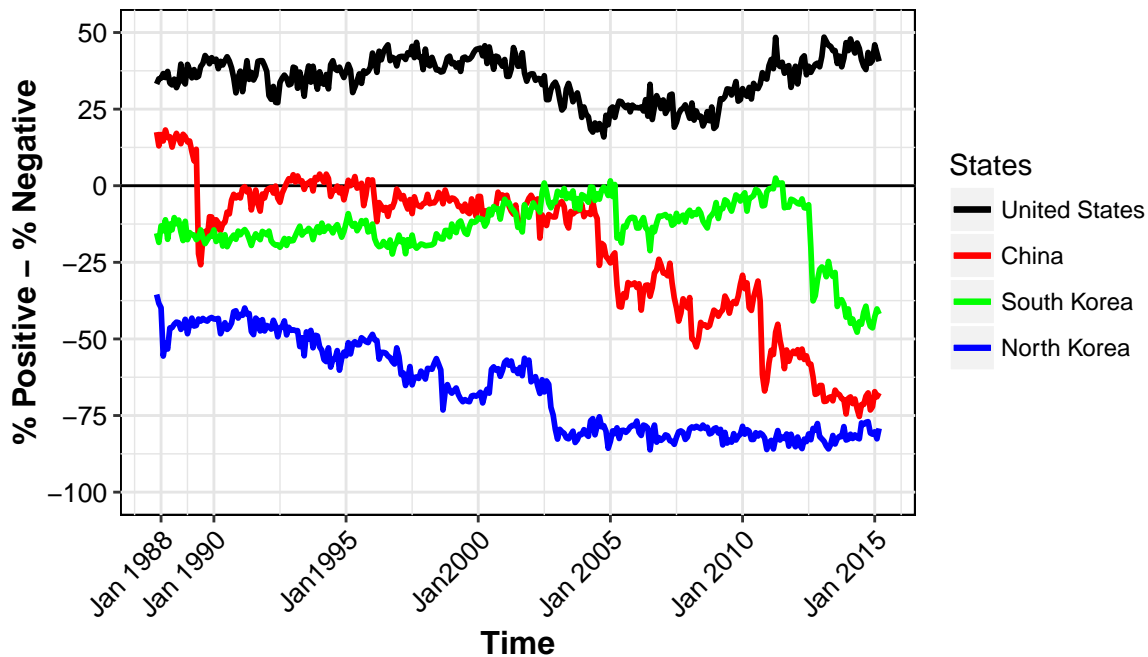**Monthly Foreign Directional Perceptions (Nov. 1987 – March 2015)**

Figure 4: Time-series Plots of Directional Foreign Perceptions

In the analysis, the aggregated percentage of respondents who included the object state as one of the up to three favorable or unfavorable countries is recorded for each month. Figure 4 shows the time-series distribution of directional perception. The score is constructed by subtracting the percentage of people who listed the country unfavorable from the percentage of people who listed the country favorable. Here, the perception towards US is relatively more positive than other countries. And, in contrast to importance, favorability towards China is in consistent decreasing tendency for this couple of decades. North Korea records the lowest favorability score for all the time period included, but still in declining trend. The graph also show rapid decrease in the score towards China and North Korea after 2005, South Korea After 2012[21].

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Directional Content of Foreign News Coverage. Since there is no sophisticated dictionary of positive and negative Japanese words, I conducted two steps of content analysis to code directional content of relevant headline for each of four object states: human-coding and machine-learning (See Appendix B for the detailed procedures). As the first step, human coding are conducted to randomly sampled 1000 headlines for each state. Coders are asked to code the headline's impressions – negative, neutral or positive – toward an object state, hypothetically for an average Japanese person. Four coders are assigned to each state, and the inter-coder reliability test of Krippendorf's Alpha (Hayes and Krippendorff 2007) is calculated. For original coding, the alphas score around 0.4 to 0.5 which do not meet the threshold of good reliability of 0.6 to 0.7, while, after considering the coders' individual tendencies to overly give neutral or directional codings, the Alpha improved to 0.66 for US, 0.78 for China, 0.79 for South Korea, and 0.61 for North Korea (See Appendix Table B.1).

As the second step of content analysis, using the human-coded training data, machine-learning is conducted with random forest method. The results indicate the difficulty in correctly predicting the positive headlines, while negative codings are roughly correctly classified (See Appendix Table B.2). According to the above result, positive and neutral codings are grouped together as the same category. This change posits no serious problem, since, as the hypotheses H2b indicates, this study treat positive and neutral similarly. Collapse of positive and neutral category also improves the precision of machine-learned negative codings. The frequencies of final coding results are shown in Table 2. The proportion of negative headline coverage is particularly high for North Korea, while it is low for South Korea. US and China received about the same amount of negative coverage. It should be noted that, for all four states, machine-coding significantly underestimates the quantities of negative headlines compare to human-coding: the machine coding is expected to only capture headlines that are "clearly negative."

Finally, Monthly coverage of negative headlines is calculated by using the codings of "All" columns in Table 2. Two indicators of negative coverage (NC) and positive (and neutral) coverage (PC) for each state are calculated by following equations:

$$NC = \left(\frac{\Sigma(Asahi.Negative.HL*W)}{\Sigma(Asahi.All.HL*W)} * \frac{4}{9} + \frac{\Sigma(Yomiuri.Negative.HL*W)}{\Sigma(Yomiuri.All.HL*W)} * \frac{5}{9} \right) * 100$$

$$PC = \left(\frac{\Sigma(Asahi.Pos.Neut.HL*W)}{\Sigma(Asahi.All.HL*W)} * \frac{4}{9} + \frac{\Sigma(Yomiuri.Pos.Neut.HL*W)}{\Sigma(Yomiuri.All.HL*W)} * \frac{5}{9} \right) * 100$$

Here, NC and PC calculates the coverage in the same way as TC. By that, it can treat negative and positive/neutral coverage independently. Figure 5 shows the time-series distribution of NC and PC. It can be seen that all countries have fair amount of variance in the coverage of negative and positive/neutral headlines. It should be noted that the peaks in negative coverage and positive/neutral coverage do not coincide with each other. This means that, at some period, the total coverage is boosted by the rise in negative coverage, while at other period, the change in total coverage is more likely to be explained by positive/neutral coverage.

