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WHAT DRIVES HIGHER BEER RATINGS? EVIDENCE FROM BIG DATA

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ABSTRACT

The purpose of this paper is to present a data analytics model utilizing a large database of beer reviews. We are witnessing a big data revolution with companies' ability to capture and analyze large volumes, velocity, and variety of consumer spending patterns and purchase factors. Analysis of consumer reviews recently has shifted from focusing only on consumer ratings to also mining the content of those reviews. Using a sample of approximately 9 million reviews over 22 years from BeerAdvocate, we developed a multiple regression model to test the relationship of alcohol by volume (ABV) and review word length to the rating that a beer received. Our main finding was that the more (ABV) that a beer had, the higher was that beer's average rating. Although increased ABV was associated with higher consumer scores, we found diminishing returns. We also confirmed that negativity bias occurred in these reviews—lower-scoring beers tended to have longer reviews than higher scoring beers had. This suggests that breweries would be advised to have higher alcohol content in their products to meet consumer preferences (even if those preferences are subconscious). Given the supply chain disruptions plaguing the world today, big data analysis of consumer preferences for beer could enable both manufacturers with constrained capacity to better align product offerings with consumer tastes and preferences.

JEL: L31, L84, M11

KEYWORDS: Big Data, Supply Chain Analytics, Consumer Reviews

INTRODUCTION

According to the Brewers Association (2020), the beer market is valued at 94.1 billion dollars annually. Even though the overall beer market has been declining in recent years, the number of craft breweries still is increasing, resulting in more product variety and consumer choice (Brewers Association, 2020). This explosion of independent craft breweries has led to breweries pushing the limits of traditional brewing by experimenting with ingredients in unique ways to create differentiated product offerings. According to the National Brewers Wholesale Association (NBWA) (2019), while a typical beer distributor managed only 185 unique SKUs in 1999, the typical distributor managed 1,174 unique SKUs in 2018 (an increase of approximately 635 percent). As a result, selecting a beer that a consumer may enjoy becomes increasingly difficult. To help with this process, online reviews are a way that current and potential customers can obtain suggestions. Social proof theory states that a higher rated product is more likely to be selected by others. In their study, Shin and Darpy (2020) found that 42.28 percent of respondents indicated that they would choose a higher rated product even if it were more expensive. The purpose of this research is to present a data analytics model showing determinants of high consumer beer ratings. Using multiple regression analysis, we examined the data obtained from BeerAdvocate (posted on Kaggle, retrieved May 29, 2020). This data set contained over 9 million user reviews of beers from 1996 – 2018. Our research question was: What factors drive higher scores in online beer reviews? If we could find statistically

significant independent variables that correlated with the final score, that information could be helpful for breweries in tailoring their products or targeted marketing toward customers.

The next section discusses the literature review. After that, we present the data and the methodology. The last two sections include results followed by discussion and conclusions.

LITERATURE REVIEW

<u>Supply Chain Big Data Analytics</u>

The term big data has been defined as data sets that are so large that they require complex methods of storage, management, analysis and technology for visualization (Chen et al., 2012). In addition, Erevelles et al. (2016) defined analytics as tools to help find hidden patterns in data. Using the combination of data and analytical tools, organizations are able to uncover valuable insights to make better business decisions (Power et al., 2018; Sharma et al., 2014). Big data and analytics have been particularly useful in manufacturing and supply chain management due to availability of data internally and externally in the organization (Sahay & Ranjan, 2008; Trkman et al., 2010). Big data analytics has been defined using the three Vs: volume, variety, and velocity (Gartner, 2012; Kwon & Sim, 2013; McAfee & Brynjolfsson, 2012). The volume of the data refers to the size of the data set that is available (Gandomi & Haider, 2015). Because data is easier to store and less expensive to collect, the sheer size of data sets available has increased exponentially. According to Holst (2021), the amount of data created, captured, copied, and consumed worldwide increased from 2 zettabytes in 2020 to 64.2 zettabytes in 2021, and is projected to reach 181 zettabytes in 2025. The velocity of data refers to the speed at which big data is generated (Gandomi & Haider, 2015). Because data is generated quickly, and in some cases, available in real time, organizations must quickly capture and analyze this data to extract maximum value (McAfee & Brynjolfsson, 2012). Finally, variety refers to the heterogeneity of the data (Gandomi & Haider, 2015). Today, data beyond numbers (structured) can be captured and analyzed in the form of sensor data, social media posts, images, audio, video, and even customer reviews (unstructured). Cukier (2010) found that only 5 percent of data is structured, while the other 95 percent exists in an unstructured form.

Bendle and Wang (2016) presented a taxonomy of big data divided into two types: structured data (e.g., ratings, questions with binary answers, or questions with a finite range of responses) and unstructured data (e.g., reviews written in free-form English). As the field of big data and analytics has evolved and has become more complex, explaining the field with only volume, variety, and velocity provided an incomplete description of the field. As such, the 3 Vs of big data analytics have since been expanded to 5Vs to also include veracity and value. Wamba et al. (2015) appear to have been the first to present the 5V big data elements from prior research in an integrated framework as: volume, variety, velocity, veracity, and value. Veracity refers to the correctness, precision, and reliability of the data (Gandomi & Haider, 2015; Richey et al., 2016), which researchers and practitioners have found to be a large barrier in implementing robust data analytics strategies (LaValle et al., 2011) and is critical to draw accurate conclusions about the data (Aman et al., 2014). Finally, value refers to the usefulness or worth of the data. In raw form, data holds little value (Gandomi & Haider, 2015), but as data transitions from unstructured data to structured data, and is later organized and analyzed, it holds much more value to be incorporated into models and strategies (Harris & Mehrotra, 2014; Veeramachaneni, 2016).

Sources of big data include point-of-sale data, in-store path data (e.g., customer browsing and purchase behaviors), and user-generated content (data created by unpaid contributors; e.g., internet searches as well as online reviews and ratings of products and services) (Boone et al., 2019). Recently the supply chain literature has experienced an increase in articles about big data analytics and literature reviews summarizing those articles (e.g., Ghalehkhondabi et al., 2020; Hazen et al., 2018; Mahya & Fereshteh, 2020; Talwar et al., 2021). Text mining at its core is a computer-automated process of word counting in free-form text

(Kulkarni et al., 2019). Ghalehkhondabi et al. (2020) divided the big data analytics research in supply chain management into the following categories: strategy development, operations improvement, sustainability, food supply chains, risk management, and marketing and sales. Given that our current study is an analysis of the effects of consumer reviews and product characteristics on demand, the next section focuses on research related to big data analytics for demand forecasting.

Big Data Analytics for Demand Forecasting

Sikora and Chauhan (2012) suggested that online reviews of products and reviewer-related data are considered by many as one of the most important knowledge-based systems associated with online commerce websites. These reviews could be mined for both structured and unstructured data, as defined by Bendle and Wang (2016). Several researchers have studied online reviews to improve forecasting effectiveness. Chong et al. (2017) compared the predictive ability of online promotional marketing and online reviews as predictors of consumer product demand. By extracting data from Amazon.com and using a neural network analysis, they were able to show that variables from promotional marketing strategies and online reviews were significant predictors of demand, and of the two, variables related to online reviews were better predictors of demand. For example, Schneider and Gupta (2016) studied reviews of tablets posted on Amazon.com. Using a bag-of-words method along with a random projections approach to reduce the amount of manual pre-processing of textual data (required to reduce the number of words or sequences of words to be mined), they found that their model performed better than a competitor's model for forecasting demand for existing and new products. Chern et al. (2015) analyzed online reviews to develop a new forecasting model using sales data from a cosmetic retail chain in Taiwan. They used variables such as the properties of reviews (polarity and text sentiment), characteristics of the reviewer, and responses from readers (number of readers who liked the review). Ting et al. (2017) used Python programming and data mining to study consumer reviews from Yelp.com and to assess how customer experiences posted online affect demand in the U.S. hospitality industry. They used text analytics to create a list of 36 words associated with online reviews by hotel customers related to rating, price, and rating/price. Furthermore, Salehan and Kim (2016) employed a sentiment mining approach of online consumer reviews of 20 different products posted on Amazon.com, and found that reviews with higher levels of positive sentiment in their titles exhibited higher readership. In addition, they found that reviews with neutral text polarity were perceived as being more helpful, and that the length of a review positively affected readership and perceived helpfulness of those reviews. Finally, Archak et al. (2011) used text mining of consumer reviews posted on Amazon.com for two different products (digital cameras and camcorders). They combined textual data with econometric and predictive modeling, finding that the content of the text in reviews was able to be used to predict consumer demand.

Beer Reviews

Some prior research has focused on beer reviews. For example, Colen and Swinnen (2016) analyzed the changes in beer consumption among countries over time. They found that per capita beer consumption fell in traditional beer-drinking countries, but increased strongly in emerging countries, particularly China. They suggested that beer consumption initially increases with rising incomes, but then decreases at higher levels of income. Donadini et al. (2014) conducted a study of 246 beer drinkers and 8 different beers in a tavern in Italy. They found that the highest percent (about 40 percent) preferred sweet and fruity samples, which were perceived as having a higher level of alcohol. Conversely, Thong et al. (2018), in a labeled choice experiment with beer drinkers in Vietnam, found that alcohol content had the least significant effect on consumer beer choice—beer brand, packaging format, and price were the most significant predictors of consumers' choice of beer. However, they noted that the alcohol percentage only ranged between 4.5% and 5.5%. Meyerding et al. (2019) surveyed German beer consumers to determine attributes of beer that consumers find critical to the purchasing process. They found that beer type had the highest influence on consumer beer choice, followed by price, the origin of beer, and alcohol content. In a study of beer

consumption in the U.S., Schiff et al. (2021) analyzed manufacturer websites, consumer beer-related websites, and Nielsen Consumer Panel data. They found that higher alcohol content beer consumption increased steadily from 2004 – 2014, increasing from 9.6 percent of total consumption in 2004 to 21.6 percent in 2014. From 2011 on, however, total consumption of beer in the U.S. declined by 3.04 percent annually. Given the extant literature, we believe that a gap exists in examining if, and how, alcohol percentages affect the rating that consumers assign to beers.

DATA AND METHODOLOGY

In this section, the model is described first. Second, the variables are discussed. Third, the data are described. Fourth, the hypotheses are presented.

Model Description

Data on beer reviews were collected from Kaggle (https://www.kaggle.com/ehallmar/beers-breweries-and-beer-reviews) on May 29, 2020, at the commencement of this study. There were 9,069,130 reviews, of which 8,897,129 had complete data for our analysis (a text review and populated score data). Therefore, our final sample included 8,897,129 reviews. For each review, a user filled out a free-form text review, and rated five numeric components (Look, Smell, Taste, Feel, and Overall). Those components then were used to calculate Score.

Variables

Dependent Variable: Score. Score is a numeric rating overall for a beer based on five attributes (Look, Smell, Taste, Feel, and Overall) that users filled out based on a five-point Likert scale that ranged from 1 (least appealing) to 5 (most appealing). Per BeerAdvocate (BeerAdvocate, 2021), Score was calculated as 0.06 * Look + 0.24 * Smell + 0.40 * Taste + 0.10 * Feel + 0.20 * Overall.

Independent Variables: ABV (Alcohol by volume) is a measure of the percentage of alcohol, where a higher number indicates a stronger beer. *TotWords* is a count of how many words the user typed into their free-form review of the beer.

Controls: Year, Month, and Day are from the date that the review was completed. These control variables allow isolation of artifacts due to chronology (e.g., it may be that reviews during a recession year, or a certain month of the year, are systematically higher).

Brewery_Id: is a unique number to identify a particular brewery. It may be that beers from a certain brewery are rated consistently better or worse than other breweries, so this control variable was used to capture that effect.

Data Description

Figure 1 highlights the the dispersion of the original 9,069,130 beer reviews in the original database before we dropped incomplete records to get our final sample. The number of reviews by year in the database increased from 1996 through 2014, then tapered down through 2018.

Figure 1: Number of Reviews by Year
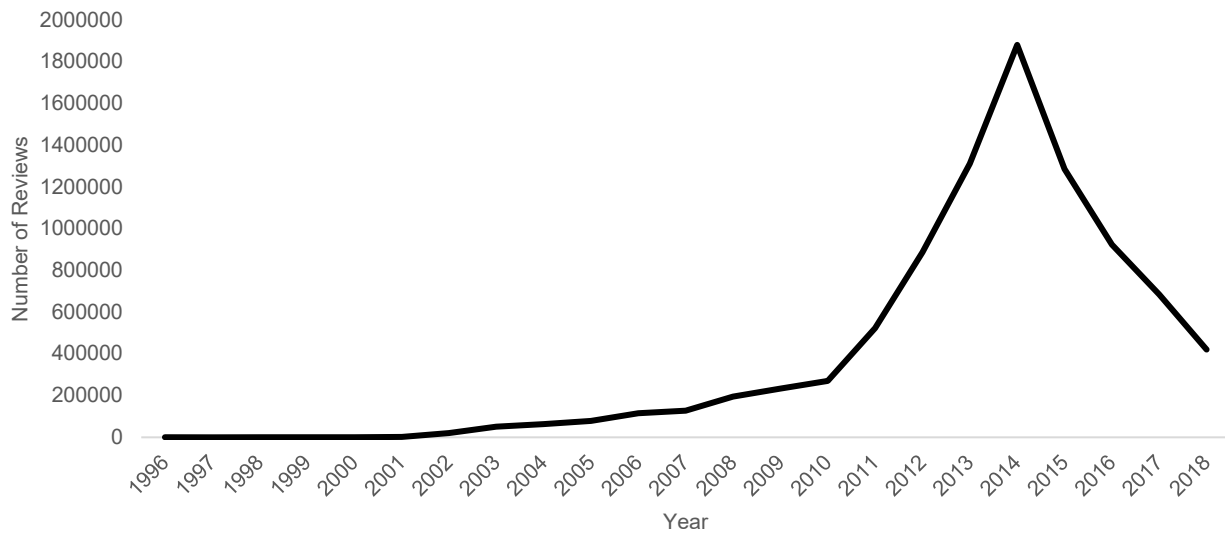
Figure 1 displays the number of reviews by year in the original dataset. Note that this number increased dramatically from 1996 to 2014, and then tapered down.

Table 1 presents the correlations between the variables included in the database.

Table 1: Correlations between Variables

	Score	ABV	TotWords	Year	Month	Day	Brewery_Id
Score	1						
ABV	0.3300*	1					
TotWords	-0.0277*	0.0100*	1				
Year	0.1038*	0.0588*	-0.4253*	1			
Month	-0.0050*	-0.0188*	-0.0177*	-0.0987*	1		
Day	0.0015*	0.0003	-0.0030*	-0.0057*	0.0189*	1	
Brewery_Id	0.1168*	0.0111*	-0.1202*	0.3831*	-0.0105*	0.0022*	1

Table 1 shows the correlations between variables. Correlations that were significant at p<0.05 are denoted with *.

As the alcohol content among beers differs widely, we wondered if that was a contributing factor to the variation in scores that reviewers gave. Therefore, we examined the possible influence of the alcohol percentage, alcohol by volume (*ABV*), on the reviewers' scoring of beers (*Score*). Further, we analyzed the length of the free-form review text (*TotWords*) and its relationship with that Score. We determined how our independent variables affected the Score that these beers received. Our two variables were *ABV* (alcohol by volume) and *TotWords* (the total number of words that the reviewer typed in their free-form review). Because drinking beer provides a vehicle for alcohol, we posited that higher ABV beers would be rated higher – after all, alcohol is likely a significant reason why people are drinking beer.

Hypothesis 1: Beers with a higher ABV will have higher Scores by reviewers.

Further, negativity bias would predict that people tend to say more about products that they dislike than those that they like. Telling someone that a beer is good conveys information to an audience. However, when a reviewer wants to convey that a beer is bad, they tend to explain in detail how it is "not good." Prior research has demonstrated a negativity bias, i.e., people tend to evaluate negative information more highly

than positive information (Poncheri et al., 2008). Thus, we hypothesized that higher scoring beers would have significantly shorter free-form reviews (*TotWords*).

Hypothesis 2: Beers with longer (shorter) free-form reviews will correlate with lower (higher) **Scores** by reviewers.

The regression model for predicting ***Score*** is:

$$Score = \beta_0 + \beta_1 * ABV + \beta_2 * TotWords + \beta_3 * Brewary_{Id} + \beta_4 * Year + \beta_5 * Month + \beta_6 * Day$$
(1)

RESULTS

Using linear regression in Stata 17 software, we found the results shown in Table 2. Both of our hypotheses were supported; higher *ABV* correlated positively with higher Scores, and the longer the review (*TotWords*), the lower the Score (negative correlation). The non-significance of the year dummy variables indicates that the Scores did not change significantly from year to year, even though the number of reviews varied widely from year to year, as shown in Figure 1 above.

We found that higher *ABV* correlated significantly and positively with the Score that a beer received. Further, the total words (*TotWords*) used to describe the beer increased as the Score decreased (significant and negative), thereby confirming negativity bias. We conducted two post hoc analyses here to delve into the details of these relationships. For the first post hoc analysis, we analyzed the average number of words used for beers (*TotWords*) scoring below average (3.9 was the average score out of 5 for beers in our dataset) versus the average number of words for beers (*TotWords*) scoring above average. From the regression results shown in Table 2, we knew that there would be a difference, but we wanted to find out the average number of words in positive versus negative scoring beer reviews. The average total words for reviews (*TotWords*) with Scores below the mean was equal to 60.6 words, and the average number of words (*TotWords*) for reviews with Scores above the mean was equal to 30.3. We conducted a two-sample t-test with unequal variances on these two distributions, and rejected the null hypothesis that they were equal. Therefore, the alternate hypothesis that the difference was not equal to zero was assumed. Thus, there was a statistically significant difference ($p<0.01$) between the shorter reviews for above-average rated beers and the longer reviews for below-average rated beers. Further, by looking at the coefficients and significance of the months in the above regression, we can examine seasonality effects, as shown in Table 3. During July and August, Scores were systematically lower. Note that reviewers were from around the world, but the majority (82.9%) were from the United States. Thus, July and August in the northern hemisphere (U.S.) would be hotter months.