In summary, this study utilizes the combination of human-coding and machine-learning to construct directional content variables for news headline coverage. The time-series distributions show that there are fair amount variance in the negative and positive/neutral coverage of foreign news,

Table 2: **Frequencies from Directional Content Analysis of Foeign News Coverage**

State	US				China			
Data	Sample			All	Sample			All
Coder	Human	Machine			Human	Machine		
Category	3	3	2	2	3	3	2	2
Negative (%)	26.7	15.1	11.7	**13.2**	25.2	15.6	14.5	**18.2**
Neutral (%)	59.8	83.0	88.4	**86.8**	62.8	83.2	85.5	**81.8**
Positive (%)	13.5	1.9	n.a.	n.a.	12.1	1.2	n.a.	n.a.
Data Size	987	987	987	**9040**	996	996	996	**3395**
State	S.Korea				N.Korea			
Data	Sample			All	Sample			All
Coder	Human	Machine			Human	Machine		
Category	3	3	2	2	3	3	2	2
Negative (%)	11.2	5.1	4.9	**6.6**	43.1	44.8	34.8	**35.3**
Neutral (%)	78.4	92.6	95.1	**93.4**	40.4	53.2	65.2	**64.8**
Positive (%)	10.5	2.2	n.a.	n.a.	16.5	2.0	n.a.	n.a.
Data Size	993	993	993	**2200**	949	949	949	**3401**

*Values shown are the proportions of each coding category in the data.

**Sample data sizes are not equal to 1000 because irelevant headlines are excluded from the analysis.

and the tendencies in time-series change differ across negative coverage and positive/neutral coverage. This confirms that the coding is meaningful. Due to limitations in the data and the procedures, though, note that this is a rough indicator of attributes of foreign news coverage. It significantly underestimates the frequency of negative coverage, thus when the coding is implemented without errors, the effect of news coverage is expected to be larger than what will be observed in the following analysis.

Economy Variables. As control variables for the analysis, this study includes two economic variables in the analysis: *trade balance* and *economy perception*. Those variables are expected to capture strength and characteristics of the tie between Japan and an object states, which can become a different route to influence perception. The increase in trade surplus may enhance positive feeling toward the object state (Fukumoto and Furuta 2012), while the increase in trade deficit may stimulate the negative feeling toward the object state. In order to construct the variable, the monthly data of exports and imports with the object country are obtained from the website of Trade Statistics of Japan[22]. Trade balance is calculated by subtracting imports from exports. To control for the economy size of Japan at each time period, both variables are divided by the gross GDP of Japan of the month[23]. Economy Perception is taken from monthly public opinion poll from Jiji
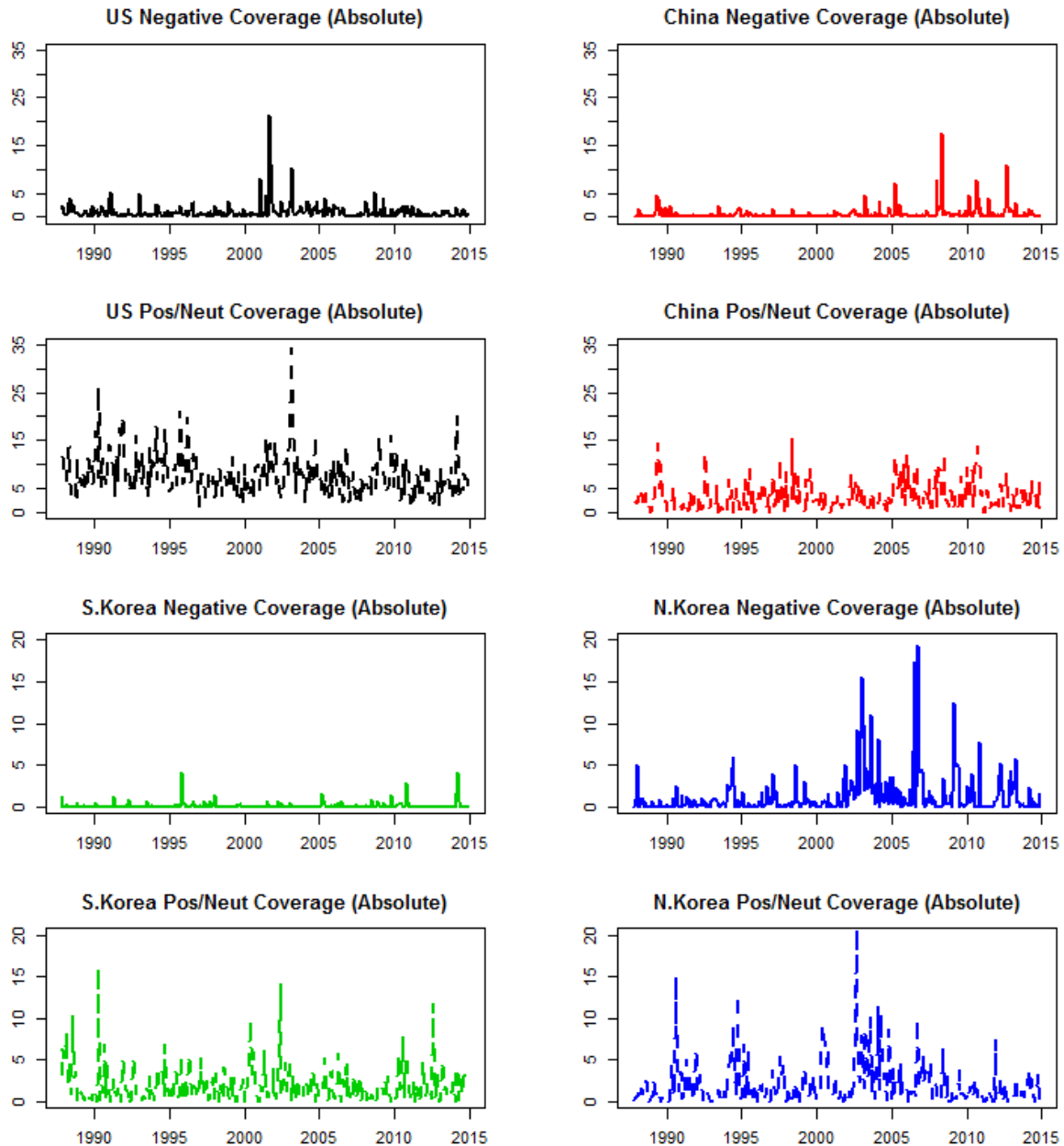
Figure 5: **Time-series Distribution of Directional Coverage (NC/PC), 1987-2015**

Press, it includes the percentage of respondents who answered that Japanese economy got worse or somewhat worse than the last month. The expectation here is that the those people who thinks economy is going bad may blame foreign countries, thus strengthens negative feelings toward any countries.

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4.2 Model

Similar to the one in the agenda setting section, using VAR model with optimal lags up to 12 months, but now include four variables directional foreign perception, NC, PC, and trade balance. Economy perception is included as the exogenous variable.

4.3 Result

The central results for persuasion function is presented in Figure **??**. Similar to the one in previous section, vertical axes represent percentage increase in directional foreign perception given one percent increase in NC or PC, controlling for another type of media coverage, trade balance, and economic perception; Horizontal axes represent months from the shock in NC or PC. Dashed lines show the 95% confidence interval[24].

Comparing the size of the effects, first, H2a is generally confirmed. Except for South Korea, increase in negative coverage has statistically significant impacts ($p<.05$) to decrease favorability perception. In South Korea, the direction of NC impact is the same as other countries and the size of effect is fairly large (about 2% decrease a month later the shock in NC), but standard errors is so large that it is not statistically significant[25] H2b is also generally confirmed. China still show statistically significant negative impact of PC on favorability perception, while the size of the effect is smaller than that of NC; no country shows statistically significant positive impact of PC on favorability perception.

For the duration of effect, the negative impact on United States (and South Korea, although initial impact not statistically significant) favorability disappears fairly quickly after 2-3 months of the shock. On the other hand, negative impact of NC on perceptions toward China and North Korea persists ($p<.05$) even after a year after the shock. For China and North Korea, the negative coverage of media possibly influencing the long-term level of favorability towards those countries.

In sum, H2a and H2b are clearly confirmed, while some countries have weaker tendencies: negative coverage has negative impact on public favorability perception, but positive and neutral coverage does not. Comparing across countries, especially for duration, China and North Korea has more persistent effect than United States or South Korea. This is considered to be consistent with H5. North Korea is the typical example, and for China, it is only recently that many tourists come between Japan and China. Media coverage seems to have more persistent impact on those countries that provides less opportunities of direct interactions.
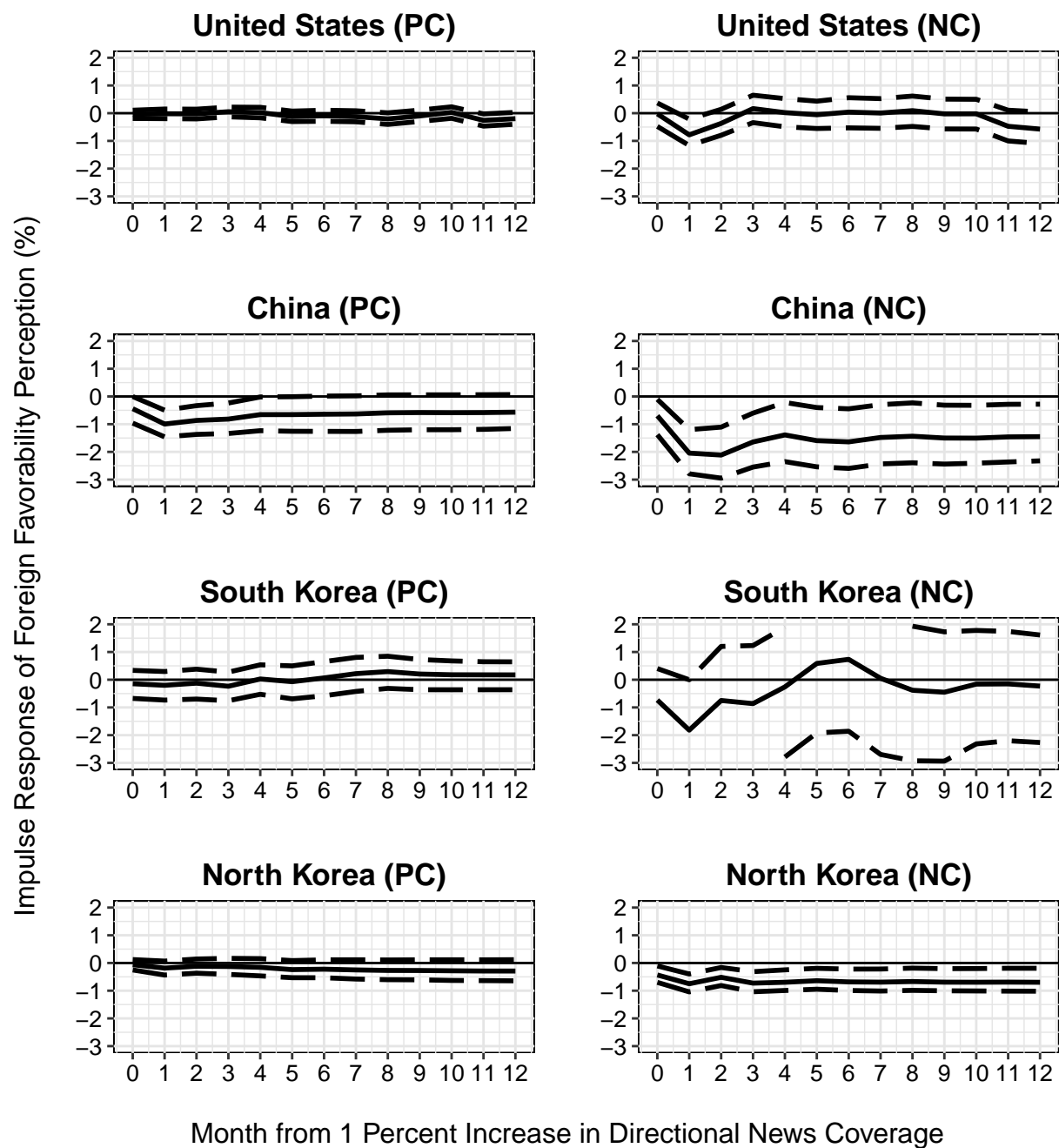
Figure 6: Percentage Increase in Foreign Favorability in Response to 1 Percent increase in PC and NC (with 95 Percent Confidence Interval)