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Table 2: ABV and Review Total Words as Predictors of Score

Variables	Score
ABV	0.0810***
	(0.0000784)
TotWords	-0.000055***
	(0.00000331)
1998.year	-0.0657
	(0.576)
1999.year	-0.123
	(0.581)
2000.year	0.0873
	(0.575)
2001.year	-0.131
	(0.572)
2002.year	-0.200
	(0.572)
2003.year	-0.236
	(0.572)
2004.year	-0.211
	(0.572)
2005.year	-0.213
	(0.572)
2006.year	-0.233
	(0.572)
2007.year	-0.246
	(0.572)
2008.year	-0.217
	(0.572)
2009.year	-0.203
	(0.572)
2010.year	-0.211
	(0.572)
2011.year	-0.153
	(0.572)
2012.year	-0.235
	(0.572)
2013.year	-0.205
	(0.572)
2014.year	-0.188
	(0.572)
2015.year	-0.131
	(0.572)
2016.year	-0.132
	(0.572)
2017.year	-0.130
	(0.572)
2018.year	-0.138
	(0.572)
Constant	3.424***
	(0.572)
Observations	8,897,129
R-squared	0.126

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10
Regression Equation: $\textbf{Score} = \beta_0 + \beta_1 * ABV + \beta_2 * TotWords + \beta_3 * Brewary_{Id} + \beta_4 * Year + \beta_5 * Month + \beta_6 * Day$
*This table shows that certain breweries outperformed other breweries in a systemic manner (one brewery may make several highly rated beers). Per our hypotheses, higher ABV correlated with a higher Score by reviewers, and the total number of words (**TotWords**) correlated with a lower Score, i.e., fewer words were used to describe higher scoring beers. Note that we controlled for the year, month, and day of review with dummy variables and used a dummy variable for Brewery_Id (Brewery_Id, Month, & Day are not shown for ease of reading this table). Further note: The year dummy variables represent the coefficient and possible significance of each year's average review Score to other years. As all year dummy variables were not significant, there were not significant differences in beer review Scores across the 1996 – 2018 time period. The year 1997 had no reviews.*

Table 3: Monthly Coefficients of Scores

	Control Month
January	
February	0.0078
March	0.0142
April	0.0133
May	0.0028
June	0.0048
July	-0.0037
August	-0.0026
September	0.0016
October	0.0089
November	0.0399
December	0.0092

All months significantly different from January at p<0.10

For the second post hoc analysis, we plotted the *ABV* against Score to see if there was a linear or non-linear relationship between the two variables. We included a squared *ABV* term to see the shape (convex versus concave). The multiple regression results showed that the square term had a significant and negative sign, indicating a concave shape to the curve. In effect, higher *ABV* correlated positively to higher Score, but with diminishing returns. It might be that beyond the alcohol limits of this data set, extremely strong beers (ABV) might score lower than the average Score for the highest *ABV* beers in our sample. Figure 2 below is illustrative of the curve (we picked four points of ABV corresponding to the midpoint of ABV quartiles and the average score associated with them).

Figure 2: ABV Related to Average Score
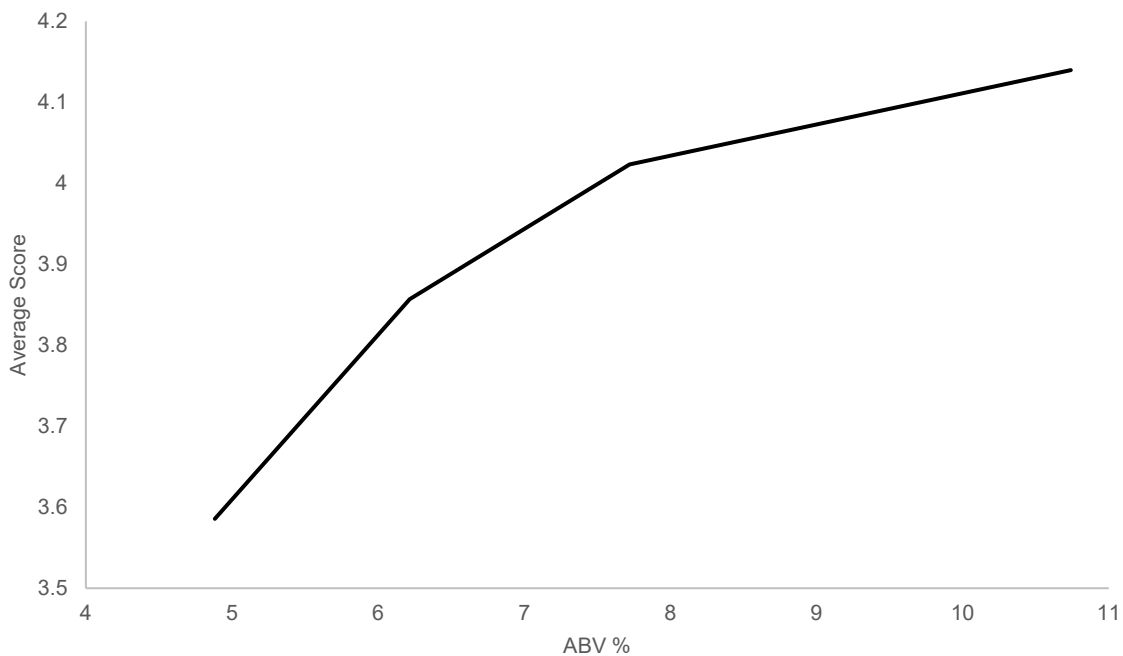
This figure lists ABV on the x-axis and beer Score on the y-axis. As shown above, the higher the ABV, the higher the average Score that those beers received. However, the increase in Score had diminishing returns, i.e., going from 5% to 6% alcohol had a greater positive impact on the Score than moving from 8% to 9%..

DISCUSSION AND CONCLUSIONS

The goal of this paper was to investigate what factors might drive higher ratings of beers by consumers. Using nearly 9 million reviews over 22 years from BeerAdvocate, we were able to find strong evidence supporting our hypotheses. First, Hypothesis 1 was supported, indicating that beers with higher *ABV* tended to have higher scores from the reviewers. It may be that all the marketing related to small-batch, craft breweries, import versus domestic, etc., is not what is important to consumers' wants and needs – whether or not they realize it. Our data give evidence that consumers like strong beers better. This one factor, *ABV*, drives the ratings, and we would advise any breweries to focus on stronger beverages if they seek to get higher reviews than those of competitor products. Further, in case consumers are aware that they prefer higher ABV, breweries could list the ABV more prominently on the label. However, consumers may not be aware of why they happen to prefer a certain beer, and conversely, be dissuaded from trying a high alcohol beer, as it may seem less "social."

Although negativity bias is a known phenomenon, with Hypothesis 2, we confirmed that negativity bias plays a role in online beer reviews. Consumers find negative aspects of a product more salient than positive ones, so they will tend to write longer reviews for products that they dislike compared to the reviews for products that they prefer. One limitation of our approach is that we used data for beer only. We cannot be sure that *ABV* would have the same effect for wine or bourbon drinks, as those may have other prestige factors such as the age of the wine, the location where grown, the barrel for the bourbon, how many years aged, etc. We would expect the negativity bias to show in wine/bourbon reviews, as that phenomenon has been documented previously in a wide variety of consumer review contexts. Beers typically have a limited range of ABV compared to wines and hard liquor. A study of a wider variety of alcoholic drinks with a large range of ABV would be a good future study. We also cannot be sure of the mechanism of ABV that is causing higher ratings – is it the sweetness, the increased effect on the consumer, or something else? Further, different regions of the world (country, climate, etc.) may have different preferences for ABV, which could be explored in future research.

Increasing the ABV of a beer comes with additional expense. This requires additional ingredients such as fruit, honey, maple syrup, and other simple sugars (Lewis, 2020). In addition, specialty beers that require aging in bourbon or oak barrels require the additional expenses of the equipment and the time and space to age the beer. These additional expenses must be weighed against a range of factors, including higher ABV content and higher consumer reviews.

Many of the reviews are rich with additional information that is relevant to consumer tastes and preferences. A more careful analysis of the free-form text could uncover trends as well as categories that are important to consumers beyond the categories that were used in the reviews (Look, Smell, Taste, Feel, and Overall). Because product reviews are influential in purchasing decisions, there are growing concerns about the veracity of product reviews. While it is clear that BeerAdvocate has processes in place to minimize the number of fraudulent reviews (requiring user accounts, only one review per beer, "report" button (for other users to report other reviews), disclaimer pertaining to review rules and consequences, etc.), fraudulent reviews still exist. Perhaps reviewers should have to take a picture of their UPC to ensure that the timing of their review aligns with the timing of consumption, and that the person writing the review actually consumed the beer (veracity). Logistic regression models also could be built to identify inaccurate or fraudulent reviews from those that are accurate. For instance, a large number of misspelled words, reviews where the text matches the exact text of another review (duplicated reviews), or reviews that fall outside of realistic tolerance ranges may be variables that could be incorporated into a model to identify reviews that should be flagged and potentially removed from the sample. For example, a review from a user who rated look, smell, taste, and feel as 5, but then provided an overall rating of 1 could be flagged as an inaccurate review.

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BIOGRAPHY

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HISTORICAL ANALOGIES AND THE UKRAINE CRISIS: COMPARISONS AND CONTRASTS OF INTERWAR GERMAN WITH POST-COLD WAR SERBIAN AND RUSSIAN IRREDENTISM AND WESTERN RESPONSES

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ABSTRACT

The paper comparatively analyzes the extended Yugoslav crisis of the 1990s with the current Ukraine crisis, focusing on the eve of the February 24, 2022, Russian invasion. It illustrates post-1989 recurrent political behavior patterns rooted in nationalist irredentism. The Soviet regime authorities did not permit the Russian Social Federated Republic to create its own republic-level Communist Party. The paper demonstrates that Russian internal Soviet diaspora populations in the Ukrainian republic were incentivized to self-identify with the Soviet state. De facto Russification of the Soviet state nevertheless functioned and alienated non-Russian national minorities. The disintegration of the USSR left internal Russophone diaspora identity in a comparatively fluid condition. European Union integration encouraged state building around the republic borders inherited from the Soviet era. Russophone elements within Ukraine faced inducements to self-identify with the titular nation exercising the core community function of the post-Soviet core community state. Political trend irredentist responses in the Russian polity intensified. They view the EU as fortifying the construction of a Ukrainian nation state. The analysis suggests that the prevailing view in Moscow perceived the EU is a proxy for extending US hegemony. Moscow demands great power national status equality in international diplomacy. Ukraine's partition is likely.

INTRODUCTION

Anation state is a state in which the overwhelming majority of citizens demonstrate their primary self-identification with the territorial community within the state boundaries. This demonstration refers to behavior by sacrifice of other values to support the sovereignty of the national community. This study utilizes the Cottam and Cottam (2001) political psychological framework for analyzing nationalism. Firstly, a nationalist is an individual who sees himself/herself as a member of a large group of people who constitute a community that is entitled to independent statehood and who is willing to grant that community a primary and the primary terminal loyalty. Secondly, nationalism characterizes a community when the modal, politically attentive citizen is a nationalist. A state territorial community acts nationalistically when the second condition is true, with regard to a particular community. If the community with which the nationalists identify does not have its own state, then this theoretical framework suggests that they will work to achieve one. By definition the attachment felt for this community will be the most important (terminal) one, and the community which a nationalist believes should have its own state will also be the largest community with which the nationalist identifies. When these conditions prevail, observers will see certain regular behavior patterns which we associate with nationalism.

This paper critiques the European Union as a peace strategy. The European Union won the 2012 Nobel Peace Prize (Cowell and Kulish, 2012). The main threat to peace in Europe is nationalism challenging internationally recognized territorial borders. One manifestation of nationalism is the political demand that an individual or group of people have that the members of a nation should live together in their own sovereign state. Most European states have peoples with more than one nation living within them. Most European nations are more or less divided among different European states. Frustration of nationalism produces intensely negative stereotypes and emotions towards the perceived barriers to creating a nation state. These barriers are frequently states perceived as representing or being controlled by other nations. The emotions include hatred and disgust. A result can be war and even genocidal violence. The European Union attempts to weaken the link between European nations and European states in the thoughts and emotions of the publics of the respective member states. Among the EU's member states, it promotes alternative values, including wealth prosperity and alternative identities, like being so-called European. Paradoxically this strategy critically relies upon the historical legacy of relatively effective states to utilize their power capacity to construct the European Union. In the case of Ukraine, integration with the EU functionally incentivizes the fortification of Ukrainian nationalism to support the Ukrainian state.

Nationalism as a communal motivation can associate with liberal values as well as with authoritarian values, depending upon the political context (Cottam and Cottam, 2001). Nationalism associated with authoritarian order values in interwar Europe. In the latter Cold War period, West European nationalisms came to associate with liberal democratic values in opposition to the expansion of Soviet communist totalitarianism. European integration as a peace strategy aims functionally to associate and harness the political mobilization capacity of nationalism with liberal, i.e., "civil society" values (Hoxhaj, 2021, 169). This utilization includes state institutional reform and standardization to contain corruption on behalf of the so-called rule of law (Baraggia and Bonelli, 2022). Functionally, European integration has thereby fortified and encouraged Ukrainian nationalism after the 2014 "Revolution of Dignity" to support pro-Western Ukrainian nation state construction (Nakashidze, 2021, 65). The wide-range of effects of the intensification of international conflict between post-Soviet Russia and the US has accelerated functionally the Europeanization of Ukrainian nationalism (Stevis-Gridneff, Gibbons-Neff and Leveson, 2022).

A key issue is the relationship between the EU and the US. The USA is a nation state, the EU is not. Nation states are more prone to engage in collective stereotyping which leads to foreign policy failures and catastrophes (Cottam and Cottam, 2001). The fact that the US is a democracy is significant, but nation state democracies can still stereotype targets, increasing the propensity towards use of deadly force, e.g., Vietnam and Iraq. The EU may need to contain the US which may see Europe increasingly as "degenerate," as Donald Rumsfeld did in 2003 leading up to the war in Iraq (DeDominicis, 2018b, 16, fn. 6). Instead, the EU appears to be enabling the US, rather than discouraging the US from overextending. "But overexpansion is a staple of IR [international relations], one not limited to Liberal states, and the narrative can be traced back to Thucydides" (Jervis, 2020, 442). The EU is cooperating with the US in confronting Moscow and Beijing. The multi-national EU confederation may not have the mobilization base to oppose the US. One might argue that another test of the EU in its relations with the US may include Ukraine. Observers should look for evidence of different views in Brussels and Washington as to how to deal with Moscow.

The paper begins with a review of selected scholarly literature regarding the conceptualization of nationalism as a foreign policy motivation. The regional empirical focus is twentieth and twenty-first century Europe and the global international system more broadly. It presents alternative explanations for the Cold War and the imputed foreign policy motivation for Moscow's belligerency towards Ukraine. It compares and contrasts Belgrade's irredentism towards the other former Yugoslav republics to illustrate the significance of the great comparative power differential between Serbia and Russia. This power differential impacts the international system's response to their respective challenge to internationally recognized state borders. The paper then focuses on outlining consequent, inferred strategies for conflict control and reduction to reach a ceasefire. It ends by highlighting the importance of an accurate consensual

understanding of the ultimate motivations of the US and the USSR during the Cold War for conflict resolution today. It notes that the prevailing view in Moscow is that the Soviet Union lost a defensive conflict to preserve its status against a NATO-led Western alliance. It perceives the US as seeing an opportunity to relegate Russia to second-rank global status through its EU proxy. The Ukraine conflict will likely remain a battleground in this conflict spiral with its roots in the Cold War.

LITERATURE REVIEW

Euromaidan

Vladimir Putin stated that the West was aiming to suppress and subjugate Russia's development (Axelrod, 2021). Moscow's prevailing view Western aid to Ukraine as reinforcing Ukrainian national attitudinal assumptions originally promoted by Soviet economic, political and cultural enforcement at Russia's expense (Putin, 2021). From this perspective, essential components of the Russian nation include territorial, ethnic and religious components that currently reside within the borders of neighboring, multi-ethnic and compound identity state of Ukraine. In a scenario in which Russia would forsake these irredenta, then Russian national identity including prevailing romantic symbol sets would have to evolve and change more rapidly. Comparisons include Greek nationalism's acquiescence to the loss of Smyrna/Izmir, and Finland's loss of Vyborg. This evolution may well occur regarding Serbian nationalism's focus on the territory of Kosovo. Russia, of course, has a power potential base that is much greater, so Russia will not acquiesce to this loss. Former German Chancellor Helmut Schmidt opposed the EU's thrust to integrate Ukraine and Georgia into the EU political economic hegemony through formal agreements ("Helmut Schmidt," 2014).

The emergence of a perceived threat to Russia's prestige and identity connected with Ukraine, comparable to that of the Serbs in Kosovo, emerged over time. The Russian prevailing view historically has been that the area under Kiev was the cradle of Russian civilization, comparable to Serbia's claim to Kosovo. As Ukrainian nationalists gained disproportionate influence over Kiev's government policies due to its militancy, the attraction of Euro-Atlantic structures (NATO and EU) was strong and became stronger. The US and its EU allies encouraged this sentiment by publicly, blatantly siding with the Kiev Maidan Square protesters (the so-called Revolution of Dignity) in 2013. These protests, encouraged by Brussels and Washington, forced the democratically elected, pro-Russian president, Viktor Yanukovych, to resign and flee the country. Yanukovych in 2013 refused to sign an association agreement with the EU following a trade war in which Russia used its economic influence to raise the economic costs to signing such an agreement. Yanukovych determined that the costs would be too high, especially for his eastern Ukraine political base, to sign the EU association agreement, despite his earlier campaign promise to do so (Hosaka, 2018). Protests began in early 2014 and the Yanukovych government used deadly force to suppress them, with the interior ministry police killing several scores of protestors. Before these shootings, the first High Representative of the EU's Common Foreign and Security Policy, Catherine Ashton, went to Maidan Square to show the EU's solidarity with the protestors. So did US Senator John McCain. So, also did US Assistant Secretary of State Victoria Nuland of the Obama administration, publicly handing out food to the protestors on the square. Nuland is again in the US State Department in the Biden administration. The Russians recorded her telephone calls, including one in which she castigated the EU for being too willing to negotiate with Moscow over the crisis (BBC, 2014b). This position parallels the Clinton administration placing primary responsibility on the Serbian authorities for "the resurgence of Serb nationalism" triggering the violent disintegration of Yugoslavia (Mujanovic, 2013, 131). Washington declined to support accommodating Serbian irredentist positions until exhausted stalemates led to de facto partition of Bosnia and Herzegovina (Harland, 2017). Freezing de facto partition while maintaining the fiction of sovereignty would be a pattern that also emerged in Kosovo (Mrdalj, 2020).

Russia's invasion of Ukraine has encountered intense, sustained resistance that some observers did not expect (Kirby, 2022). Rather than submit to annexation as did Czechoslovakia in losing the Sudetenland to

Germany, Ukrainian nationalism demonstrated its mass public prevalence through mobilization. London and Paris signaled to Prague that they would not militarily intervene to stop German annexation, which undercut Czech willingness to resist militarily. Ukrainian nationalists also note repeated NATO statements that NATO will not militarily intervene directly to confront Russian forces (Shear, 2022). NATO is supplying defensive weapons on a large scale as well as not obstructing individuals moving to Ukraine to fight on the Ukrainian side by the thousands (Engelbrecht, 2022, Crowley, 2022). As the mass violence continues through the months intensifying mutual hostility and zero-sum interaction, de facto partition of Ukraine along future ceasefire lines seems to a be a more plausible scenario.