Table 3: **List of Key Words to Extract Frames**

Frame	Key Words
Economy	boeki (trade), toshi (investment), gatto (GATT), kanzei (tariff), en (yen), yunyu (import), yushutsu (export), kin-yu (embargo), shihon (capital), genchi-seisan (production in foreign country), gyogyou-kyotei (fisheries agreement), WTO, FTA, APEC, enjo (assistance), shien (support), keizai (economy), kabu (stock), soba (market price), en-yasu (weak yen), endaka (strong yen), owarine (closing price), shijo (market), akaji (deficit), kuroji (surplus), kokyo-jigyo (public works), sangyo (industry), baburu (bubble), shugyo (employment), doru (dollars), won (Korean currency), tsusho (commerce), sha (company), kozo-kyogi (structual impediment), enshakkan (yen loan), jinmingen (Chinese currency)
Defense	seisai (sanction), buryoku (armed power), gun (army), kaku (nuclear), kokubo (national defense), huantei (instability), antei (stability), yuji (emergency), gunkakku (military expansion), kyoi (threat), shinko (invasion), boei (defense), anzen-hosho; anpo (national security), jieitai (Self Defense Army), kogeki (attack), kosen (combat), bakugeki (bombing), kubaku (air raid), teisen (cease-fire), wahei; heiwa (peace), domei (alliance), jieiken (self-defense right), senso (war), iraku (Iraq), ahugan; ahuganistan (Afghanistan), tariban (Taliban), tero (terrorism), senkaku (territorial dispute with China), rachi (kidnap by North Korea), takeshima (territorial dispute with South Korea), misairu (missile), geigeki (intercept)

5 Analysis 3: Framing Effect

5.1 Data

For framing effect, this study particularly focus on two major frames in foreign coverage by media: economy and defense. To extract those two frames, I conduct relevant word search in the headlines[26]. Based on the reading of randomly sampled headlines, I listed possible relevant for two frames shown in Table 3. Then I conduct simple search of headlines including these keywords. Since the words that are used in these two frames are distinct and systematic than ambiguous coding of positive or negative, this procedure can be considered to appropriate.

The result of frame extraction is presented in Figure 7. It shows that, generally there are more defense coverage than economy, and defense coverage has larger variance thant economy coverage. Even when the coverage is small for countries like South Korea, there are significant movement within them. It is not shown in figure, but defense coverage is dominantly negative, while economy frame has some positive and negative coverage within it.

5.2 Model

Since this section is the extention of previous two sections, the analytical models and control variables of the analyses are the same as previous two sections. It uses VAR model and IRF anal-
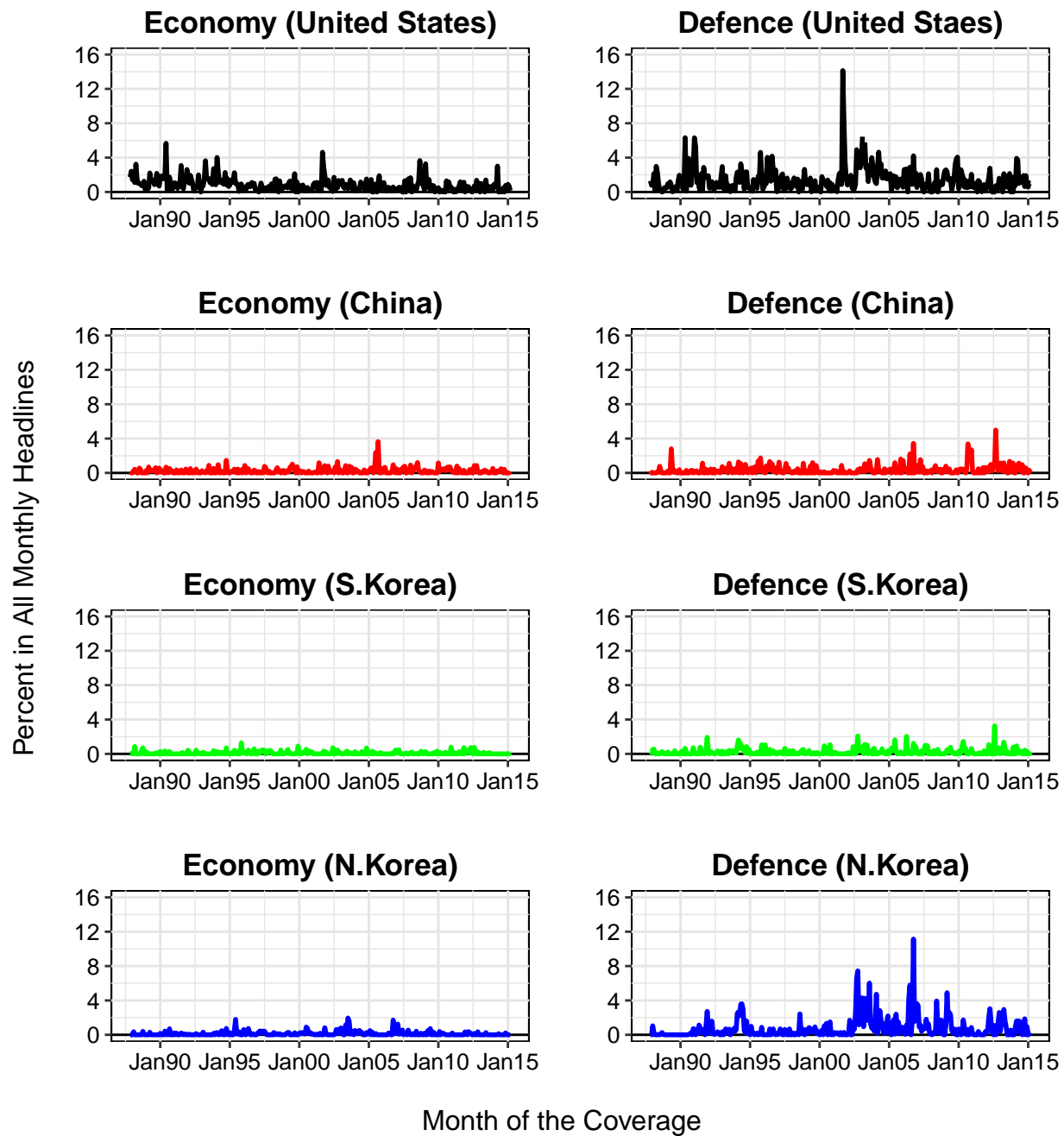
Figure 7: Time-series Plots of Frames

ysis, and for agenda-setting effect and framing effect analysis, the analysis use framed coverage of economy and defense, trade volume and exogenous question category change. For persuasion and framing effect analysis, it uses negative coverage with economy and defense frame. Positive and neutral coverage are excluded from the analysis, given that those have no significant effect on favorability perception.

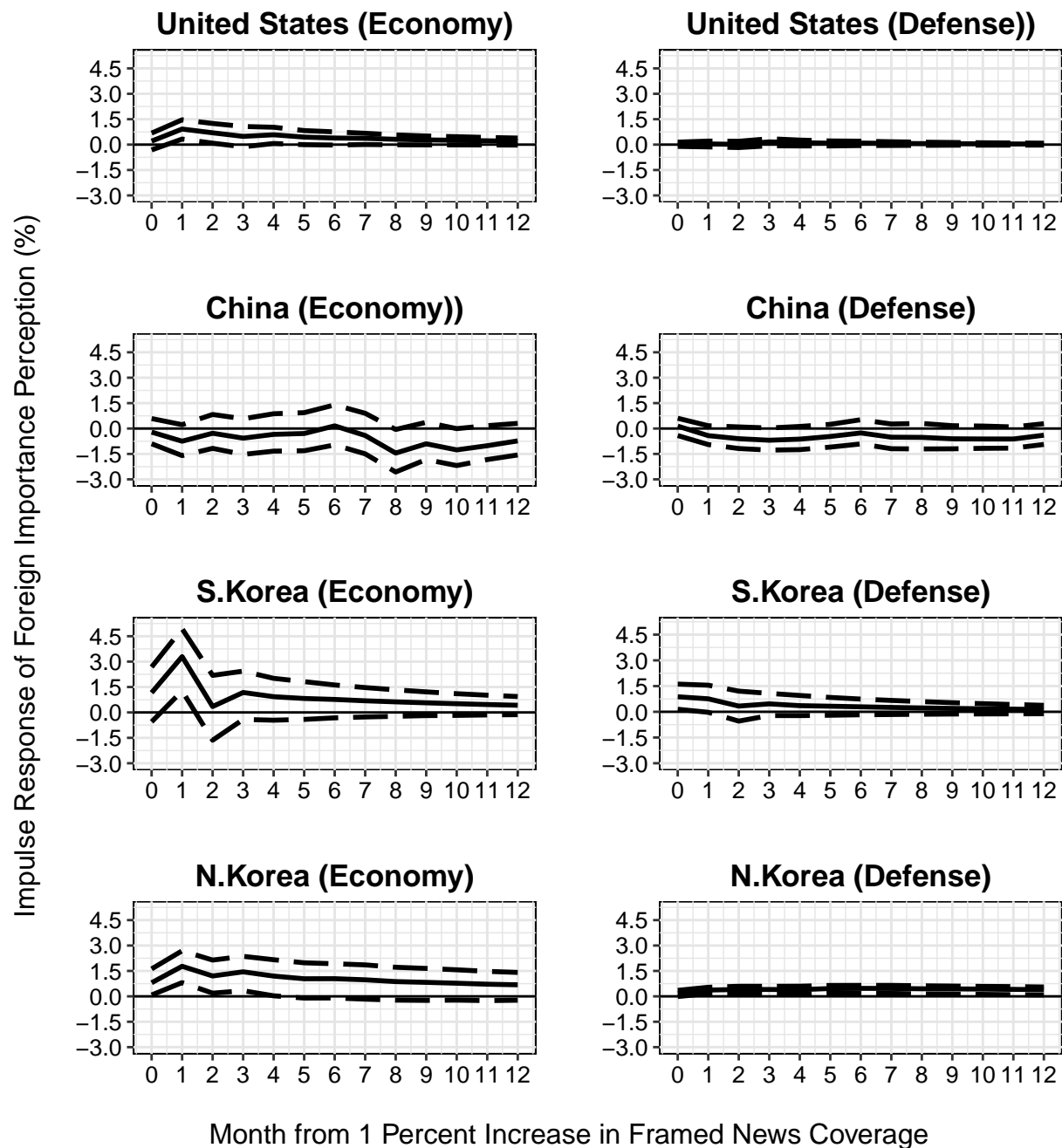## 5.3   Result 1: Agenda-Setting Effect and Frame

Figure 8: Percentage Increase in Foreign Importance in Response to 1 Percent increase in Framed TC (with 95 Percent Confidence Interval)

Figure 8 shows the IRF analysis result for agenda-setting and framing effects. It shows the result consistent with H3a. In United States, South Korea, and United States, agenda-setting effect of economy framed coverage are stronger than the effect of defense framed coverage. For example in South Korea, 1% increase in economy framed coverage pushes up importance perception toward

South Korea by more than 3% (1 month after the shock), while the same amount of increase in defense framed coverage only contribute to less than 1% increase in importance perception (1 month after the shock), and it is not statistically significant. In China, the differentce is relatively unclear, while the statistically significant negative impact of TC on importance perception disappears for economy framed coverage.

5.4   Result 2: Persuasion and Frame

Figure 9 shows the IRF analysis result for persuasion and framing effect[27]. The result is less clear than the one in previous subsection. On the contrary to H3b, it shows that economy framed negative coverage tend to have larger persuasion effect than defense framed negative coverage. On the other hand, defense framed negative coverage has far smaller standard errors than economy framed negative coverage, thus the effect tend to be more statistically significant than economy framed coverage. Also, defense framed negative coverage tend to have more persistent persuasion effect. Actually in United States, the impact gradually become larger over time, and it becomes significant (p<.05) for the first time a year after the shock. In sum, H3b is partially supported: defense framed negative coverage are more consistently and persistently have impact on favorability perception, while the immediate size of the effect may be larger of economy framed negative coverage.