Some observers view the conflict as a deadly struggle over the redrawn borders between Ukraine and its neighbors (Vause et al., 2022). The partition of Ukraine would likely involve forced population movements on a massive scale. Russian nationalism historically viewed the territory around Kiev as the founding settlement of Russian civilization. As of July 2022, "the Biden administration has concluded that the Russian leader still wants to widen the war and try again to seize Kyiv, the Ukrainian capital" (Baker and Sanger, 2022, para. 9). Russia has vastly greater power capability to pursue its irredentist aims that Belgrade did not have towards the rest of Yugoslavia. Belgrade may have not formally activated a plan for ethnic cleansing in Kosovo (DeDominicis, 2020). The rapidly escalating conflict dynamics were producing zero-sum maximal outcomes of forced population separation which NATO intervened to block. NATO is arguably unlikely to block a comparable outcome in Ukraine east of the Dnieper River (DeDominicis, 2018b). Precedent for forced population transfers emerged in the Soviet era as well as earlier in the Balkans and Anatolia (Özsu, 2013). *Jus cogens* has incorporated the results of population expulsions during and after the Second World War into international law (Lemberg, 2008). The prevailing view in Moscow may view such long-term recognition as inevitable.

An increasingly unlikely ceasefire scenario short of partition may include a high-level tactical component involving a constitutional restructuring of the Ukrainian state. It would conceivably involve joint NATO, EU and UN Security Council, i.e., Russian and Chinese, supervision. The political potentialities for it are rapidly dissipating along with the rapidly escalating fear, hatred and disgust functionally polarizing the community into zero-sum social competition. By way of historical analogy, the US came to discourage recognition of Serbia's nationalist grievances as a contestant in the Balkans. External actors imposed their own frames on the conflict in Yugoslavia, shifting from "ancient hatreds" to Slobodan Milosevic's own personal power drive to create "Greater Serbia" (King, 2007, 125). So, also the US is unlikely to deemphasize its characterization of Russia and specifically Putin as the primarily guilty party in Ukraine. Public declarations of Putin as a war criminal have lessen this political capacity to satisfy Russian regime stability and national dignity demands (Sanger, 2022).

Another trend eliminating this political capacity to negotiate a ceasefire short of partition is the strengthening of Ukrainian nationalism. It resists imposed political solutions that do not acknowledge equal Ukrainian national sovereignty. Ukrainian nationalist opposition was a factor blocking Zelenskyy's moves to implement the Steinmeier formula for implementing the long-stalled Minsk Accords (Deprez, 2019). They were the framework for overseeing the reintegration of the Donetsk and Luhansk regions into Ukraine. Named for the then German foreign minister, the Steinmeier plan aimed to agree on a sequence of steps overseen also by international observers including the Organization for Security and Cooperation in Europe (Miller, 2019). Since then, Moscow has recognized these two regions as independent states. The Steinmeier formula may have been the last political opportunity to resolve the conflict short of partition. The opposition of Ukrainian nationalists did not allow Zelenskyy the decisional latitude to implement it after he announced his intention to move forward with it (Shevtsova, 2020). Russian government public statements by Foreign Minister Lavrov portrayed the US as prodding the Ukrainians not to implement the Minsk Accords (TASS, 2020). In April 2022, the Ukrainian government refused to meet with Frank-Walter Steinmeier, now President of the Federal Republic of Germany, in Kyiv, due to his perceived past willingness to appease Russia ("Zelensky Snub," 2022).

Ukrainian wartime mobilization illustrates the high salience and intensity of nationalism as a motivating value among its Ukrainian core community. It allows this constituency to dominate the Ukrainian political system. They evidently do constitute the modal citizenry, i.e., the most typical category of national identity citizen in Ukraine appears to be a Ukrainian primary terminal self-identifier. Before the 2022 invasion, their core organized street protests that Zelenskyy or any post-Yanukovych Ukrainian president was unlikely to suppress with coercion after the events of 2014. Their opposition narrowed the political decisional latitude available to Zelenskyy to move forward on the Steinmeier formula after he was elected. Several years previously, Yanukovych attempted and failed to suppress the so-called Revolution of Dignity and many scores of protestors were killed. The resolution of the conflict short of partition is unlikely, while the rest of Ukraine continues to integrate de facto with the West. Moscow's prevailing view perceives the attraction to the West increasing among the Ukrainian public. "In the eyes of Russian leaders, EU expansion is a stalking horse for NATO expansion" (Mearsheimer, 2014, para. 10).

International Strategic Environment

A main conceptual focus of this paper is collective, prevailing view of perception of motivation and relative capabilities of policy targets. Table 1 shows that this paper's framework rejects single factor causation in state behavior in international relations (Waltz, 1954). It favors opening the so-called black box, i.e. the polity system processes generating, managing and aggregating political inputs into foreign policy outputs (Yeoh, 2016). It proposes a hierarchical component system-linked motivational formula that shapes the general thrust of a state's foreign policy (Cottam, 1977). Assuming single-factor individual, bureaucratic, economic, power or international systemic determinism in overdetermining state foreign policy behavior is analytically deleterious. Conceptualizing political conflict resolution strategies require tactical foci components that emphasize multiple state and individual-level causal factors for state policy behavior. They dynamically interact with the changing intensity of mutually perceived challenge in relations among the great powers. Different constituencies within a polity serve as carrier vectors for these different motivations.

Table 1: An Inclusive Typology of Foreign Policy Motivations of a State

ECONOMIC	COMMUNAL	MESSIANISM	GOVERNMENTAL	DEFENSE
Loot	**National**	**Ideological**	**Bureaucratic Vested Interests (BVI)**	
	Independence		Foreign Policy and Defense Bureaucracies	
	Unity-Irredentism		Non-Defense Bureaucracies	
	Dignity		Military Vested Interests (MVI)	
	Grandeur			
Demographic	**Participant Excitement**	**Cultural**	**Personal Power—Internal**	
Economic Vested Interests (EVI) Defense	**Frontier Dynamics**	**Religious**	**Survival of the Regime**	
Trade Domestic Investments Foreign Economic Vested Interests			**Personal Power—External**	

Source: Data Summarized from Cottam, 1977, 31–53, Quoted from DeDominicis, 2018a, 5 The strategic environment in which state leaderships engage in diplomatic bargaining is essentially important for effective strategic foreign policy planning. In "A" state, e.g., the prevailing government view perceives "B" state's international belligerency as due to aggressive, imperialist motivations. "A" will respond signifcantly differently to "B"'s attempts at influence towards "A," than if "A" perceived "B"'s belligerence as motivated ultimately by defensive motivations. "A" may misperceive the ultimate source of "B" belligerency; if "B" is indeed belligerent due to perceived threat from "A," then "A"'s belligerent response due to contain "B" may reinforce "B"'s misperception of intense threat, heightening "B"'s belligerency. The outcome is a conflict spiral, i.e., escalating hostility due to mutual mispercetion of threat.

The two basic determinants in the strategic analysis and decision making of political actors are estimations of the motivation and relative capabilities of the other relevant actors. Foreign policy decision makers may make the mistake of inaccurately or incorrectly estimating both the motivations or the capabilities of other actors. A notorious case of a failed strategy is the strategy of "appeasement" in dealing with Nazi Germany. The functional basis of a foreign policy strategy, such as containment towards the Soviet Union, is the prevailing view's perception of the target's intentions/motivations and the target's capabilities. Failed strategies can emerge because of misperception of motivation, and also of relative capabilities. The greater the intensity of the external challenge which prevails within the initiator state, then the more vulnerable will the initiator state be to misperceptions of the intentions and capabilities of the target state. Table 2 shows an example of an outline of the so-called appeasement strategy using this paper's framework. It highlights its assumptions regarding the hierarchical systems relationship amongst constituency inputs into the 1938 German polity's foreign policy making process.

Table 2: The Basis of the 1938 "Appeasement" Strategy Was the Misperception That the Motivation for the Conflictual Belligerency of Hitlerian Germany as Being the Following

70%	A)	National dignity National unity National independence
20%	B)	Personal power external Economic vested interests
10%	C)	Ideological messianism

Source: DeDominicis, 2022, Adapted from Cottam, 1977 Appeasement is a state "A" foreign policy strategy towards a target, state "B," in which, the prevailing governmental "A" view is that "B"'s belligerency is due to "B"'s misperception that "A" aims to subordinate "B." By appeasing "B," "A" aims to change the prevailing view in "B" so that "B"'s prevailing government view ceases to view "A" as an existential threat to "B." "A"'s attempted satisfaction of "B"'s defensive national status equality drives focuses on accepted norms of international law, e.g., the right to full military preparation for self-defense. Inaccurate inference of Hitlerian Germany's belligerency as due to the intention to dismember, disarm and weaken Germany was the critical foundational assumption of the appeasement strategy. In fact, German belligerency was due to perceived imperial opportunity.

Table 3 shows the actual hierarchical systems relationship amongst constituency inputs into the 1938 German polity's foreign policy making process. The tragedy of appeasement was rooted in its misperception of the ultimate sources of German belligerency. Appeasement functionally served to confirm Hitler's articulation of the image of political degeneracy of Nazi Germany's great power interlocutors (see table 4). The appeasement strategy thereby functionally confirmed the validity of Hitler's worldview among the Nazi regime authorities. It functioned to increase Hitler's domestic authority, making Germany more belligerent and aggressive, rather than pacifying it.

Table 3: In Reality, the Motivational System in 1938 Hitlerian Germany Corresponded with the Following

85%	A)	Personal power -- external
		    National grandeur
		    Participant excitement

10%	B)	Military vested interests Economic vested interests
5%	C)	Bureaucratic vested interests – foreign policy/defense National security

Source: DeDominicis, 2022, Adapted from Cottam, 1977 Hitlerian Germany belligerency at the 1938 Munich conference was in due ultimately to a prevailing Berlin worldview of outstanding political opportunity to establish German hegemony. Hitler would be the leader-dictator of a dominant Germany in this new European and world order. It would extend well beyond compensating for the perceived national humiliation of Germany's dismemberment, personal loss and economic sanctioning and dislocation since the Versailles Treaty. The Nazi self-serving prevailing view that the regime had far outperformed the hopelessly disorganized great power adversaries of Germany during extended interwar crises readily encouraged this worldview. The appropriate strategy should have been a variant of containment. Appeasement inadvertently confirmed the degenerate image (see Table 4).

In order for Nazi Germany collectively to have this motivational system, the authorities had to see a world which allowed it collectively functionally to justify this motivational system. To rephrase, the prevailing view of the external political environment was one in which it saw a marvelous opportunity to expand its influence. The main facet of this worldview was that the other great power actors had similar capabilities but lacked the will and determination to use them. They lacked this will and determination because they had become degenerate. This gross stereotypical misperception led to a foreign policy strategic disaster. A stereotype is an oversimplified perceptual image of the target. Table 4 shows Case 1: The prevailing view in the polity of Nazi Germany perceived the US, France, UK, USSR as degenerate. The relevant foreign policy elements of the "degenerate" stereotype apply if this stereotype is the prevailing view in the foreign policy making process.

Table 4: Case 1-The Critical Political Strategic Elements of This Stereotypical Degenerate Prevailing View Within the Initiator Regarding the Target Are the Following

1)	**Motivation:**	Confused
2)	**Decisional locus:**	Incremental – no coordination
3)	**Decisional style:**	Disorganized to the point of confusion
4)	**Capability:**	Lacks will and determination (i.e., the opposite of the prevailing view perception of Self within the initiator polity held by the governing authorities)
5)	**Prevailing view within the initiator polity towards internal political dissenters/opposition:**	Effete (i.e., they are agents/vectors of degeneracy)

Source: Data Adapted from Cottam and Cottam, 2001, 98. Quoted from DeDominicis, 2018a, 9 Hitlerian Germany's Lebensraum strategy included the foundational inference that Nazi Germany possessed a sufficient power potential base relative to its all its great power adversaries to attempt and achieve world domination. The belief that Germany had the power capability to place global hegemony acquisition within its range of feasible policy options indicates that a collective political psychological approach is useful to explain this worldview. The key factor differentiating Nazi German from its great power targets was the perceived exponentially greater collective will and determination of Germany under Nazi leadership and control. Germany's targets were critically unable to organize themselves to respond effectively to a forceful, sustained German challenge which had first overcome its internal degenerate opponents.

From the point of view of the leadership of this authoritarian populist regime, a commitment to international cooperation is foolish with regard to "degenerate" states. Instead, a virile, worldwide Pax Romana-type strategy is necessary to exploit the opportunity to assume and provide global leadership, i.e., predominance. Figure 1 summarizes the prevailing definition of Germany's international political environment as collectively perceived in 1939 Berlin, as if analogously perceived by a single individual.

Table 5 summarizes the ideal-typical image stereotype extremes of policy targets to which the foreign policy behavior of nation states is comparatively more prone to conform. Policy behavior patterns outlined in Table 6 conform with these images along with intensifying perception of challenge. This challenge can be threat or opportunity perceived as confronting the initiator state.

Figure 1: The International System, 1939 German Prevailing View

Ally

Japan | Italy

Degenerate ——————————— **Complex** ——————————— **Colonial**

UK, France
USA, USSR

Egypt
Syria
Turkey
Greece
Poland, Czechoslovakia
Yugoslavia, Romania
Hungary

Norway | Denmark
Belgium | Netherlands

Degenerate Proxy   *(Source: DeDominicis, 2022, adapted from Cottam, 1994,192)*
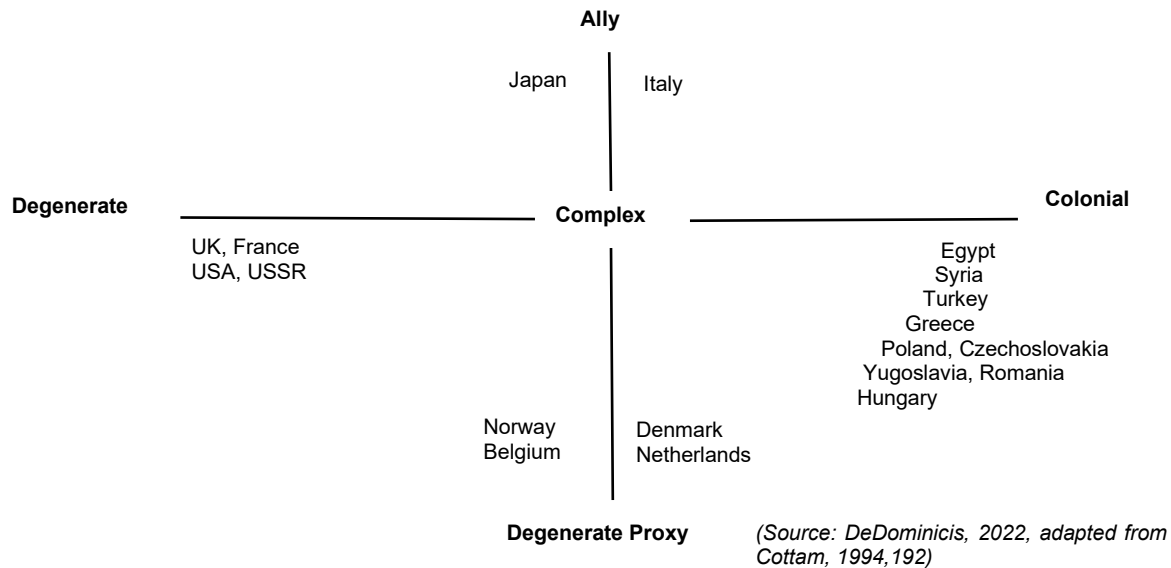
Figure 1 depicts the prevailing worldview of the 1939 Nazi German regime. Drawing on the findings from cognitive balance theory, allies are positively stereotyped. Lesser powers are perceived derivatively in terms of their stereotyped role in the international system dominated by the great powers. In addition to perceived relative power potential base, stereotyping also reflects perceived cultural level of the target polity, i.e., in today's terms, their level of technological development. The typology of images/stereotypes is summarized in Table 5. The strategic policy behavior consequences are summarized in Table 6. Stereotyping is more frequent within the polities of nation states such as Germany, Japan, Russia and the United States, ceteris paribus. Stereotypes as the foundations for strategy leads to strategic catastrophes.

Table 5: Image Attributes of a Perceived Source of Challenge (I.E., Threat or Opportunity)

Image/Stereotype	Capability (as perceived/stereotyped)	Culture (as perceived; today, tends to be equated with perceived technological proficiency)	Intentions (as perceived/stereotyped)	Decision Makers (as perceived/stereotyped)	Threat/Opportunity (as perceived/stereotyped)
"Enemy"	Equal	Equal	Harmful	Small elite	Threat
"Barbarian"	Superior	Inferior	Harmful	Small elite	Threat
"Imperial"	Superior	Superior	Harmful	A few groups	Threat
"Colonial"	Inferior	Inferior	Benign	Small elite	Opportunity
"Degenerate"	Superior or equal	Weak-willed	Harmful	Confused, differentiated	Opportunity
"Rogue"	Inferior	Inferior	Harmful	Small elite	Threat
"Ally"	Equal	Equal	Good	Many groups	Threat (from a shared enemy, i.e., the enemy of my enemy is my friend)

Source: quoted from Cottam and Cottam, 2001, 98 Stereotyping in image formation demonstrates patterns that move towards the ideal-typical forms e.g., outlined in Table 4 (degenerate) and Table 7 (enemy) concomitantly with the greater intensity of perceived external challenge. Image formation towards lesser powers will tend to be derivative of the overarching definition of the international situation framed by the perceived relationships among the great powers. Great powers embedded in a conflict spiral may derivatively perceive lesser powers as sources of opportunity, i.e., colonial or degenerate, to assist in prevailing over the perceived high level strategic threat from a great power. Lesser powers perceived according to the colonial framework become targets for the competitive expansion of metropole influence and control responding to the challenge from other great powers.

These perceptual stereotypes associate with psychological behavioral pattern predispositions that, in turn, become the basis for derivate group behavior orientations by the perceiver as outlined in Table 6. Table 6 shows the general political strategic thrust of an actor towards a target in an ideal-typical typology of image stereotypes. The foreign policy making process relevant components of the stereotype images relevant for this analysis are outlined in subsequent tables.