6   Conclusion and Future Directions

In summary, the initial hypotheses were generally supported in the analysis. Firstly, as H1 expects, the increase in the total coverage of an object state does produce the increase in the perception of importance toward and object state. Newspapers do have agenda-setting effect over foreign perception. Second, persuasion function is also confirmed. As H2a expects, the increase in the negative coverage is followed by the decrease in favorability perception. In addition, as H2b suggests, the positive/neutral coverage does not significantly increase favorability perception. Third, the framing effect hypotheses are partially supported. For agenda-setting effect and frame (H3a), economy framed coverage have larger agenda-setting effect than defense framed coverage. For persuasion and frame (H3b), on the other hand, defense framed negative coverage has no larger persuasion effect than economy framed negative coverage, while persuasion by defense framed coverage are more consistent and persistent than economy framed negative coverage.

Comparing across foreign states, there are partial supports for H4 and H5. First, as H4 expects, agenda-setting effect is the largest for those countries with middle level long-run media coverage: Russia and South Korea. However, given that strong agenda-setting effect couldn't be observed for Europe and South East Asia, those also with middle level of long-run media coverage. Evidence for H4 is rather mixed. Second, the pattern in North Korea give strong supports for H5. The media has much more persistent agenda setting effect persuasion on North Korea – where people almost never update information from sources other than media – than other foreign states.

This study make four important contributions to the literature of media effects. First, The above results combined give significant insight to the general understandings of different types of media effects. It is now clear that three types of effects – agenda-setting effect, persuasion, and framing effect – and two dimensions of effect strength – size and durability – are conceptually different, can be captured by distinct measurements, and have different implications. Second, by utilizing time-
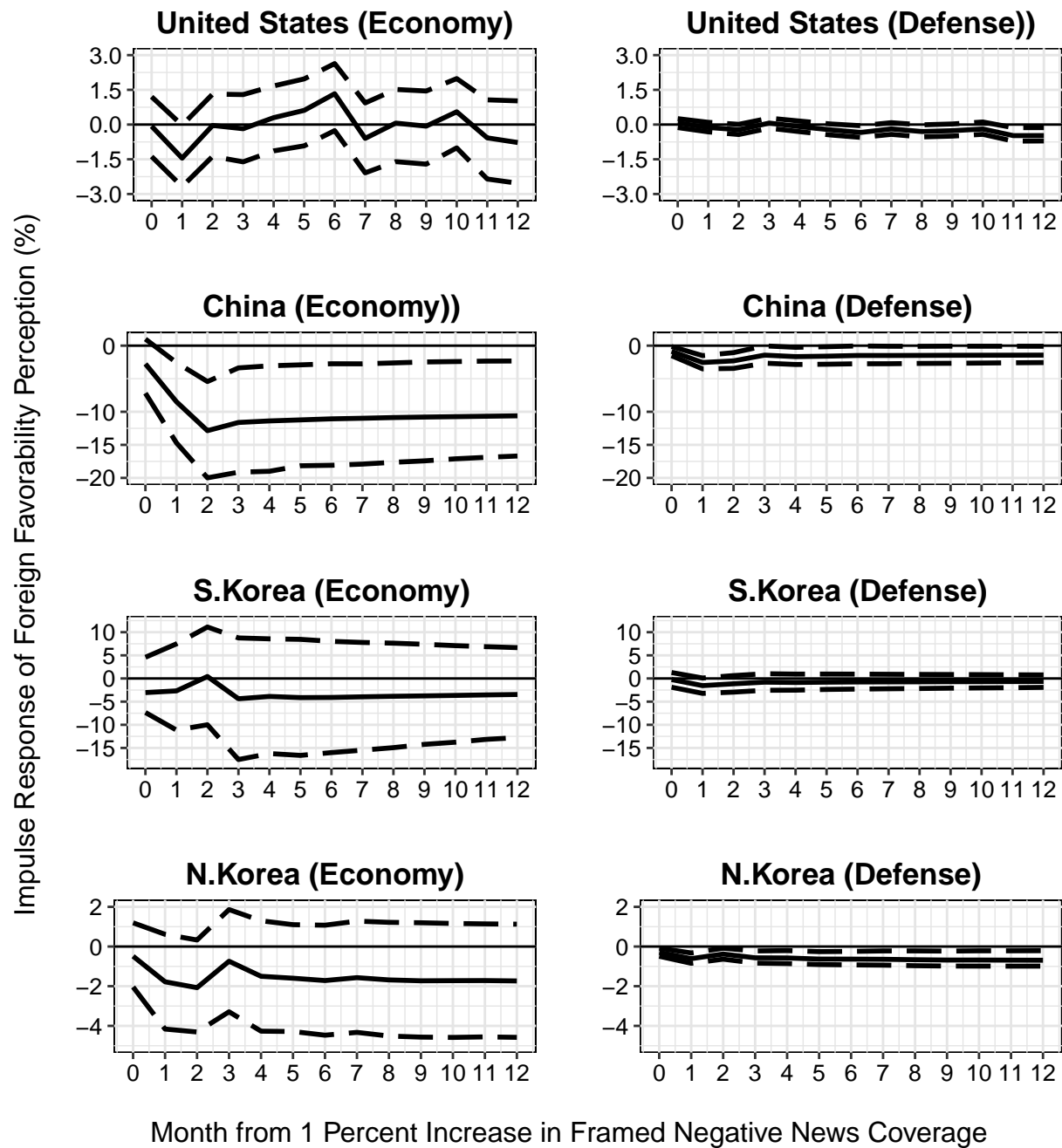
Figure 9: Percentage Increase in Foreign Favorability in Response to 1 Percent increase in Framed NC (with 95 Percent Confidence Interval)

series analysis of monthly data, this study introduces the useful framework to study the duration of media effect. Beyond the relative durability of effects, this method makes it possible to assess the absolute durability of media effects. In analysing the real-world implications of media effects, this is a very important development. Third, it shows the significance in combining human-coding and machine coding. Previous studies either rely on full human-coding or complete computer coding with ready-made corpus to give directional values to the media coverage. This study show that,

with the combination of two types of coding researcher may reduce both time for the human-coding and arbitrariness of full-computer coding. Fourth, finding the cross-national difference of the size and duration of media effects, this study has significant contribution to the literature of foreign perception and agenda setting, which used to be conducted solely by cross sectional studies. If an object foreign state is not sufficiently familiar and receives the medium level of coverage in the long runs (like South Korea, Russia and North Korea for Japanese), people are more likely to be affected by the media coverage.

Several caveats remain. One is the limitation in content analysis. The reliability and accuracy of the content coding in this study had been not greatly successful. To capture the media content more accurately, it may need more sophisticated framework to code directional content of the news coverage. Another limitation is aggregated nature of the data. The aggregation of headlines and public perception may be useful to capture central tendency in the society, but may miss out important component of individual differences. The "accessibility bias" (Iyengar 1991) logic of the agenda setting is primarily an individual phenomenon. The design of this study makes it impossible to observe the micro level phenomena.

The next steps for this study can go in at least three directions. First, for time-series modeling, it is probably better to use structural vector error correction model (SVECM) to re-analyse the result. Since SVECM can incorporate both long-term structural shift and short-term change, I would say this is more appropriate way to assess the impact of media effect of different range. Then, I can clearly differentiate the long-term effect and short-term effect of media coverage.Second, as an additional control variable, I am thinking to collect the data for elite communication. This could be a critical variable, because media intensively cover the foreign states when there is elite communication (e.g., conference, meeting of political leaders). Third, it can split the target period of the analysis. As Wu et al. (2002) suggests, the characteristics of the effect may change by different period. For example, the unfavorability toward China has been in rapid increase after the period of around 2005. The characteristics of an effect may change by before and after those significant time point. Fourth it is also possible to compare the effect across different newspaper companies and media formats. (Kepplinger et al. 1989) finds the strong effect of news magazines compare to the daily newspapers. Japanese paper is known to have less content variance across different companies, but if there is a significant difference across companies or the format, it would be quite interesting. Answering the above questions would contribute to the further understanding of media effects: how large and how persistent can it be across different conditions.

Notes

[1]Foreigners here mean those people "who still have the nationality of their home country." The data is from 2013, taken from OECD database (https://data.oecd.org/migration/foreign-population.htm).

[2]Priming, one other highly discussed effect, is often considered to be the extension of agenda-setting effect (Cacciatore, Scheufele and Iyengar 2016, 11).

[3]In addition, using aggregated 21 opinion polls across different time periods, Wang and Shoemaker (2011) find that the valence of the media coverage toward China correlate with the favorability perception of China

[4]The original data is referenced from *Jiji Yoron Chosa Tokuho* (Jiji Public Opinion Poll Reports), published four times in a month by Jiji Press. The target population is 2000 for each survey, randomly sampled from all over Japan. Interview method is face-to-face interview.

[5]Those states and region never scored 5 percent or more are excluded from the analysis, so it just have twelve states and regions.

[6]According to the public opinion poll conducted in 2014 by *Shimbun Chosakai [Newspaper Research Association]*, the Japanese public interest incorporated foundation. See http://www.chosakai.gr.jp/notification/pdf/report7.pdf for the detail (in Japanese).

[7]This is the case for commercial TV stations. NHK, national public service television station is an exception here.

[8]Data are extracted from Waseda University Library access of online newspaper article databases: *Yomidas Rekishikan* http://www.yomiuri.co.jp/database/rekishikan/ for *Yomiuri Shimbun*, and *Kikuzo II Visual* https://database.asahi.com/library2/ for *Asahi Shimbun*.

[9]Since this step is an automatic coding, there are some errors in the extraction process. Generally, though, the coding system is successful in extracting correct relevant headlines.

[10]"Month" in this study is defined as the period from the starting date of the interview of current *Jiji-Poll* to a day before the starting date of the interview of poll in the next month. *Jiji-poll* generally starts their interviews in the Monday of the second week of each month, so month(t) TC includes the first week of actual month(t+1), but does not include the first week of actual month(t). The rationale for this operationalization is following. If the "month" in this study coincides with the month in calender, month(t) would miss out first few days in a month preceding to the interview date of next *Jiji-Poll*. Therefore, to include those days in month, it is more appropriate to operationalize month(t) here as the period between each *Jiji-Poll*

[11]The data is referenced from *Yomiuri-Shimbun* website adv.yomiuri.co.jp/yomiuri/circulation/. The number is from 2014, but it is fairly consistent over the years.

[12]http://www.customs.go.jp/toukei/suii/html/time.htm

[13]The original data is obtained from the website of Cabinet Office, Government of Japan http://www.esri.cao.go.jp/jp/sna/menu.html.

[14]With automatic model specifications using AIC statistics, I used the best time lags for each state, but setting the maximum to 12 months.

[15]Also, since the options of the importance perceptions changed slightly in June 2011, I include a dummy exogenous variable to differentiate the period before and after June 2011

[16]The time-series data has several important characteristics which affect the choice of the modeling in the analysis. In the agenda setting context, Blood and Phillips (1995) discusses about one important characteristics of time-series data: non-stationarity. Non-stationarity is an individual characteristic of a time-series that " there is no tendency for them to fluctuate around a constant (mean) values as there is when a series is stationary" (10) . The stationarity of the data, that there is a consistent mean values over time. However, if a series is non-stationary, it becomes harder make predictions of its movement, since it has "random tendency to drift away from any given value over time" (10). Here, many of the non-stationary time-series become stationary when it takes first order difference from its past values. Thus, many research apply the VAR model to the series with first order difference values.

In this study, I find non-stationarity in the the dependent variable – foreign perceptions – and trade variables for some countries (but not for others), while foreign news coverages are found to be stationary over time for most of the states and regios: the result from Augmented Dickey Fuller (ADF) Test. I didn't take the method to take the first difference of all relevant variables, however, because this procedures lose information of originally stationary variables. VAR model can still be applied to the model with non-stationary variables, but the popular test of Granger causality cannot be used in this context.