Table 6: "Images and Policy Predispositions"

Image of Perceived Challenger	General Policy Predispositions Towards Perceived Challenger	Policy Predispositions Towards Perceived Challenger in Intense Conflicts
"Enemy"	Wary suspicion, containment	Hostility, defense
"Barbarian"	Fear, form alliances	Preemptive strikes, precipitate alliance intervention (potential for genocide)
"Imperial"	When domination is stable: fear, avoid conflict, submit	When conflict is unstable: anger, shame, struggle for liberation
"Colonial"	Paternalistic policy guidance and direction	Most commonly nonviolent repression
"Degenerate"	Contempt, mobilize for competition	Disgust, offensive aggression
"Rogue"	Derogate, isolate	Hostility, violent repression (potential for genocide)

Source: quoted from Cottam and Cottam 2001, 121 Identifiable behavior patterns tend to associate with particular images that the actor holds towards the target. The rhetoric of state decision makers is one part of evidence for analysis to use to infer state foreign policy motivation. The leaders of aggressive, imperialist actors inevitably portray their policies in terms of victimhood and defensive motivations. Hitlerian Germany's relative power potential base firmly placed it within the first rank great power status. Vladimir Putin's Russia appears to have stereotyped Ukraine as a degenerate actor subject to colonialism by a threatening US-led NATO/EU alliance. Moscow's perception of opportunity towards Ukraine was significantly derivative of its perceived threat ultimately from Washington. The economic component of Russia's power potential base is equivalent to that of Italy.

The appropriate strategy for countering Hitlerian Germany was rather containment. Appeasement inadvertently confirmed and reinforced the degenerate image of 1938 Germany's foreign policy targets, a stereotype promoted whose advocates included Hitler. Tragically, appeasement therefore contributed to a greater likelihood of the outbreak of war. By the end of the 1940s, the American prevailing view became that, in effect, the Soviet Union was a Russian version of Nazi Germany, and the appropriate strategic response would be containment (Cottam, 1977). The latter strategy would deny the Soviet leadership the imperial expansion and glory that it allegedly needed for the totalitarian Soviet regime to survive and thrive domestically. Appeasement was, in effect, a détente strategy. It was an approach whose prevailing assumption was that the belligerency of Germany was due to suspicion of imperial motivations of the allied powers towards Germany. By accommodating post-Versailles Germany's demands for return to the ranks of the European great powers, Germany would reemerge as a status quo power.

The question of the ultimate source of Russian belligerency since 2013 towards Ukraine and the West is an essentially important issue. If Russian foreign policy motivations are to re-create the Russian empire in post-Soviet garb, then appeasing Russian expansion would be dangerous. If Russian foreign policy is ultimately rather the system of foreign policy motivations outlines in Table 12, then a containment strategy may functionally serve to reinforce the prevailing perception of threat in Moscow. A containment strategy against a defensively belligerent state risks intensifying a conflict spiral. This writer has argued elsewhere that the Cold War may have been a case of a conflict spiral, i.e., mutual misperception of aggressive, ultimately imperialist belligerency by Moscow and Washington (DeDominicis, 2021). Post-Soviet Russia, as a nation state, unlike the multi-national USSR, is more prone towards stereotyping and belligerency, ceteris paribus (Cottam and Cottam, 2001). Figure 2 summarizes the prevailing definition of Russia's international political environment as collectively perceived in February 2022 Moscow, as if analogously viewed by a single individual.

The respective prevailing views within US and USSR polities collectively perceived each other during the most intense periods of the Cold War as a "diabolical enemy," e.g., US President Ronald Reagan's characterization of the USSR as an "Evil Empire" (Hall, 2015). The foreign policy-relevant elements of the "Diabolical Enemy" stereotype are outlined in Table 7, Case 2.

Figure 2: The State System, February 2022 Russian Prevailing View (I.E., Eve of Invasion of Ukraine)
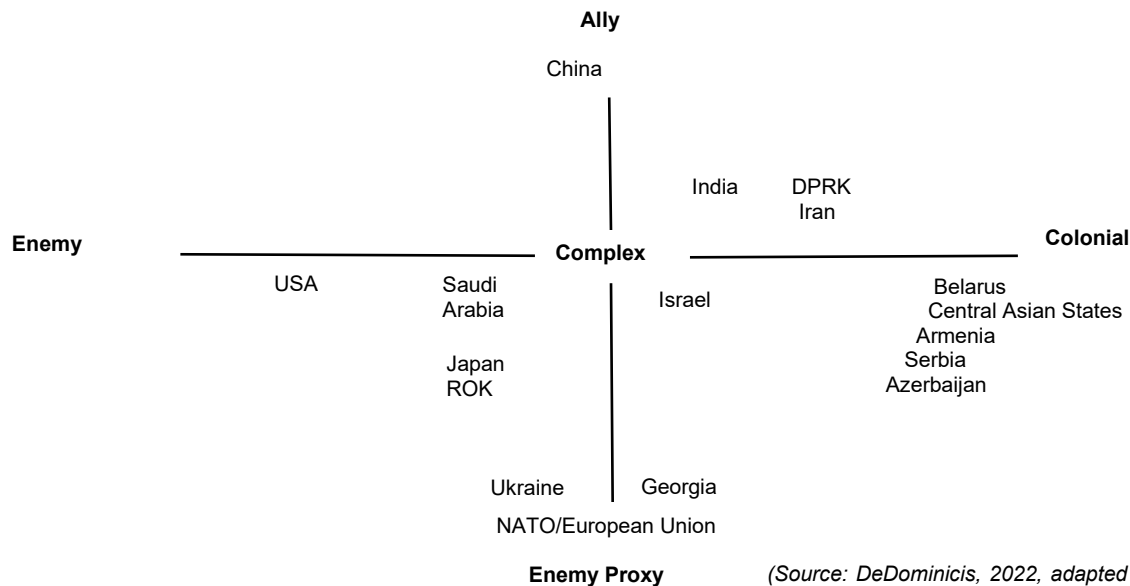
(Source: DeDominicis, 2022, adapted from Cottam, 1994, 192)

The Putin administration's definition of the international situation focuses on the US threat to Russian unity and international status and regime stability (see Table 12). Russia's imperial aggression towards Ukraine stereotyped the latter as degenerate, self-servingly and disastrously dismissing the strength of Ukrainian nationalism. The initial failure of Russian invasion to achieve its objectives in the face of massive Ukrainian resistance highlights the intensity of perceived threat in Moscow from the international system. The consequence of this gross misreading is likely to be the further intensification of perceived threat including the intensifying orientation towards scapegoating and conspiracy postulation. The diminution of the Russian middle class due Russia's economic isolation will lessen resistance to these tendencies.

Table 7: Case 2-The Critical Political Strategic Elements of This "Diabolical Enemy" Stereotypical Prevailing View Within a Government of a Target Are the Following

1)	Motivation:	Evil
2)	Decisional locus:	Monolith
3)	Decisional style:	Highly rational
4)	Capability:	Derived from the purported goodness and naivete heretofore dominant within the perceiving, initiator polity, hobbling its collective comprehension of and mobilization against the threat (i.e., the opposite of the perception of the nature of the threatening Other, target polity.)
5)	Prevailing view within the initiator polity towards internal political dissenters/opposition regarding the portrayal of the target as a diabolical enemy:	Dupes at best, or, at worst traitors

Data adapted from Cottam and Cottam, 2001, 96-98, 108. Quoted from DeDominicis, 2018a The image pattern formation tendency of perceived sources of intensifying threat display propensities towards the so-called enemy stereotype under the following conditions: the target is perceived as roughly equal in capability level and cultural level. The enemy image characterized the American prevailing view of the USSR particularly during the early Cold War period. Previous work by this author argues that the Soviet leadership mirrored this (mis)perception of US motivation, albeit at a lesser intensity, indicating that the Cold War was at its foundation a conflict spiral (DeDominicis, 2021). The Putin administration is more likely to assume that US concerns regarding 2022 Moscow's belligerent foreign policy motivations are rather self-serving justifications for the US' own quest for seeking American hegemony via Russian subjugation.

In this stereotypical worldview, an effective containment strategy is necessary to deter the highly rational, inherently expansionist, monolithic enemy from aggression. Failure to deter otherwise risks loss of control over local crisis situational dynamics escalating to direct military confrontation. The highly rational enemy must not doubt the will and determination of the defender to resist to prevent the aggressor's prospective victory. Failure to project the requisite will and determination risks encouraging the aggressor. Consequent destabilizing imperial expansion drives increase the prospect of the defender having to choose between

escalation to military confrontation or acquiescence, i.e., further appeasement. In the latter case, the cycle of imperial expansion will intensify, leading to the next crisis but with even less credibility to display the ultimate willingness to resist by the defender. As in the case of Hitlerian Germany at the 1938 Munich conference, appeasement will ultimately serve to confirm the perception of target degeneracy. It thereby reinforces the predisposition towards intensely aggressive imperialism. The post-1945 nuclear setting made demonstrating adequate will and determination to resist a more imminent concern. In contrast to the international system in the late 1930s, useful comparisons may be made with the international system on the eve of the First World War, as an example of a conflict spiral. Belligerency and expansion may be motivated by ultimately defensive motivations as well as aggressive, imperialist drives. The aphorism, the best defense is a good offense, captures the former. An accurate depiction of the motivations for Russian international belligerency in 2022 is critical for formulating an appropriate strategy to avoid loss of control over escalatory dynamics.

Table 8 highlights the danger of a conflict spiral producing war. Each actor is ultimately defensively motivated but misperceives the belligerency of their great power adversary as ultimately stemming from imperialist, aggressive motivations. Hence, acquiescence to the opponents demands will only make the opponent more aggressive due to failure to demonstrate the will and determination to meet force with force to contain the other. The First World War was a great power conflict rooted in defensive motivations. This analysis proposes that Russia in February 2022 viewed Ukraine in terms parallel to 1914 Vienna's prevailing view regarding Belgrade. Hence a conflict resolution strategy for the Ukraine war requires a critical focus on Moscow-Washington political strategic interaction. Mutually shared misperceptions of aggressive imperial intent among the great powers contributed to a conflict spiral leading up to what became the First World War. It rapidly escalated in response to a lesser power's involvement in the June 1914 assassination of the Austrian heir to the throne.

Table 8: The International Political System, Six Weeks Prior to Outbreak of World War I

State Actor	Power Potential Base	Intensity of Perceived Challenge from External Political Environment	Direction of Perceived Challenge
UK	1	5	Threat
France	1	5	Threat
Austria-Hungary	2	4	Threat (but Opportunity towards Serbia for restoring the empire in the view of other major powers by subjugating Belgrade)
Italy	2	5	Threat
Germany	1	5	Threat
Russia	1	5	Threat
USA	1	7	Threat

Source: DeDominicis, 2022, adapted from Cottam, 1977 Utilization of historical analogies to analyze Russian foreign policy motivation for the 2022 Ukraine invasion should include the outbreak of what became the First World War. In Table 8 above, the Great War was the result of a conflict spiral. Austria-Hungary, weakened by centrifugal nationalist predispositions of varying intensity, was a second-rank power. The assassination of the heir to the throne provided Vienna the derivative opportunity towards Serbia to reassert its lost first rank great power credentials by eliminating Belgrade as an actor. Claims of valid historical parallels with Moscow's behavior towards Ukraine would imply that Russian foreign policy motivation is closer to that formula assumed for the appeasement strategy towards Germany. Table 2 outlines this assumption, invalid regarding Germany.

The images which the great powers had of each other were complex. Six weeks prior to what became the start of the war, the international system witnessed a rapid shift in these images from complex understandings of each other to stereotypes. In formulating a peace strategy amidst the current Ukraine crisis, an accurate understanding of Russian ultimate foreign policy motivation is necessary to avoid further conflict escalation. Vienna saw an opportunity to "restore the Empire's prestige by subduing Serbia" (Lyon, 2015, 116). Vienna saw a threat from burgeoning nationalism to its multinational empire including Serb minorities attracted to neighboring Serbia. The essential perceptual dynamic of an international spiral conflict which also resulted in World War I involves mutual misperception of threat. The leadership of State A fears that the leadership of a perceived "diabolical enemy," State B, sees State A as "degenerate."

So, State A is belligerently defensive to demonstrate its virility and will and determination to resist so as to prevent further aggression from state B.

If state B has the same fear towards State A, then the result is a self-reinforcing vicious circle of mutual misperception of threat. Each side's defensive efforts confirm the misperception of aggressive intent which the target of the defensive policy has towards what is, in reality, another defensive power. A conflict spiral is an international conflict which intensifies due to mutual misperception of threat. It is the consequence of a wrong estimation of the intentions/motivations of a belligerent actor in international relations as being expansionist, when it is really defensive. An actor's policy emerges of assertive defense in the form of containment, i.e., demonstrating its will, determination and resolve to fight and sacrifice to resist aggression. The target's fear then increases, and it becomes even more belligerent, and open warfare becomes a possibility. A containment policy towards defensively motivated actors increases the potential for the loss of escalatory control over situational dynamics, leading to a foreign policy disaster.

During the early Cold War, the US polity, i.e., the political elite factions and their respective constituencies, came to share a consensus in seeing a great threat from the USSR (Hook, 2019). An important question was whether their perception of Soviet foreign policy motivation was accurate. To rephrase, was the Cold War ultimately a spiral conflict. The analyst faces the task of determining whether a state acts belligerently because it is defensively motivated. Or is it belligerent because it really is an imperialist state perceiving an ultimate marvelous opportunity on the international stage. Hitlerian Germany's belligerency was due to a motivation and perceived opportunity to engage in world domination for the grandeur of the nation and its leadership. A path towards a solution lies in determining the answers to the following 3 questions: 1) the belligerent state's priority for peaceful resolution of conflict; 2) the belligerent state's satisfaction with level of influence exercised in the world; 3) the belligerent state's satisfaction with the actor system. The image intensity (stereotype) which characterizes the prevailing view of the public will show up in terms of the polity's collective willingness to sacrifice to meet the external challenge. This stereotypical prevailing view will also be dependent on capability self-image. The threatening state's predisposition to act through its foreign policy process output will significantly depend on the extent and intensity of this stereotype imagery within the public. As of February 2022, the Putin administration's policy behavior patterns towards Washington appeared to accept the global status quo. In this worldview, Washington challenged this status quo by expanding so-called Euro-Atlantic structures into the former Soviet bloc. Moscow did not appear to indicate that it perceives itself as confronting a global environment of surrounding great power political degeneracy offering a marvelous global strategic opportunity. Such a worldview would require Moscow's prevailing view to include an estimation that it possesses a great mobilizational capability advantage. This superior will and determination would enable it to overturn the US-dominated international order. For example, due to the prospect of default on its foreign debt due to US-led economic sanctions on Russia, Moscow has threatened to "sue." According to Russian finance minister, the government "undertook all necessary action so that investors would receive their payments" (Ponciano, 2022, para. 5).

This analysis implies that the foreign policy leadership of an initiator state needs to build in tests into the foreign policy to determine the accuracy of comprehension of the intentions of the target. Stereotyping is law-like in its regularity under particular conditions. As an oversimplification of both intention and capability, it is a pathological tendency in making foreign policy and international political strategy more broadly. As stereotypes of the external world constitutes the prevailing view in a political system, changing them becomes politically difficult. Demagogues manipulating simplistic symbolic representations of the international environment will tend to have a domestic political competitive advantage. Nationalistic communities and nation states, e.g., Russia, China and the US, are more prone to perceive external challenges and to stereotype them. They demonstrate a greater relative vulnerability to generate a a prevailing view converging on a stereotypical image of other actors/targets in the external environment. Nationalism associates with stereotyping and the affect that associates with it (Cottam and Cottam, 2001).

A political observer who does not stereotype will have a complex image of the foreign policy making process within the target actor. Perceiving political complexity is necessary to formulate effective political strategies. These strategies are more likely to dynamically influence perceptual, attitudinal and value trends among relevant foreign policy constituencies within the target polity. Table 9 shows the policy making relevant perceived qualities of the polity target that a policy initiator avoiding stereotyping displays. This policy maker perceiving complexity portrays this complex image of the target in political interlocution with policy making cohorts. The complex image portrays the target as having a politically complex foreign policy making process, including Putin's Russia.

Table 9: A Policy Initiator Rejecting Stereotypical Imagery Perceives Political Complexity within the Policy Making Process of the Policy Target. This Initiator More Likely Articulates Policy Recommendations on the Bases of the Following Assumptions Relevant for Foreign Policy Political Strategy

1)	Motivation of the target:	1) describes rather than judges the motivation as evil or good 2) sees of number of component interests (motivations) and coming up with a policy that satisfies all of them is very difficult
2)	Decisional locus of the target:	The leadership provides some coordination for a large number of competing, functional organizations.
3)	Decisional style of the target:	Incremental, with decision makers immersed in details.
4)	Capability of the target:	Sees capability in terms of a full range of objective factors, implicitly paralleling Hans J. Morgenthau's list of national power components (1988).
5)	Prevailing view within the initiator polity towards internal political dissenters/opposition regarding the portrayal of the target as complex:	Disagreements are inevitable, but those who advance a stereotypical view are demagogues seeking political power.

Source: Quoted from DeDominicis, 2021, 77 Stereotype imagery of policy targets leads to greater likelihood for loss of control over conflict dynamics. Stereotypes are perceptual pattern simplifications that are dysfunctional in terms of planning political strategic policy towards a target because they overlook political influence capacities. Stereotyping of the target as degenerate risks significantly overestimating the initiator/perceiver state's relative power capability. Hitlerian Germany's prevailing view that achieving global domination lie within its policy option range with the Nazi leadership providing the necessary will and determination is a stark example. Other cases derivative of conflict spirals include the Putin administration's initial overestimation of its ability to impose its political will on Kiev and American overestimation of its capacities in Vietnam and Afghanistan.

In sum, an observer having a complex image of a target will see the following key elements. The perceived motivation of the target will be perceived as a complex mix of motivations, and reconciling them is difficult. The perceived decisional locus of target will highlight a large number of functional organizations with coordination and some policy leadership from above. The perceived decisional style of target will be perceived as incremental and decision makers will be aware at best only partially of major systemic policy patterns. The perceived capability of the target will involve the perception of a full range of capability factors which implicitly parallels Morgenthau's list (1988). A political actor perceiving complexity will tend to view those compatriots who disagree with this complex portrayal of the target as due to inevitable, but individuals advancing a near-stereotypical view of the target will be suspected of demagoguery.

Derivative stereotypes of weaker powers emerge in this world political context of intense great power conflict. A political paradox emerges.Nationalistic appeals are useful for a leader to mobilize community resources for creating foreign policy instruments for influence expansion, but they associate with stereotyping. The leader's decisional latitude in terms of the range of foreign policy options available to the state leader is usually more narrow. During an international crisis, a nation state polity is more prone to perceive an intense external challenge (threat or opportunity). Nationalistic communities demonstrate greater decisional latitude for the decision making elite to devote polity resources to expand international influence. They show a greater political ability to mobilize a greater proportion of the community's resources, to adopt policies to meet the perceived intense threat/opportunity. Concomitantly, the national state leadership has less decision latitude for withdrawal and toleration of perceived national humiliation while domestically surviving politically (Cottam and Cottam, 2001).

Making nationalistic values more salient by these normative active appeals raises the likelihood of misperception through stereotyping. Collective emotional affect intensifies along with nationalistic mobilization of the public to address an external challenge, i.e., threat or opportunity. These emotions include hate, fear, rage, disgust, contempt, joy, envy, and others. Nationalistic leaders of nation states are more prone to overestimate their state's relative power capabilities. *New York Times* editorialist Maureen Dowd (2022, para. 23) quotes one observer of authoritarian populists: "One of the great truths of history is that the great deceivers also deceive themselves." Table 10 shows the contours of the 1938 international political system, i.e., the essential nature of the political relationships among the great powers. Such states have comparative potential power bases that place them in first and second rank in power capability. They can, if they choose, determine their own foreign policy aims rather than consistently defer to the foreign policy aims of other more powerful allies and adversaries as do lesser powers, by definition. The intensity and direction of perceived challenge from the external political environment within the prevailing view within each state determines its commitment of its power resources. These resources are diverted from domestic consumption allocation to create diplomatic bargaining instruments, e.g., military instruments and foreign aid (Cottam, 1977, Cottam and Gallucci, 1978). In 1938, the prevailing view in London and Paris mistakenly assumed that the ultimate source of German belligerency derived from Berlin perceiving threat. Prevailing views in London and Paris held a tragically flawed understanding of their international political environment.

Table 10: The International Political System at the Time of the Munich Agreement In 1938

State Actor	Power Potential Base	Intensity of Perceived Challenge	Direction of Perceived Challenge
US	1	4	Threat
UK	1	3	Threat
France	1	2	Threat
Germany	1	1	Opportunity
Italy	2	1	Opportunity
USSR	1	3	Threat
China	2	1	Threat
Japan	2	1	Opportunity

Source: DeDominicis, 2022, adapted from Cottam, 1977 The prevailing view in London in 1938 was that German belligerency derived from perception of existential threat by Berlin from the external environment. London's foreign policy adopted the appeasement strategy with the aim of thereby transforming Germany into a status quo power. In reality Hitlerian Germany's belligerency was due to perception of surrounding political degeneracy. It pointed to a marvelous opportunity if Germany and its allies had the will and determination to seize it. Appeasement (see table 2) disastrously (mis)confirmed the prevailing view of degeneracy (see table 4) portraying London and Paris' willingness to compromise as confirmatory evidence. Hitler was a main advocate of this worldview; appeasement strengthened his position further within the German polity, making war more likely, not less.

During the Cold War, a critical issue was whether the Soviet Union was belligerent because its leadership saw a great opportunity or a dangerous threat from the external environment. Table 11 describes an international spiral conflict, i.e., a conflict based on mutual misperception of threat.

Table 11: During the Latter Stage of the Cold War (as Postulated by the Author)

State Actor	Power Potential Base	Intensity of Perceived Challenge	Direction of Perceived Challenge
US	1	4	Threat
USSR	1	3	Threat
European Community	1	5	Threat
India	2	5	Threat
China	2	1	Threat
Japan	2	9	Threat

Source: DeDominicis, 2022, adapted from Cottam, 1977 This portrayal of the international system characterizes the Cold War as a conflict spiral. A lesson learned from the debacle of interwar appeasement was that appeasing a militantly imperialist power would intensify its aggressiveness by appearing to confirm the aggressor's perception of political degeneracy and opportunity. The prevailing view by the late 1940s emerged in Washington was that USSR was basically a Russian version of Nazi Germany. An effective global containment strategy was therefore necessary to prevent Moscow from the expansionist imperial glory it allegedly needed to maintain its harshly coercive regime domestically. The enemy stereotype (Table 7) of the USSR contributed to the general failure to predict the peaceful fall of the Berlin Wall and the disintegration of the USSR itself (DeDominicis, 2014).

Variations in the satisfaction of nationalist values can explain the difference in levels of violence in the breakup of the Soviet Union in comparison to Yugoslavia. Differences in Serb and Russian nationalism-centered issues explain why Yugoslavia degenerated into war in the 1990s while the USSR did not.

DATA AND METHODOLOGY

This analysis is predominantly a deductive analysis highlighting the application of image theory for analyzing the Yugoslav and Ukraine crises since the end of the Cold War. It relies upon the public record given its focus on international system developments since the early twentieth century. It utilizes triangulation with recent selected scholarly literature in accordance with this deductive approach. It thereby engages in process tracing for explaining the current European-centered conflicts in the international system.

RESULTS AND DISCUSSION

Yugoslavia's Disintegration

The Socialist Federal Republic of Yugoslavia, like the USSR, was a multinational state in which one group, in this case the Serbs, was numerically dominant. It was foremost in the military officer corps (Cottam and Cottam, 2001). The 1974 Constitution reflected Tito's long-term aim to prevent the Serbs from becoming politically predominant. It gave Kosovo and Vojvodina more power and autonomy; both provinces had their own assembly as well as representation in the Serb assembly, and they also had seats on the rotating presidency. In this way, Serbian ethnic and national community political influence was less, and other republics received reassurance that Serbia would be unable to control the federal government. Pressures began to mount for change in the constitution as economic conditions continued to deteriorate and nationalism grew in the republics. Also at this time, political and economic horse-trading came to focus on the constitution. In exchange for concessions on economic reforms in 1986, for example, Slovenia gave up its turn to the Yugoslav Presidency to Bosnia (Cottam et al., 2015, referencing Woodward, 1995).

The political situation of Serbs within the Yugoslavian national state became increasingly galling to Serbian nationalists. This constitutional arrangement deprived Serbian nationalists of what they viewed as their natural, complete power base within the Yugoslavian state (Stojanović, 2021). They viewed the Vojvodina and Kosovo autonomous regions within the Serbian republic as constituting part of their natural power base. This constitutional arrangement, in their view, also deprived them of Kosovo, which was a central symbol of Serbian nationalism. They regarded Kosovo as the cradle of Serbian civilization. The small portion of the population of Kosovo as Serb, the rest being Albanian, contributed to the conflict because of the symbolic importance of Kosovo and the claim that Serbs were being expelled (Mehmeti, 2021).

Ultimately, under the leadership of Slobodan Milosevic, the Communist Party co-opted these Serbian nationalists which had mobilized. Milosevic appealed to Serb nationalism to defeat party rivals with less of an inclination toward radical nationalism. Milosevic constructed a complex political coalition (Musić, 2019). He first defeated the liberal wing of the party. Then, he used the party machine to from a broad coalition of Serbs which the common bond of Serbian nationalism united (Silber and Little, 1997). Workers from all strata, as well as urban and rural levels, as along with communists and anti-communists and Serbian members of the military and police constituted his coalition. The movement emerged as "a hybridization of Serbian nationalism and Leninist socialism under the umbrella of anti-bureaucratic populism" (Grdesic, 2016, 775). In the federal government, Milosevic managed to gain de facto control of the votes of Kosovo, Vojvodina, and the republic of Montenegro. The upsurge of Serbian nationalism in general followed the pattern an observer should expect from a nationalistic people in this context. In sum, they believe that they, in comparison with other groups, have suffered from mistreatment and deprivation of natural rights. Also necessary is the prevailing belief that they have the capability for autonomous statehood (Cottam and

Cottam, 2001). The differences in the number of casualties and the extent of destruction quantifies the difference between the departures of Slovenia and Croatia. In a brief conflict with few deaths, the Yugoslav army attempted to prevent Slovenia from leaving the federation. An agreement between the Serbian and Slovenian leadership to stop the hostilities and, in fact, permit Slovenia to secede produced the end of the hostilities (Silber and Little, 1997). This agreement announced the end of Yugoslavia as a federation. It also announced the end of the Yugoslavian army as the military force of that federation. Hereafter, it was now the Serbian army. The Serbian leadership would use it in a much more destructive war to prevent Croatia in 1991 from seceding with a large Serbian population. "[A]fter mass desertions of the nonSerbs – the JNA [the Yugoslav federal army] had become basically Serb-dominated and this enabled Milosevic to pose as its real leader instead of the federal authorities" [*sic*] (Oproiu, 2011,149).

Cottam and Cottam (2001) note that several perceptual factors caused the difference in these wars. Firstly, unlike the Croats and Serbs, the Slovenes and Serbs did not have a history of ethnic genocidal conflict. Serb historical memory of relations with Croatia evoked the Serbian sense that they must protect their own national kindred from potential annihilation. In their view, they supported annexation of the territory which the Serb nation deserved, and which oppressors had denied for so long (Kataria, 2015). Secondly, meanwhile, the pattern which the Croats followed anticipated the pattern which this framework would expect when a people hold the barbarian image of their opponent (Cottam and Cottam, 2001). Croatian President Tudjman's advisers pushed him to declare war on the Yugoslavian army and leave the federation as well after Slovenia successfully seceded. Yet Tudjman continued to place his hope in alliances along with international recognition as the means to provide him with the leverage which he would need to avoid war. He did not want to take on the Yugoslavian army (Silber and Little, 1997).

Thirdly, Cottam and Cottam (2001) argue the degenerate image of Croatia and its international supporters appeared to be the prism through which Serbian leaders perceived them. The Serbian leadership perceived the Croats themselves as relatively similar to the Serbs in terms of cultural sophistication and also in terms of capability. This image prevailed when the Yugoslavian army was truly the army of the Yugoslavian state. By 1991, the Serbs held a degenerate image of the Croats as a lens through which to perceive their behavior because the Serban leadership collectively saw, firstly, opportunity. The authorities aimed to unite Serbs in a territory complementary to the nation. Milosevic's policies succeeded in transforming the Yugoslav federal army with its large military resources into the de facto Serbian army. The Croatian authorities' hesitation to confront this army reinforced this image. The Croatian leadership sought international support, and the devastation wrought in Krajina helped provoke this international intervention (Hislope, 1996). The Croatian authorities reciprocated with the barbarian stereotype prism towards the Serbs: a threatener superior in capability and inferior in culture. With the provoked barbarian capable of genocidal cruelty, the defender must attract the intervention of external allies (Cottam and Cottam, 2001). The Croats together with the international community in the opening phase of the war appeared unwilling and unable to act decisively against the Serbs while attempting to negotiate a cease-fire.

Finally, Cottam and Cottam (2001) argue that the Serbs saw the opportunity to enhance the nation's grandeur. They would achieve what the Great Powers and the Communists had historically and, in their view, unjustly denied them. International denial of a Serb nation attaining territorial unification was a source of old Serb grievances. Serbs believed that territorial unification was a great power promise which the great powers did not keep (Pavkovic, 2002). The rhetorical explanation by which the Serbs justified their actions to themselves was their necessity to protect Serbian lives. It derived from the powerful imagery of their ugly history of genocidal conflict. In sum, whether Tudjman wanted it or not, war was on, in an effort to redefine the borders of Croatia and Serbia (Cottam and Cottam, 2001).

Cottam and Cottam (2001) conclude that the postwar difficulties inherent in transforming national identity are evident from the civil wars of the 1990s in the former Yugoslavia and in the Soviet Union. Strategies relying on coercion to destroy national identity only work temporarily. Not threatening national identities

while offering an additional common identity, as in Yugoslavia, is the other extreme. It apparently needs generations of time and prosperity, in order to succeed. Charismatic or at least legitimate leadership and symbols may be necessity for the success of such a strategy, or at least it will benefit greatly from it. In short, people must want to live together, if not as a nation, then as a state (Cottam and Cottam, 2001). The analysis of multinational states has an additional example of vulnerability to international intervention in Yugoslavia. Recognition of the independence of Croatia and Slovenia was one form of the important role which other countries played in the breakup of Yugoslavia (Coughlan, 2016). Germany's early recognition was particularly important because it could only heighten Serb recollections of and sensitivities to the alliance between Croatian fascist Ustashe and Hitler's Germany (Raju, 1997).

Post-Soviet Russia

Cottam and Cottam (2001) argue that the situation for the Russians was different. In the USSR, the Russians had a republic in which the overwhelming majority of Russians resided. A Serbian complaint was that the Communist authorities had denied only them a territory roughly complementary to the nation as one of the constituent nations within the sovereign state. In addition, Russia had been an empire with boundaries that fluctuated under the Czars. Consequently, at the periphery of the Russian nation, where exactly Russia stopped was unclear even for Russians (Martinez, 2013). If broad agreement on a territorial boundary had existed, and the secession of republics of USSR was violating that boundary, then the likelihood of violent resistance would have been significant, but no violence occurred. By the early 1990s, 25 million ethnic Russians now lived outside Russia in the Soviet successor states. This fact would become an issue in future Russian foreign policy. The view of radical Russian nationalists where Russia ends is different. Some have desired a return to an empire which Russia controls. What they perceive to be the maintenance of the territorial integrity of the nation's land has clearly become an issue which they press in the Russian foreign policy process (Cottam and Cottam, 2001). The fact that in neither the SFRY nor the USSR case did full-scale war occur to preserve the multinational state is the central point. Full-scale war did occur to achieve nationalist aims which multinational authoritarian state control strategies had thwarted. As Yugoslavia disintegrated, the case of Serbia demonstrated this pattern. The reality of Russian identity became clear when the USSR began to disintegrate even though political actors often considered Russia and the USSR coterminous. Russia was not coterminous with the USSR. Russia itself, under Yeltsin's leadership, left the Soviet Union in June 1990 (Cottam and Cottam, 2001).

Putin's ruling coalition includes also Russia workers from urban and rural levels together with members of the security, police and military services. Capital concentrations focused on post-Soviet nouveau riche factions supportive of the post-Soviet security clique (Galeotti, 2021). Moscow's ruling coalition shares the common bond of Russian irredentist nationalism particularly towards the Slavic republics. While previously balancing conflicting pragmatic and revisionist pressures, Putin increasing gravitated towards the more militant wing of Greater Russia advocacy on the eve of the Ukraine invasion (Troianovski, 2022).

Post-Soviet Ukraine

Ukraine more closely corresponds with the Weberian ideal-typical category of being a multi-ethnic, Ukrainian core community state (Cottam and Cottam, 2001). The core group committed to sovereignty of the state are Ukrainian primary terminal self-identifiers, i.e., Ukrainian nationalists. They apparently had been the modal component of the 44 million Soviet-era population. The community identity profile complexity in post-Soviet Ukraine implies that the mobilization base among the population is weaker than, for example, in the neighboring Polish nation state. Politically significant components of the Slavic population historically were attracted to neighboring Russia. The intensity of this attraction varied.

In the more than 30 years since the dissolution of the Soviet Union, the influence of the Ukrainian nationalist constituency has been politically disproportionately influential. Parliamentary election support of avowedly

nationalist parties has been quite small. The Ukrainian case illustrates the disproportionate influence of nationalists in part because of comparatively intense self-mobilization capacity. Prior to 2022, the overall, collective strength of Ukrainian nationalism appears not to have been sufficient to undertake far-reaching economic reforms, unlike in neighboring Poland. "In Ukraine, unlike Poland and Czechoslovakia (but also unlike Russia), there had been no attempt at real reform after the fall of communism" (Mikloš, 2021, 52). The first post-Communist government's commitment to reforming Poland included the adoption of the so-called economic shock therapy approach in the Balcerowicz plan. US economists, particularly Jeffrey Sachs, played a high-profile role in advising a government committed and capable to implement far-reaching economic reform (Matynia, 2019). The post-Soviet Ukrainian authorities, in contrast, have been comparatively slow in implementing economic reforms that would rupture trade networks inherited from the Soviet era. Ukrainian nationalists would seek to maintain the territorial resources that the Soviet legacy had bequeathed to them. One of the political functions of Soviet-era republic boundary creation was to undercut the propensity towards nationalism among the peoples of the old Russian empire. Persuading core nationalist constituencies among these peoples that the Soviet Union was not a neo-colonial de facto Russian core culture state was one critical aim. It would prove to be an insurmountable challenge.

Tactical policies included allocating territories with significant Russophile populations to the respective territories of republics neighboring the Russian republic. This ultimately unsuccessful aim to ameliorate minority national group vulnerabilities towards perceiving neo-colonial Russian designs extended of course into other areas as well. The Russian republic, for example, was not permitted to have its own formal republican Communist party structure or its own republic KGB as did the other republics until the rise of Yeltsin (Cottam and Cottam, 2001). Russian nationalists in the later Soviet period came to view the Soviet state has unjustly repressive of Russian political national representation. They displayed this view of the state as parallel to Serb nationalist perceptions of the Yugoslav state.

Despite these long-term Soviet and Yugoslav de facto nation building strategies, these two multinational states disintegrated concomitantly with their democratization. Their dissolution indicated that Soviet and Yugoslav territorial identity failed to supersede ethnic national identity. The Soviet legacy of ethnic, sectarian, territorial identity complexity in the post-Soviet era included a strong Russophile component in Ukraine. The attraction of Ukraine nationalists towards integration with so-called Euro-Atlantic structures for their own nation state building project has been strong. Moscow's 2014 and 2022 interventions aimed functionally to obstruct this high-level strategic goal of Ukrainian nationalism. The 2014 intervention removed a substantial component of the Russophile population from the Ukrainian polity. It thereby functionally strengthened the influence of Ukrainian nationalism in the remaining territory. This strengthening generated a Russian nationalist response in Moscow, culminating in the Russian 2022 full-scale intervention. Moscow has been condemning the functional, inevitable disproportionate influence of Ukrainian nationalism in the post-Soviet Ukrainian state. Ukrainian nationalism has been sufficiently strong to limit the policy option range of the Zelenskyy government. The latter had been unable to implement the Minsk Accords for reintegrating Donetsk and Luhansk in a confederal Ukrainian system. Moves to do so generated demonstrations that threaten the government's stability. "On 1 October 2019, President Zelensky announced that Ukraine was agreeing to the "Steinmeier formula" as a means of kick-starting the peace process. According to this plan, proposed in 2016 by then–Foreign Minister Frank-Walter Steinmeier of Germany, Ukraine would hold OSCE-supervised elections in the separatist "republics" [in the Donbass] and grant them "special status" after the vote. Zelensky's announcement was met in Ukraine with harsh criticism and accusations of capitulation" (Shevtsova, 2020, 145-146). The Yanukovych administration utilized deadly force to suppress these actors but failed to do so. These pro-Euro-Atlantic forces had the open support of US and EU representatives (Cohen, 2014, Snider, 2022). Putin's verbal characterizations of the Ukrainian government under the control of neo-Nazis apparently equates Ukrainian nationalism as antithetical to Russian identity (Tipaldou and Casula, 2019).