[17]Africa, interestingly have two peaks – 2 months after and 5 months after – but each of the strong effect decay after few months

[18]Furthermore, four countries receives adequate coverage from the Japanese media to conduct content analysis

[19]The original data is referenced from *Jiji Yoron Chosa Tokuho* (Jiji Public Opinion Poll Reports), published four times in a month by Jiji Press. The target population is 2000 for each survey, randomly sampled from all over Japan. Interview method is face-to-face interview.

[20]The same variables of favorability and unfavorability are utilized in Fukumoto and Furuta (2012).

[21]This movement in itself is the interesting study target, but I omitt the discussion here. Please read Fukumoto and Furuta (2012) for somewhat more detailed comments on the time trends.

[22]`http://www.customs.go.jp/toukei/suii/html/time.htm`

[23]The original data is obtained from the website of Cabinet Office, Government of Japan `http://www.esri.cao.go.jp/jp/sna/menu.html`.

[24]The confidence interval for NC in South Korea goes beyond the range in the graph. It is not shown, but it just means that the confidence interval is wider than the range presented in the figure

[25]This may be due to the nature of coding for South Korea, given that South Korea receives significantly low level negative coverage than other countries (see Table 2).

[26]Before starting the search, I use RMecab (`http://rmecab.jp/wiki/index.php?RMeCab`) to conduct morphological analysis. Since Japanese language has no space between words, it separates words and fix verb back into basic form.

[27]Note that due to large discrepancy between countries, vertical axes are not consistent across countries.

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A Wording for the Original Questions of Foreign Perceptions

Importance

Q: In the next 5 years, which of the relationships with following countries and areas will become important for Japan? List up to 3 countries and areas.

A: United States; Canada; Russia; The Former Soviet Union other than Russia; European Countries; China; Taiwan; South Korea; North Korea; South East Asian Countries; Central and South America; The Middle and Near East; Africa; Oceania; Don't Know. (From June 2010, the question started to offer India as an additional option)

Favorability

Q: List up to 3 countries you like.

A: United States; Soviet Union (Russia); UK; France; West Germany (Germany); Switzerland; India; China; South Korea; North Korea; None; Don't Know.

Unfavorability

Q: Conversely, list up to 3 countries you don't like.

A: United States; Soviet Union (Russia); UK; France; West Germany (Germany); Switzerland; India; China; South Korea; North Korea; None; Don't Know.

B Procedures in Content Analysis

As the first step of Content Analysis, I extracted the headline involving related words using KH coder, the text analytic software developed by Koichi Higuchi at Ritsumeikan University, Japan (http://khc.sourceforge.net/en/).

After extracting all the headlines, I asked eight human-coders to code randomly sampled 1000 relevant headlines for two of four foreign states. Since each coder is randomly assigned to code headlines for two states, each foreign state is coded by four human-coders. Here, specifically, sampled headlines are splitted into 500 randomly sampled *Yomiuri Shimbun* headlines and 500 randomly sampled *Asahi Shimbun* headlines, but the dataset given to the coders are randomly ordered, thus they don't know which headline is for which newspaper. Coders are undergraduate junior, senior and graduate students of Waseda University. All students major in political science or economy.

Each coder are asked to judge whether a headline would give positive, neutral or negative impressions toward an object states for average Japanese. For the exact wording in coding manual please contact the author at gento.badger@gmail.com.

Table B.1 show the initial result of inter-coder reliability test. The values shown are the Krippendorf's Alpha. For original coding, it scores around 0.4 to 0.5 which do not meet the threshold of good reliability of 0.6 to 0.7. Here, It is observed that some coders have a tendency to overly give directional codes while others have a tendency to overly give neutral codes. To consider this issues in count, second and third rows in the table show the inter-coder reliability scores after the slight fix along the above tendencies. Fixed result show the rise in inter-coder reliability, and all countries have the score above 0.6. Confirming the fair-level of inter-coder reliability, I create the training dataset for the next step – machine learning – by the majority rule of human codes in each state.

Table B.1: Inter-Coder Reliability of Attributes of Foreign Headlines

	U.S. Kripp.Alpha	China Kripp.Alpha	S.Korea Kripp.Alpha	N.Korea Kripp.Alpha
Original Coding[*1]	0.4284	0.4761	0.5038	0.4009
Overly Directional Codes Recoded[*2]	0.5403	0.6584	0.6688	0.4403
Overly Neutral Codes Recoded[*3]	0.6639	0.7821	0.7911	0.6194
Num. of Coders	4	4	4	4
Num. of Coding Categories (Ordered)	3	3	3	3

[*1] "Don't Know" to neutral. Irelevant Headlines Dropped.

[*2] When 3 out of 4 coders are neutral, recode the last one to neutral.

[*3] In addition to [*2], when 3 out of 4 coders have the same pos/neg codes, recode the last one to have the same code.

Table B.2 shows the result of machine learning of the training data. The method in use is random forest. Random forest is known to have high accuracy, and run effectively for big sized data, and can cope with the unbalanced coding in training dataset (Kin 2007, 271). The result of machine learning using all three categories utilized in human-coding shows that positive headlines is learned poorly by the computer. In addition to very low rate of recall, precision rate is also low

Table B.2: Precisions and Recall Rates for Random forest Analysis

	US		China		S.Korea		N.Korea	
	precision	recall	precision	recall	precision	recall	precision	recall
3 categories								
Negative	61.1	34.5	75.5	46.6	88.2	40.5	69.6	72.4
Neutral	64.7	89.8	70.0	92.8	83.2	98.3	54.7	72.1
Positive	47.4	6.8	25.0	2.5	68.2	14.4	6.4	52.6
2 categories								
Negative	67.8	29.5	79.9	45.8	85.7	37.8	78.8	63.6
Pos./Neut.	78.7	94.9	84.0	96.1	92.7	99.2	75.9	87.0
Cases	987		996		993		949	

precision: % of cases in machine coded values where values coincide with original training data values.

recall: % of cases in original trainind data values where values are coded as the same in machine coding.

for the positive coding. Therefore, I decided to combine positive and neutral headline together, and re-run random forest analysis. The new machine learning result omitting the positive category shows fairly high precision rate for each category of coding. The final analysis utilized this result (The final coding results are shown in Table 2 and Figure 5.).