Russian Foreign Policy Motivation Under Putin

In the 30 years subsequent to the collapse of the USSR, a push towards integration of component elements of the old Soviet Union into US-led North Atlantic international institutions emerged (Menon and Ruger, 2020). Moscow's prevailing view had presumed that the former Soviet territories were part of what Moscow recently has labelled as the so-called Russian World, i.e., its sphere of influence in the "near abroad" (Harned, 2022, 4). The attraction of integration of those former Soviet components towards the North Atlantic institutions threatens Russian national security as well as Russian national identity values. Table 12 shows the author's inference regarding the motivational formula source of Russian foreign policy towards Ukraine in February 2022. The importance of understanding the ultimate sources of a foreign policy target's belligerency in international relations is critical as events subsequent to the 1938 Munich conference illustrate. The framework in this paper highlights the importance of explicating and testing the assumptions regarding the motivations for a target's belligerency in strategically formulating a response. It is a necessary component for an effective conflict resolution strategy. The construction of tests within foreign policy is needed to check the validity of these inferences. The author's inference of the motivation formula for Russian foreign policy behavior towards Ukraine and the so-called West produces a foreign policy motivation similar to that in Table 2. It appears similar to that perceived foreign policy motivation formula that was the foundation of the ill-fated appeasement strategy towards 1938 Germany. The author infers that Russian foreign policy aims support political strategic goals that are as of this writing much more limited than those of 1938 Hitlerian Germany. Whereas the latter aspired to world domination, 2022 Putin's Russia aspires to contain further expansion of US hegemony into the former Soviet Union's Slavic heartland. In the prevailing Russian February 2022 worldview, the more indirect forms of American expansion in the postwar nuclear setting include so-called Europeanization. The February 2022 Russian foreign policy motivation formula was the following:

Table 12: The Author's Inferred Understanding of Russia's Foreign Policy Motivation in February 2022

70%	A)	National dignity National unity-irredentism
20%	B)	Personal power -- internal Bureaucratic vested interests Survival of the regime
10%	C)	Defense Economic vested interests

Source: DeDominicis, 2022, adapted from Cottam, 1977; Cottam, 1994; Cottam and Cottam, 2001 Interwar appeasement aimed to pacify Hitlerian Germany on the basis of the mistaken inference Berlin's foreign policy motivation formula. Thereby Germany would presumably transform into a status quo power rather than risk the horrendous costs of a repeat of the Great War. Appeasement failed because the inferred motivation for Germany belligerency was fundamentally flawed. A portrayal of Russian foreign policy motivation more in accordance with appeasement's assumptions is more plausible; the entire GDP of Russia is equivalent to that of Italy. A détente strategy aims to eliminate the misperceptual basis of a conflict spiral while avoiding encouragement of misperceptual tendencies to view compromises as demonstrating lack of capacity to mobilize to resist expansion, while US post 1989 expansion is global.

The Putin regime's harnessing and selective co-optation of the oligarchs reflects the downgrading of economic vested interests as a foreign policy driver. The question of whether to accommodate Moscow's irredentist demands is also a relative power capability issue. As a result of negative and positive economic pressure incentives Moscow placed on Ukraine, Yanukovych in 2013 declined to sign a trade association agreement with the EU (BBC, 2014a, Houiex, 2022). Yanukovych attempted to placate his eastern supporters centered in the Donbas. Moscow violently intervened in Ukraine in 2014 after US Deputy Secretary of State Victoria Nuland, US Senator John McCain and EU representative Catherine Ashton publicly accompanied and encouraged the protests. The violent police response to them intensified polarizations that led to the flight of Ukrainian president Victor Yanukovych (DW, 2013, BBC, 2014a, Guardian, 2013, Waterfield, 2014). Western actors functionally assume that those eastern constituencies are threats to Western interests. The perceptual basis of the Ukraine crisis in February 2022 included a perceived threat from the North Atlantic community. The prevailing view in Moscow perceived the EU as

an imperial danger, with superior cultural development in the twenty-first century. Moscow's self-perceived power capacity equivalencies lie in its trade commodities along with itsmilitary and security instruments. Supplying and supporting these security and force instruments requires maintenance of a technological capacity comparable to any other state actor. Among prevailing Russian polity worldviews, these force instruments hold critical symbolic representational status for Russian nationalism. They are the core institutions of the post-Communist Russian nation state. The Russian communist party does not have a comparable status. The Russian Orthodox Church has gained symbolic representational status through its elevation by the post-Communist Russian state leadership. It is a dependent actor in the Russian polity, i.e., it is not a threat to Putin. The Serbian Orthodox Church was comparably more skeptical of Slobodan Milosevic, favoring rather the Bosnian Serb leadership (Mojzes, 1998).

Moscow's prevailing view of the cultural superiority of the West outside of control and force technologies results in social creativity that emphasizes traditional values. It manifests itself in creating alternative, parallel structures, e.g., the Eurasian Economic Union and the Collective Security Treaty Organization (Larson, 2020). By creating and promoting de facto alternative civilizational claims with these institutional representations, Moscow and Beijing respond to the perceived challenge of the West (Owen, 2020). Moscow's twenty-first century foreign policy behavior increasingly appears to parallel patterns that Soviet Moscow displayed. Comparison with the West, while manifesting perceived threat imperial threat from the West, leads to social competition and social creativity.

Unlike the Serbian Federated Socialist Republic in Tito's Yugoslavia, the Russian Social Federated Republic was not permitted to create its own republic-level Communist Party. Pan-Yugoslav Serbian nationalist self-identification with the Serbian republic was more feasible to develop around this ruling party republic institutional structure. Russian internal Soviet diaspora populations in the Ukrainian republic were incentivized to self-identify with the Soviet state. Recognition that ultimate power laid in the party and police structures contrasted with the absence of a Russian republic-level Communist party and secret police entities. De facto Russification of the Soviet state developed. Higher language education policy and de facto Slavic predominance in the components of the coercive apparatus reflected this Russian core community de facto function. It encouraged compensatory internal Russophone diaspora self-identification with the Soviet state (Yapıcı, 2022). The disintegration of the USSR left external Russophone diaspora identity in comparatively fluid condition. European Union integration encouraged state building around the republic borders inherited from the Soviet era. Russophone elements within Ukraine faced inducements to self-identify with the titular nation exercising the core community function of the post-Soviet non-nation state. The rise of Putin and the so-called men of the forces in Russia encouraged the rise of Russian nationalism around the core bureaucratic components inherited from the Soviet-era control system (Kanet, 2021). These constituencies were more prone to equate Russian ethnic identity with Soviet-era institutional representations, specifically the coercive instrument bureaucracies. European integration is a threat to traditional Russian self-identification with Kiev insofar as it encourages post-Soviet fluid Russian identity to integrate with Ukraine. As the current violence continues and intensifies, a greater likelihood emerges of interethnic polarization between Ukrainian and Russian self-identifiers within Ukraine. Forced population separation and movements become more likely.

To redirect these trends prior to 2022, integration of Belarus, Ukraine and Russia with a focus on constitutional restructuring of Ukraine would have been necessary. In this scenario, the Minsk Accords would have been implemented, and Ukraine would have recognized the loss of Crimea. The Ukrainian government should have permitted dual citizenship to permit Ukrainian-Russian participation in both Ukrainian and Russian elections. Precedents elsewhere are extensive, including in Bulgaria and Turkey regarding the Bulgarian Turkish diaspora in Turkey (DeDominicis, 2011). They vote in both Bulgarian and Turkish elections. The refusal of Kiev to permit dual citizenship indicates that the prevailing view prior to 2022 did see a threat from pan-Russian irredentism. It assumed that pan-Russian minorities will respond positively to these irredentist appeals from Moscow. European integration is about liberal nation state

building in Europe, functionally propagating liberal nation state integration of European states. It attracts Ukrainian Russophones, and Russian nationalists see Russian national self-identity as under threat.

The crippling of the Russian economy and the decimation of the Russian middle class would likely increase the intensity of Russian nationalism. The authorities will functionally rely on the latter to compensate for the decline in constituencies' utilitarian economic prosperity provision due to the war and international sanctions (Cottam and Gallucci, 1978). Authoritarian populism will increasingly characterize the regime further with the EU portrayed as a threat to traditional Russian values. The Russian Orthodox Church is articulating this narrative of archetypes and stereotypes of self, versus other (Horowitz, 2022). In this scenario, Russian public opinion will increasingly transfer their aspirations to the international influence expansion achievements of the Russian state. It will parallel political value trends in 1930s Germany. If not annexation of the Baltic states, the likelihood increases of foreign policy aims focusing on partition and annexation of territory of other post-Soviet states. Journalistic reports as of June 2022 describe "Russia" as "gripped by increasingly aggressive nationalism" (Bigg et al., 2022, para. 25).

A critical differentiator between Moscow and Belgrade in terms of their irredentist foreign policy behavior is their self-perceived relative capability regarding the international system. The prevailing view in Moscow is that it perceives itself as a great power, i.e., a state with a sufficient comparative power potential base to establish its foreign policy aims autonomously. Great powers perceive themselves as having a policy option range set by their own capabilities and their willingness to expend them. Their policy options are not ultimately determined by the regional foreign policy aims of more powerful external actors. Belgrade's prevailing view functionally assumed that the Western great powers lacked the incentive to view the Yugoslav crisis as worthy of significant resource expenditures. To intervene effectively would require political controversy and resource commitments. Serbia, as a nationalistic polity, was prone to stereotyping of the external environment's actors to achieve its objectives.

Belgrade miscalculated. the West eventually came to view Belgrade's coercive policies towards the other former Yugoslav republics as a source of challenge (Gonzalez, 2017). Public criticism of the perceived post-Cold War inefficacy and relevance of NATO as violence escalated in the Balkans generated an American nationalist response (Cottam and Cottam, 2001). The Cold War containment instruments, a consumer of vast governmental budget allocations since the late 1940s, portrayed themselves as agents of international peace. In this ultimately self-serving worldview, this peace came via benign American hegemony which these institutions administered (Jones, 2016). The US domestic political threat to these vested interests stemmed from the Balkan wars' instigation of debate over the continued relevance of these vested interests from the containment era. 1990s US-led Western military intervention in the Balkans utilizing ideological human rights justifications of national self-determination generated skeptical responses from Russian academics at the time (Utkin, 2000).

Serbia had the greatest proportion of its national population becoming minorities in sovereign states dominated by historical adversaries. Belgrade's contribution to systemic violations of humanitarian law from the ensuing chaotic violence was arguably the greatest, but it was not the only party guilty of nationalist irredentism. Serbia's historically allied with Moscow while Germany-oriented Croatia and Slovenia could more effectively appeal to NATO vested interests. The US declared Serbia the guilty party predominantly responsible for the violence while the EU sought initially to keep a neutral position and attempted to enforce an arms embargo (Jovic, 2006). NATO then expanded its role and influence into so-called peacemaking operations, going beyond its original mission of containing the Soviet Union. The vast US national security establishment that developed during the Cold War now found a new mission in the post-Cold War international environment. A critical component of this mission was the expansion of US-led NATO influence into eastern Europe. The prevailing view in Yeltsin's Moscow lacked the perceived power capability and the intensity of perceived threat to contain and prevent NATO expansion. Elements within the Russian security establishment did perceive such a threat. Russian peacekeeping units

spontaneously rushed from Bosnia to the Prishtina airport in Kosovo at the conclusion of the US-led bombing campaign (Hughes, 2013). This action was evidence of such a view among certain Moscow constituencies. The prevailing worldview in Moscow shifted its direction with the rise and dominance of Putin and the so-called siloviki, i.e., the forces personnel. They became the dominant constituency in the Russian regime, eclipsing and subduing the heretofore autonomous business oligarchs.

For the siloviki, maintenance of their control is significantly dependent upon their primary drive to redraw the inherited Soviet legacy borders to encompass Russian minorities and territory. They share that motivation with the Yugoslav state coercive control instruments as Milosevic progressively Serbianized them during the opening phase of the Yugoslav wars. The Putin administration relies on these Soviet-legacy vested bureaucratic interests throughout the former Soviet Union to be the constituency foundation for Russian irredentism. These vested interests include economic as well as bureaucratic control instruments. Europeanization of Ukraine threatens these vested economic and bureaucratic instruments by reorienting them towards the North Atlantic community. The business oligarchs will more likely swing in their allegiance in reaction to perceived profit-making opportunities in addition to applied coercion. The bureaucratic control vested interests are the foundational constituency of this regime. They functionally aim to harness the business elite. This control becomes more vulnerable if these network periphery areas as in Ukraine come under North Atlantic hegemony. Belarusian President Alexander Lukashenko relies on these similar post-Soviet bureaucratic control instruments to remain in power. The relatively stronger influence of Ukrainian nationalism centered in the western regions is more influential in Kiev. Belarusian identity is more a creation of the Soviet era, making these vested coercive control apparatus instruments the dominant political constituency for his regime (Shraibman, 2018). Ukrainian president Victor Yanukovych "gained considerable power regarding the selection and dismissal of judges in 2010." Before the start of the war, Zelenskyy moved to increase the power of the executive over the legislature (Minakov, 2021, 96).

A PATH FORWARD

As of June 2022, news reports imply that as the evolving crisis continues, Moscow may acquiesce to the partition of Ukraine with the unoccupied nationalist core joining the European Union. In return, Moscow would presumably seek reintegration into global trade and commerce flows. Putin continued to castigate the EU for its submission to serving Washington's influence expansion strategy. He made a distinction between Moscow accepting that Ukraine can join the EU as "the sovereign decision of any country," while continuing to reject Ukraine's integration into NATO (Troianovski, Kramer and Levenson, 2022). An increasingly probably outcome is the violent partition of post-Soviet Ukraine as forced population movements amidst war crimes and violence continues. Formulation of frameworks for ceasefire agreements might focus on possible historical strategic models. They include the various, pre-1995 Dayton plans for the constitutional reconstruction of Bosnia and Herzegovina. They would require a partnership between the EU, NATO and Russia along with the UN Security Council (China). Restructuring of the Ukrainian constitution would appeal to those vested economic and bureaucratic interests in Russia that would like to maintain their post-Soviet networks. They would also have additional opportunities to integrate with Western-based business networks. It would also appeal to national dignity demands of Moscow by providing equality partnership status with Brussels in managing the de facto international protectorate over Ukraine. De facto partition occurred in Bosnia and Herzegovina after the US refused to support the UN-EU/Vance-Owen plan in the United Nations Security Council (Burg and Shoup, 1999). The US chose instead to place most of the blame and responsibility on the Serbs for the violence there (Hartwell, 2019). As a result, the violence continued to escalate to genocidal levels. Bosnia and Herzegovina continues as a legal entity, but the willingness of the Croats, Bosniaks and Serbs to cooperate remains weak, and Bosnia is slowly unravelling, according to the International Crisis Group (2014). The EU increased its peacekeeping troop deployments to Bosnia on the eve of the Russian 2022 invasion of Ukraine (Rettman and Zalan, 2022). EU strategy continues to emphasize political stabilization within internationally

recognized borders rather than accommodating nationalism to proactively restructure sovereignty boundaries (DeDominicis, 2018b).

Russia has vastly more diplomatic bargaining leverage towards the US and the EU than Serbia did or does. Ukrainian nationalists would likely oppose this restructuring with its de facto loss of sovereignty. Their political influence over the US and EU is limited. As the violence escalates along with its consequent fear and hatred, the conflict will increasingly become in effect zero sum. It will lead to maximalist solutions of population expulsion and de facto partition that in the world witnessed in Bosnia and Kosovo. Large numbers of Ukrainians have extensive family and economic interests extending throughout much of Russia as well as Ukraine so they would lose much due to ethnic cleansing and de facto partition. They are a political constituency foundation for a ceasefire agreement and subsequent peace settlement. Conflict dynamics may escalate out of control so that compromise becomes increasingly politically difficult every day that the war continues as more people flee and more people die. Militant Ukrainian nationalists do not want to forsake the vast resources that the Soviet-era republic boundaries gave to their state. Those Soviet-era drawn boundaries, as with the 1940s-era drawn boundaries in Yugoslavia, were drawn by the Communist authorities for a number of political aims. They included reducing the perceived political power and influence of the respective largest national groups in those 2 federations: the Russians and the Serbs.

Presently, powerful countries have condemned Russia's act and imposed sanctions and supplied weapons to Kyiv, but their ultimate political aim is unclear. Direct conflict with Moscow is to be avoided at all costs. A determination of their effectiveness requires a conceptualization of the desired future that the EU and the US seek to actualize. The sanctions can then more readily be evaluated as to their effectiveness. Apparently, a functional aim of the Biden administration for the outcome of this crisis to include the removal of Putin in Moscow. Milosevic was ousted in Serbia, but Serbia is vastly weaker than Russia.

Escalation Potential to Direct Great Power Conflict

Comparable historical analogies are more likely are the outbreak of the First World War. Russia, like Austria-Hungary, is seeking to be seen as a first-rate global power and wants its influence over the former Soviet republics (if not the Baltic states) confirmed. The prevailing view in Moscow seeks derivative opportunity to restore its global status by illustrating its dominance over a Ukraine it views and degenerate and weak. Moscow may have underestimated the overall prevailing intensity of Ukrainian nationalism. Nationalists typically, whether American or Russian or Ukrainian, tend to stereotype their foreign policy targets and overestimate their relative power capabilities.

Russian-China Alliance

China could play a mediating role through the UN. Effective Mediators utilize their power leverage while pursuing their own national interests to bring the contestants to the view that their conflict has evolved into a "hurting stalemate" (Zartman and Touval, 2007, 445). In sum, the respective prevailing view evolve among all contestants to infer that their respective interests will suffer more damage by continuing the conflict than by reaching a peace settlement. China might mediate but it will want something in return for this mediation from the US and the EU. China would likely demand US concessions on China's irredentist claims regarding Taiwan. Washington may not want China to mediate given emerging dominant threats that perceive China as a threatening, imperialist challenger that in the long term is more problematic than Russia. Shifting prevailing views in Moscow towards favoring a ceasefire requires shaping the prevailing view in Moscow. This prevailing view focuses on the ultimate perceived foreign policy motivations towards Moscow of the other great powers. Should Moscow's prevailing view include achieving maximal, achievable objectives in Ukraine as necessary to sustain the Moscow regime, then the war will likely continue. This analysis suggested that the Ukraine conflict ultimately derives from a conflict spiral focused on Washington and Moscow as a critical factor. The intensity of perceived threat from Washington

correlates with this predisposition to stereotype the Ukraine war as a life-or-death struggle for Russia. The comparative historical analogies with the lead up to the First World War include Germany allowing Austria much autonomy in its foreign policy by solidifying its alliance with Vienna. Russia, in the role of Austria, may view itself as having this Chinese support because China has few friends in the US-led containment approach to China in Asia and the world. Russia plays a useful role for China as leverage towards Washington. Concomitantly, the escalating conflict between Washington and Beijing can increasingly reduce the salience of this lever for Washington to restrain US containment moves towards Beijing. It can reinforce US containment efforts towards Beijing as the prevailing view in Washington shifts towards a Cold War-type bifurcation of international relations into two opposing camps.

These two competing alliances are headed by Washington and Beijing, respectively. By way of historical analogy, Austria in 1914 functionally obtained isolated Berlin's underwriting of Vienna's policy towards the western Balkans. In its strategy towards Ukraine, Moscow may be constructing its strategy assuming an immutable close alliance with China. A plausible conflict spiral escalation development for the Ukraine crisis involves scenarios over Western recognition of Taiwan. Washington's increasingly intense perception of challenge may lead to the inference that Moscow would not prosecute its extended attack on Ukraine without Chinese support. This inference may reinforce attitudinal trends to contain China through recognizing Taiwan. This horizontal scenario is in addition to accidental vertical escalation through military mishaps in the nuclear setting. Serbian nationalists' assassinating the Austrian archduke in 1914 aimed directly at the nature of the target state and its regime, a multinational, increasingly unstable empire. A prevailing view may be increasingly evident in Washington that Communist China enables post-Soviet Moscow's violent imperialism. Officially recognizing the sovereignty of liberal democratic Taiwan, Washington's Cold War ally, would increasingly likely be perceived as vital. It would be viewed as part of a containment policy that strikes at the ultimate enabler of imperialist totalitarian great power violence.

De-escalation scenarios may focus on the EU and the UN, i.e., Russia, US and China, overseeing the implementation of the new constitutional institution-building process in post-Soviet Ukraine. Upon reaching a ceasefire agreement, peacekeeping forces from the EU, the OSCE, and the UN would be deployed, which would of course include Russian and US military personnel. In this scenario, Ukraine would be neutral, i.e., it would never join NATO and the EU. Functionally, the EU and Russia would enter into a de facto partnership to oversee the governance of a Ukraine not fully sovereign. For this proposal to succeed it needs to be implemented before genocidal attacks to expel forcibly mass populations become essentially irreversible. It needs to be implemented immediately, and its feasibility already is questionable. Otherwise, zero-sum conflict dynamics will predominate. The increasingly likely functional political outcome will be de facto partition along with forced, massive population expulsions. This outcome is what occurred in Bosnia and Herzegovina after the international community proved unable to intervene to restructure the constitution of disintegrating Socialist Yugoslavia. The US placed most of the blame and responsibility on Belgrade for the violence. The violence continued to escalate to genocidal levels. Bosnia and Herzegovina continues today to be a legal entity. The willingness of the Croats, Bosniaks and Serbs to cooperate is functionally stalemated, and the 1995 Dayton Accords are slowly "unravelling," according to the International Crisis Group (2022, para. 4).

CONCLUDING COMMENTS

The goal of this paper is to explicate and outline in systematic, comparable form the assumptions underpinning Russian and Western foreign policy strategy regarding Ukraine in February 2022. This analysis proposes that the primary sources of Russian belligerency lie ultimately in perceived stereotyped threat to Russian national unification and self-determination from Washington and its allies. Comparisons are made with the impact of Serbian nationalist irredentism in the violent disintegration of post-Cold War Yugoslavia. This comparison illustrates the critical salience of irredentist nationalism as a state-level communal foreign policy motivation. It challenges international political systemic functional preferences

for stabilization of Communist-era legacy interstate borders of newly sovereign states. This paper compares the Serbian post-Tito and German interwar irredentism with Post-Soviet Russia. Its framework highlights critical differences for constructing an effective strategic conflict resolution strategy regarding Ukraine in 2022. Moscow perceived a derivative opportunity to contain the so-called threatening West in Ukraine. Moscow self-servingly stereotyped the latter lesser power as degenerate as reflected in its Kyiv's vulnerability to the attractions of the West.

The limitations of the paper lie in accommodating the fluidity within the political dynamics among constituencies in the Russian polity since the invasion in February 2022. In sum, the paper does not provide an analysis of the correlation of political forces within Russian policy making circles. It does imply that an overemphasis on the individual will of Vladimir Putin is itself a manifestation of stereotyping of Russia as a diabolical enemy. Directions for future research include the praxis potential for differentiating Brussels from Washington within the prevailing view in Moscow. As of July 2022, news reports imply that as the evolving crisis continues, Moscow may acquiesce to the partition of Ukraine with the unoccupied nationalist core joining the European Union. In return, Moscow would presumably seek reintegration into global trade and commerce flows centered on Europe. Moscow has publicly affirmed its commitment to Eurasia as its alternative to economic integration with the North Atlantic integration. Power imbalances between Russia and China incentivize Russia maintaining and developing its diplomatic bargaining leverage with the North Atlantic community over the long term.

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A COMPREHENSIVE RETIREMENT FINANCIAL PLANNING TOOL

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ABSTRACT

Financial planning makes up an essential element of any retirement plan. Assuring availability of sufficient resources to meet uncertain future needs requires careful planning. Advisors supply assorted tools and advice to assist in this process. This paper presents a comprehensive planning tool to aid potential retirees in developing their financial plan. The tool evaluates the financial picture of individuals annually throughout their retirement years. The analysis goal is accommodating a long retirement, with income that increases at the rate of inflation, achieved by using all assets available and without exhausting the portfolio. The tool provides a starting point for users to responsibly assess their financial future in retirement.

JEL: C60, D10, G17, M41, M50

KEYWORDS: Financial Modelling, Retirement Planning, Personal Financial Planning

INTRODUCTION

Potential retirees must assess many issues in evaluating their post-employment life. Assuring a secure financial life in retirement ranks among the most critical of these issues. Failure to plan properly can lead to an inadequate quality of life and relying on others to support you. Responsible planning affords the retiree financial security and peace of mind throughout a long retirement period.

Potential retirees have access to many available personal financial planning tools. These tools commonly focus on small areas of an individual's financial future. Social Security planning tools do not directly consider other elements of an individual's portfolio. Similarly, optimal Individual Retirement Account (IRA) withdrawal plans do not directly consider potential sales of real estate. Combining various individual plans together to achieve an overall financial picture represents a daunting task for individuals and families. This paper provides a comprehensive financial planning tool that aids individuals in developing appropriate retirement plans. The plan here combines multiple elements of financial planning to present a comprehensive lifetime picture. Users can adjust elements of the plan to accommodate their specific circumstances. The template accommodates stress testing to evaluate the impact of unanticipated circumstances on the overall financial picture. The tool creates a single overall measure to evaluate the plan's strength.

This work complements earlier works that develop tools for forecasting business financial statements requiring users to enter only managerial determined values. The tools automate all other calculations (Jalbert 2020a, 2020b, 2020c, 2019 and 2017). The output is completed pro-forma financial statements for five years along with extensive financial analysis. Similarly, the analysis here requires individuals to enter selected personal financial information. The program then calculates the financial position of the retiree each year until death.

The tool represents a starting place for retirement planning. Modifying certain parameters in the spreadsheet could produce unintended and erroneous results. For this reason, users should only use this spreadsheet in

consultation with a licensed and qualified professional financial advisor who can fully evaluate the results and advise them on such matters.

This document and associated files represent an academic project intended for general scientific purposes. The authors of this paper and creators of the associated files are not licensed to provide financial advice. The materials here are not intended, and should not be taken, as financial advice to any person. The authors do not warrant the accuracy of information in the paper or the suitability of the information here for any purpose. The template provides a starting place for evaluating retirement choices and may require modifications. While care was used in developing the tool, issues may remain that could lead to incorrect or misleading results. Moreover, some circumstances might cause the tool to function erroneously. Individuals should seek independent professional financial advice from a properly credentialed advisor. Readers should not rely on information in this paper or spreadsheet for financial or other decisions.

The authors encourage users to begin working with the tool independently. Doing so can help them in accumulating necessary information and identifying issues for their consideration to assist the professional financial planner. Preparing this document in advance offers the possibility of reduced financial planning fees and provides the user a better understanding of their own finances. The user should present the completed template to their financial advisor for review and modifications.

The rest of the paper is organized as follows. The next section contains a literature review. The following section shows the model and displays the spreadsheet in tables. The paper closes with concluding comments and suggestions for future research.

LITERATURE REVIEW

Kumar, Shukla and Sharma (2019) identify and rank barriers to retirement planning. They note various barriers including financial literacy, financial dependency, goal clarity, marital status, number of dependents, gender and income level. The research presented here helps resolve goal clarity and financial literacy concerns by creating a model that allows users to adjust their goals to reflect the reality of their financial situation. The tools here also simplify user inputs and automatically performs many calculations, reducing the need for extensive financial literacy in successful financial planning.

Some studies address the extent that individuals use financial planning tools. Hentzen, Hoffmann and Dolan (2021) surveyed 440 Australian pension fund members. Results show that consumers' financial self-efficacy, perceived financial security, future consequence consideration, retirement planning involvement and perceived usefulness directly or indirectly effect their planned engagement with a mobile retirement app. As one would expect, the intent to adopt was stronger for those closer to retirement.

Murphy and Yetmar (2010) surveyed 206 MBA students on personal financial planning attitudes. Most respondents felt that financial planning represents an important endeavor. Further, most were interested in developing a financial plan. However, few felt they had the ability and knowledge to create financial plans. Results showed that only thirteen percent of those surveyed had prepared a comprehensive financial plan.

The benefit of having a financial advisor is well established. Kinniry, Jaconetti, DiJoseph, Walker and Quinn (2022) of Vanguard, estimate that a financial advisor adds about a three percent net annual return. Marsden, Zick & Mayer (2021) examine the value of financial advice around the 2008 market decline. They examine data from a U.S. university with over 10,000 employees and a sample size of more than 3,100 respondents. Their results show that seeking financial advice reflects a function of financial attitudes and knowledge and socio-economic characteristics. Their results further show that collaborating with financial advisors result in several positive activities including goal setting, calculation of retirement needs, investment diversification and accumulation of emergency funds.

Another line of literature examines demographic factors that determine whether an individual uses a professional retirement planner. Kimiyaghalam, Safari and Mansori (2016) supply a review of this literature. Research generally finds that individuals with higher income more frequently seek out financial planners (Joo and Grable, 2001) while individuals with lower income are less likely to seek out financial planners (Miller and Montalto, 2001). Research shows a positive relationship between education and seeking financial planners (Elmerick, Montalto and Fox (2002). Waliszewski and Warchlewska (2021) show that men and those in the 26-35 age group most often use budget management applications. In contrast, Chang (2005) finds a higher propensity to seek financial help by female heads of household than married couples. She further finds that Black families seek help more often than White families. Letkiewicz, Robinson, Domain and Uberceva (2015) find that individuals facing financial stress are more likely to seek financial help.

A recent phenomenon in financial planning involves automated financial advice. Zhang, Pentina and Fan (2021) examine consumer preferences for robot versus human financial advisors. Their results show that consumers prefer humans with an elevated level of expertise over a robot advisor. However, they find no preference differences between a novice human advisor and a robot advisor. Abraham, Schmukler, and Tessada (2019) find that automated advisors or robo-advisors have become increasingly popular as an easily accessible, low-cost alternative to human advisors. They note it is important for clients to understand the limitations of these services in order to achieve their goals. They also highlight the need for proper regulation and supervision by policymakers. Bruggen, Post, and Schmitz (2019) find that online retirement planning tools that require more interaction lead to a higher level of customer interest and involvement in monitoring the progress of their retirement plans. Their results indicate that men preferred the highest level of interactivity while women preferred a medium level. Dorman, Mulholland, Bi, and Evensky (2019) tested a set of 41 online retirement tools that are available to the public for free or a modest fee. They find the majority of these tools to be inaccurate and therefore dangerous to trust when planning for retirement. They attribute the poor performance of inefficient tools to opaque wage replacement rate variables, a lack of customization, and the inclusion of fewer input variables. The model presented in this paper includes a wide range of adjustable parameters and flexible assumptions.

Despite the benefits of having a financial advisor, the literature notes individual resistance to using a financial advisor. Chang 2005 finds that most people prefer not to use a financial advisor. Others note that people prefer to address the issues personally or with advice from friends because of trust and cost issues (Grable, Cantrell and Maddux, 2004). Hesitancy to use financial advisors emphasizes the importance of freely available tools that aid individuals with their financial planning like the one presented in this paper.

THE MODEL

The model presented here provides a comprehensive financial planning tool. It incorporates considerations not commonly found in financial planning templates. Specifically, this tool accommodates a pension that increases by a fixed dollar amount each year, rather than a fixed percentage amount. This fixed dollar amount increase makes the pension susceptible to inflation risk. The template presented here offsets this loss of buying power with a growing annuity. The model also considers potential inheritance which supplies additional retirement income resources. The tool tracks rentals and sales prices of three real estate properties and incorporates them into the overall financial plan. Further, the template accommodates purchase and sale of a retirement item such as a boat or farm.

The model includes fifty-five adjustable parameters allowing users to adapt the spreadsheet to accommodate their needs, as shown in Table 1. Users can vary these parameters to stress test their retirement plans against unexpected contingencies. The spreadsheet includes eight worksheets. Worksheet 'M' includes the model parameters and primary calculations. Worksheet 'P' contains supporting pension calculations. Worksheet 'SS' provides supporting Social Security calculations. Worksheet 'R' produces

supporting property rental figures. Worksheet 'A' shows growing annuity calculations. Worksheets 'F' and 'S' show Federal and State tax computations, respectively. Worksheet 'O' supplies miscellaneous calculations. Cell references throughout the discussion show the worksheet name followed by the cell reference within the worksheet.

Table 1: Adjustable Parameters

Parameter	Terms	Place
Retirement Year	Year	M:C12
Life Expectancy Spouse 1	Age	M:C10
Inflation Rate	Annual Percentage	M:C4
Rate of Return Earned on Stock Market Investments	Annual Percentage	M:C5
Rate of Return Earned on Real Estate Investments	Annual Percentage	M:C6
Real Estate Transaction Fees	Percentage of Sales Price	M:C7
Starting Stock Portfolio Value	Current Dollars	M:C18
Desired First Year Draw from Stock Portfolio	Current Dollars	M:C20
Desired First Year Social Security Supplement Payment	Current Dollars	M:C28
Current Age Spouse 1 (S1)	Age	M:C26
Current Age Spouse 2 (S2)	Age	M:C27
Social Security Draw Age (S1)	Age	M:C23
Social Security Draw Age (S2)	Age	M:C24
Second Social Security Draw Age (S2)	Age	M:C25
Current Social Security Statement Amounts S1	Current Dollars	M:C32-C40
Current Social Security Statement Amounts S1	Current Dollars	M:D32-D40
Pension as a portion of final salary at Age 62	Decimal	M:C44
% Pension Increase Per Year of Work	Decimal	M:C45
Pension Red. For Dual Life	Decimal	M:C46
Ann Pens Inc. % First year	Decimal	M:C47
Salary Growth as a percent of Inflation	Annual Percent	M:C50
Salary Information	Future Dollars	M:C53, M:D53
Real Estate 1 (RE1) Current Value	Current Dollars	M:D68
Real Estate 1 (RE1) Sales Year	Year	M:F68
Real Estate 2 (RE2) Current Value	Current Dollars	M:D69
Real Estate 2 (RE2) Sales Year	Year	M:F69
Real Estate 3 (RE3) Current Value	Current Dollars	M:D70
Real Estate 3 (RE3) Sales Year	Year	M:F70
Inheritance 1 (I1) Current Value	Current Dollars	M:D71
Inheritance 1 (I1) Sales Year	Year	M:F71
Inheritance 1 (I1) Received Year	Year	M:C89
Retirement Purchase (RP) Current Value	Current Dollars	M:D72
Retirement Purchase (RP) Sales Year	Year	M:F72
Primary Residence Indicator	1 = Yes, 0 = No	M:C68-C72
Property Basis	Current Dollars	M:E68-E71
Real Estate 1 (RE1) Rental Price 1 and Through Year	Current Dollars	M:C78, M:D78
Real Estate 1 (RE1) Rental Price 2	Current Dollars	M:C79
Real Estate 2 (RE2) Rental Price 1 and Through Year	Current Dollars	M:C80, M:D80
Real Estate 2 (RE2) Rental Price 2	Current Dollars	M:C81
Real Estate 3 (RE3) Rental Price 1 and Through Year	Current Dollars	M:C82, M:D82
Real Estate 3 (RE3) Rental Price 2	Current Dollars	M:C83
Inheritance 1 (I1) Rental Price 1 and Through Year	Current Dollars	M:C84, M:D84
Inheritance 1 (I2) Rental Price 2	Current Dollars	M:C85
Retirement Purchase (RP) Rental Price 1 and Through Year	Current Dollars	M:C86, M:D86
Retirement Purchase (RP) Rental Price 2	Current Dollars	M:C87
Current Spending	Current Dollars	M:C92
Annual Total Spending in Retirement	Current Dollars	M:C93
Proposed Pending Pattern	Current Dollars	M:C97-C105
Current (Pre -Retirement) Annual Savings	Current Dollars	M:C123
Current Cash Balance	Current Dollars	M:C110
Proposed Cash Uses Pre-Retirement	Current Dollars	M:C111-C116
Desired Cash Level	Current Dollars	M:C119
Hawaii Exemptions	Number	M:C129
Tax Filing Status	Code 1-4	M:C136
Current Ordinary Tax Rate on IRA withdrawals	Percentage	M:C132

This table shows changeable model parameters. The first column shows the changeable parameter. The second column shows the units of entry for the parameter and the third column shows the location of the parameter in the spreadsheet. All references noted in Column 3 appear on Worksheet 'M' of the spreadsheet.

Table 1 shows adjustable variables included in the model. The first column shows the changeable parameter. The second column shows the units of entry for the parameter and the third column shows the location of the parameter in the spreadsheet. All references noted in Column 3 appear on Worksheet M of the spreadsheet.

The presentation continues with a model description and discussion of model parameters as shown in Tables 2-4. Users change bolded parameters to reflect their financial condition. The spreadsheet automatically incorporates changes to bolded items throughout the rest of the spreadsheet. Only advanced users should change unbolded items and should do so with the expectation of unexpected results and errors.

Table 2, contained in Worksheet M, shows assumptions and input variables. The model design reflects investors earning some rate of return beyond inflation. Users enter their estimate of inflation in cell M:C4. Next, users enter their expected stock market return and real estate investments return in cells M:C5 and M:C6, respectively. Users enter a percentage real estate transaction fee in sell M:C7.

Next, users enter the life expectancy for Spouse 1 (S1) in cell M:C11. The model assumes a Spouse 2 (S2) age of two years lower than Spouse 1. Advanced users might change this assumption, but changes may require programming changes throughout the model. Users enter the planned year of retirement and current year in cells M:C12 and M:C13, respectively. Retirement year indicates when the couple will stop working. This date may differ from the Social Security draw date.

Users enter the current value of their retirement portfolio in cell M:C18. As designed these portfolio balances exist in pre-tax accounts such as IRAs. As such, the model calculates taxes due on all withdrawals from the account. Cell M:C19 shows the portfolio beta goal. This figure, while not bolded may be changed by the user. However, the figure does not affect other calculations in the model. Users should evaluate their stock return assumptions to assure consistency with portfolio risk taken. Cell C20 indicates the first-year desired portfolio withdrawal amount. This figure adjusts via a growing annuity pattern in following years as discussed later in the paper.

The section titled Social Security requires users to input the initial draw date from Social Security. As noted earlier this date may differ from the retirement date noted in cell M:C12. Cells M:C23 and M:C24 show the Social Security draw ages for Spouse 1 and Spouse 2, respectively. The model accommodates a second state pension SS2 for Spouse 2. Such a scenario might exist for individuals who work and earn a pension in multiple countries. Cell M:C25 indicates the initial draw age for the second pension.

Cells M:C26 and M:C27 show the current age of each spouse. Only advanced users should change these figures as doing so may necessitate other template changes. Next, users enter the 1st year Social Security supplement payment. This amount supplements spendable funds in years between retirement and drawing Social Security. A segregated part of the investment portfolio funds these withdrawals.

In the area titled Current SS amounts, users enter annual Social Security retirement amounts, in the case of U.S. retirees, as shown on their Social Security statement. To access U.S. Social Security statement amounts, individuals create an account with the U.S. Social Security Administration at www.ssa.gov.

The model accommodates a pension for Spouse 1. Pension calculations equal a percentage of the workers highest three-year average salary. Cell M:C44 reports the percentage of earnings payable to the retiree in each retirement year if the employee retires at age 62. The spreadsheet design assumes an initial pension payment draw date equal to the retirement date. For delayed retirement beyond age 62, pension amounts increase. Cell M:C45 shows the annual percentage pension increase for each year of added work.

Some pensions offer joint survivor benefits. Joint survivor benefits continue pension payments through the death of both spouses. Obtaining this feature often requires a reduction in the initial pension. Cell M:C46 indicates the percentage reduction in the pension required to obtain the dual survivor feature. Users not needing, or desiring, dual survivor benefits should set the entry to '0'.

Table 2: Model Parameters and Assumptions

	A	B	C	D	E	F
1	ASSUMPTIONS					
2						
3	Market Returns and Inflation					
4	Inflation		0.05			
5	Earned on Stock Mat. Invest.		0.07			
6	Return on Real Estate Invest.		0.05			
7	Real Estate Transaction Fees		0.06			
8						
9	Life Expectancies			S1 Age	S2 Age	
10	Life Expectancy S1		92			
11	Life Expectancy S2		90			
12	Retirement Year		2023	62	59	
13	*Current Year		2022	61	58	
14	* Current Year must be less than or equal to retirement year					
15						
16	Investment Portfolio					
17						
18	Starting Portfolio Value		600,000			
19	Target Portolio Beta		0.5			
20	Desired 1st Year Draw ($2022)		18,000			
21						
22	Social Security					
23	S1 Draw Age		67	2028		
24	S2 SS1 Draw Age		65	2029		
25	S2 SS2 Draw Age		65	2029		
26	S1 Current Age		61			
27	S2 Current Age		59			
28	First Yr. SS Sup. Pmt ($2022)		20,000			
29						
30	*Curr. SS Stat. Amts.*					
31	Retirement Year	S1 Age	S1 SS	S2 SS	S2 SS2	
32	2023	62	20,000	15,000	1,000	
33	2024	63	21,600	16,200	1,050	
34	2025	64	23,328	17,496	1,103	
35	2026	65	25,194	18,895	1,158	
36	2027	66	27,209	20,407	1,216	
37	2028	67	29,385	22,040	1,276	
38	2029	68	31,736	23,803	1,340	
39	2030	69	34,275	25,707	1,407	
40	2031	70	37,015	27,763	1,477	
41						
42	Pension					
43						
44	Pension Age 62 Percent		0.44			
45	% Pens. Inc. Per Yr of Work		0.02			
46	Pens. Red. for Dual Life		0.15			
47	Ann Pens. Inc. %		0.03			

This table shows input variables and preliminary calculations for the model. Presented in Worksheet 'M'.

Table 3: Model Parameters and Assumptions (Continued)

	A	B	C	D	E	F	G	H	I	J	K
49	S1 Salary										
50	Growth as % of Intlation		0.75								
51											
52	Year		Age	Salary							
53	2021		60	80,000							
54	2022		61	83,000							
55	2023		62	86,113							
56	2024		63	89,342							
57	2025		64	92,692							
58	2026		65	96,168							
59	2027		66	99,774							
60	2028		67	103,516							
61	2029		68	107,398							
62	2030		69	111,425							
63	2031		70	115,604							
64											
65	Real Estate										
66											
67	Current Values		PR*	Value	Basis	Sale Yr.	S1 Age	S2 Age	Sale Price	Exclusion	Gain on Sale
68	Current RE1 Value		1	250,000	200,000	2060	99	96	1,500,587	500,000	800,587
69	Current RE2 Value		0	100,000	80,000	2045	84	81	288,723	0	208,723
70	Current RE3 Value		0	80,000	70,000	2051	90	87	309,533	0	239,533
71	Current I1 Value		0	50,000	50,000	2056	95	92	246,907	0	196,907
72	Current RP Value		0	20,000	20,000	2029	68	65	26,453	0	6,453
73											
74	* PR 1= Primary Residence, 0 = Not Primary Residence										
75											
76	Property Rentals in $2022		Annual								
77			Rental	Until Yr	S1 Age	S2 Age					
78	RE1 Rent 1		0	2060	99	96					
79	RE1 Rent 2		0								
80	RE 2 Rent 1		12,000	2030	69	66					
81	RE2 Rent 2		0								
82	RE3 Rent 1		0	2061	100	97					
83	RE3 Rent 2		0								
84	I1 Rent 1		3,000	2034	73	70					
85	I1 Rent 2		3,000								
86	RP Rent 1		0	2035	74	71					
87	RP Rent 2		0								
88											
89	Inheritance Year		2034		73	70					
90											
91	SPENDING ANALYSIS										
92	Current Spending Level		60,000								
93	Ret. Base Spend ($2022)		80,000	133.33%							
94	Init. Spend in Ret. Future $		84,000								
95											
96	Proposed Spending ($2022)										
97	Food		12,000	15.00%							
98	Housing		12,000	15.00%							
99	Entertainment		10,000	12.50%							
100	Medical		10,000	12.50%							
101	MSC		10,000	12.50%							
102	Give Away		3,000	3.75%							
103	Car		8,000	10.00%							
104	Travel		10,000	12.50%							
105	Long Term Care Insurance		5,000	6.25%							
106											
107	Total Spending		80,000								

This table shows input variables and preliminary calculations for the model. Presented in Worksheet 'M'.

The pension increases annually in retirement. The annual increase equals some percentage of the initial pension amount. In the example presented here the user adjustable percentage equals three. Suppose a worker receives an initial annual pension equaling $20,000. The annual pension increases equal $1,200 per year (20,000 X 0.03). The retiree receives a $1,200 annual increase each year for life. This feature exposes the retiree to inflation risk, especially problematic at higher levels of inflation. Retirees facing this situation must make other accommodations to address the decreasing purchasing power or decrease real spending throughout their life.

Table 3, contained in Worksheet M, continues the presentation of model parameters and assumptions. The first section of Table 3 shows salary inputs. Users enter their beginning, 2021 salary in Cell M:C53. The worksheet calculates salaries in following years based on the inflation rate.

Workers might expect salary increases above or below inflation. To accommodate this possibility users enter their expected annual salary adjustment as a percent of inflation in Cell M:D50. Advanced users, who wish to more specifically estimate future salaries, may override figures in cells M:D54-D63 to reflect their expectations.

The next worksheet section deals with real estate holdings. Users enter the current value of current and future real estate holdings in cells M:D68-D72. RE1, RE2 and RE3 represent standard properties owned by the retiree, including their primary residence. I1 indicates an inherited property, with Cell M:C89 indicating when the retiree expects to acquire the inheritance. RP1 represents a purchase for retirement purposes. This purchase occurs on the retirement date noted in cell M:C12. Users who do not have real estate holdings set these values to zero. Users enter property current tax bases in cells M:E68-E71. Primary residence properties receive special tax treatment. Entries in Cells M:C68-C72 inform the tool of the primary residence status of each property. An entry of 1 denotes a principal residence. An entry of 0 denotes a non-principle residence property. Users enter their tax basis for each property in cells M:D68-D71.

Retirees may rent a property to provide income during retirement. Cells M:C78-C87 indicate annual rental income proceeds from each property in current dollars. The model accommodates two rental periods with separate rental rates. For example, RE2 has annual rental income of $12,000 from the retirement year, adjusted for inflation, through 2030. Some retirees use a property for their personal needs for some years, followed by a rental period. In this case, enter 0 for the first rental period and the current dollar rent value in the second period. Enter the end of the first rental period in cells M:D78, M:D80, M:D82, M:D84 and M:D86.

Retirees commonly sell properties as they progress through their retirement years. For example a second home may become undesirable when retirees reach their 90's. Further, some retirees sell their home when they transition to an extended care facility. In other cases, retirees sell homes to extend their spending power. Cells M:F68 through M:F72 indicate the intended sale year for each property. The tool calculates property sales proceeds based on the current price and assumed return on real estate, entered in cell M:C6. Real estate transaction fees, noted in Cell M:C27 reduce the sales price. The spreadsheet calculates taxable gain on sales considering the sales price, property basis, real estate transaction fee and any applicable exclusions for primary residences.

Table 3 continues with an examination of spending. Users indicate their current annual spending level in cell M:C92. Retires spend more or less than this amount in retirement. Some individuals will spend more money in the newly available free time in retirement. New spending might include entertainment and travel expenses. Others spend less in retirement because lower income forces an adjustment in spending or because they no longer have work related expenses. Retirees indicate their planned total annual retirement

spending in cell M:C93 in current dollars. Cell M:C94 shows future spending in year 1 of retirement after accounting for inflation.

Cells M:C97-C105 allow the user to develop a planned retirement budget with expenses classified into categories. Users adjust these figures to reflect their own spending. Users enter their choices on spending by area to assure planned spending corresponds with the overall spending budget. While these figures do not factor into other calculations in the spreadsheet, they do provide an explicit statement about what expenses need to be covered by various sources of income.

Table 4, contained in Worksheet M, continues the presentation of model parameters and assumptions. The table begins with an analysis of operating cash. Users input their current operating cash level in cell M:C110. Enter projected annual savings, in current dollars, for the remaining pre-retirement years in cell M:C123. They also indicate the desired operating cash level in their retirement years in cell M:C115. Next, users enter planned cash purchases prior to retirement in cells M:C111–C116. These purchases might include new cars, house repairs or other items. With this information entered, the spreadsheet reports the amount of excess operating cash on hand or the operating cash deficit in cell M:C120. Users adjust their spending plans to reach the targeted amount of operating cash on the retirement date.

Table 4: Model Parameters and Assumptions (Continued)

	A	B	C	D	E	F	G
109	CASH ANALYSIS						
110	Current Cash		100,000				
111	**S1 Car Purchase**		**35,000**				
112	**S2 Car Purchase**		**35,000**				
113	**RE1 Repair**		**4,000**				
114	**RE 2 Prepair**		**3,000**				
115	**RE3 Repair**		**2,000**				
116	**Business Liabilities**		**1,000**				
117	Savings pre retirement		24,000				
118	Net Cash for Retirement		44,000				
119	Desired Cash Level		**40,000**				
120	Excess Cash		4,000				
121							
122	Savings						
123	Current Annual Savings		**24,000**				
124							
125	Tax Assumptions						
126	Hawaii Exemptions		**2**				
127	HI Standard Deduction		2,000				
128	HI Exemptions		1,444				
129	Current Ordinary Income Tax Rate Fed + S		**32%**		**Filing Status**		
130	HI CG Tax Rate		7.5%		Single = 1		
131	2022 Fed Standard Deduction		25,900		Married Filing Joint = 2		
132	Once in a Life time exclusion		500,000		Married Filing Separate = 3		
133	Filing Status		**2**		Head of Household = 4		
134							
135	Fund Balance Calculations						
136	Current Retirement Funds		600,000				
137	After Tax RP		26,400				
138	SS Fund		94,530				
139	Unused GA Funds		0				
140	Initial GA Fund		418,494				
141	Reserve Funds		60,575				
142	Starting Total Funds EX SS fund		505,470				
143	Starting Total Funds EX Ret. Purch.		573,600				

This table shows input variables and preliminary calculations for the model. Presented in Worksheet 'M'.

Reserve funds reported in Cell M:C141 represent money remaining in excess of funds necessary to pay for the retirement purchase, M:C136, provide the delayed Social Security offset fund, M:C137, and, fund the growing annuity, M:C139. The calculation includes excess growing annuity funds that occur as a result of delayed retirement. Reserve funds cover discrepancies that may occur between income and spending throughout the lifetime and functions as an emergency fund for unexpected occurrences. The rows labeled Starting Total Funds EX SS fund and Starting Total Funds EX RP represent intermediary computations to complete calculations that follow.

Next Table 4 requires tax assumption inputs. The program incorporates basic tax calculations. Advanced users can consider more detailed tax calculations. This template incorporates the U.S. Federal taxes and the Hawaii State tax system. Advanced users may modify the spreadsheet to reflect taxes associated with other states and localities. Users enter three tax parameters. State of Hawaii taxation utilizes exemptions. Enter the number of Hawaii exemptions in Cell M:C126. Enter the filing status in cell M:C133 (1 for single, 2 for married filing a joint return, 3 for married filing a separate return and 4 for head of household).

The presentation continues with the current ordinary income state and federal tax rate entered in cell M:C129. This rate relates to purchase of the retirement property noted in row 72. By assumption, IRA's hold all retirement funds. To obtain funds necessary to make the retirement purchase, retirees withdraw money from the IRA. The current ordinary income State and Federal tax rate, noted in cell M:C129 equals the rate of taxes retirees must pay on these withdrawals. The following discussion reflects calculations based on this rate.

The section titled Fund Balance Calculations provides some preliminary computations. Current retirement funds are taken from cell M:C18. As noted above the retirement purchase requires withdrawal from the pre-tax IRA. Cell M:C137 shows the sum of the purchase amount entered in cell M:D72 plus the tax due on withdrawal. Thus, a $20,000 purchase requires withdrawing 26,400 from the retirement fund. SS Fund indicates the special fund set aside to substitute for Social Security receipts in the years between retirement and the time Social Security is drawn. In the example presented here, the retiree sets aside $94,530 at the time of retirement to supplement income until the retiree claims Social Security.

The analysis here uses a growing annuity to supplement pension receipts that decline in value due to inflation. The growing annuity provides increasingly large payments to offset the loss in purchasing power thereby maintaining a constant real spending pattern. Cell M:C140 shows the amount of money required today, to achieve the payments throughout the live expectancy noted in cells M:C10 and M:C11.

Table 5, appearing in Worksheet M shows income calculations from the pension, Social Security and investments. Figures in Table 5 require no user input. Calculations reflect user entries in Tables 2-4. The presentation shows results for each year from retirement through age 111 for Spouse 1 and 109 for Spouse 2. Column M:P, M:Q and M:R shows the year, along with the age of each spouse. Column M:S shows a year counter to facilitate computations. Column M:T reflects pension income along with the annual raise in Column M:U. As noted earlier, annual pension raises equal a fixed dollar amount based on a percentage of the initial pension payment. Pension amounts reflect changes in work earnings amounts and changes in retirement year noted in cells M:D53-D63 and M:C12 respectively. Table 9, presented in Worksheet P, shows supporting pension calculations. Table 9 requires no user input. The table shows pension amounts that occur in each retirement year, for each possible retirement date. Pension calculations average the highest three years of earnings. Annual pension payments in the first retirement year equal a percentage of the highest three-year average salary. Gross pension, Column P:E equals the first-year annual pension amount without the spouse protection feature. Post Reduction equals the first-year annual pension with spouse protection.

Table 5: Income from Pension Social Security and Investment Income

	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD
1	AGE				INCOME										
2					PENSION			SOCIAL SECUTITY					INVESTMENTS		
3					Annual	Pension							Invest	Special	PV Special
4	Year	S1 Age	S2 Age	Year	Pension	Raise		S1 SS	S2 SS1	S2 SS2	Total SS		Withdrawal	Withdrawals	Withdrawal
5	2023	62	59	0	31,056	932		0	0	0	0		18,900	21,000	19,626
6	2024	63	60	1	31,988	932		0	0	0	0		19,845	22,050	19,259
7	2025	64	61	2	32,919	932		0	0	0	0		20,837	23,153	18,899
8	2026	65	62	3	33,851	932		0	0	0	0		21,879	24,310	18,546
9	2027	66	63	4	34,783	932		0	0	0	0		22,973	25,526	18,199
10	2028	67	64	5	35,714	932		39,379	0	0	39,379		24,122	0	0
11	2029	68	65	6	36,646	932		41,348	28,715	1,340	71,402		25,328	0	0
12	2030	69	66	7	37,578	932		43,415	30,150	1,407	74,973		26,594	0	0
13	2031	70	67	8	38,509	932		45,586	31,658	1,477	78,721		27,924		
14	2032	71	68	9	39,441	932		47,865	33,241	1,551	82,657		29,320		
15	2033	72	69	10	40,373	932		50,258	34,903	1,629	86,790		30,786		
16	2034	73	70	11	41,305	932		52,771	36,648	1,710	91,130		32,325		
17	2035	74	71	12	42,236	932		55,410	38,480	1,796	95,686		33,942		
18	2036	75	72	13	43,168	932		58,180	40,404	1,886	100,470		35,639		
19	2037	76	73	14	44,100	932		61,089	42,425	1,980	105,494		37,421		
20	2038	77	74	15	45,031	932		64,144	44,546	2,079	110,769		39,292		
21	2039	78	75	16	45,963	932		67,351	46,773	2,183	116,307		41,256		
22	2040	79	76	17	46,895	932		70,719	49,112	2,292	122,122		43,319		
23	2041	80	77	18	47,826	932		74,254	51,567	2,407	128,229		45,485		
24	2042	81	78	19	48,758	932		77,967	54,146	2,527	134,640		47,759		
25	2043	82	79	20	49,690	932		81,866	56,853	2,653	141,372		50,147		
26	2044	83	80	21	50,621	932		85,959	59,696	2,786	148,441		52,655		
27	2045	84	81	22	51,553	932		90,257	62,681	2,925	155,863		55,287		
28	2046	85	82	23	52,485	932		94,770	65,815	3,072	163,656		58,052		
29	2047	86	83	24	53,416	932		99,508	69,105	3,225	171,838		60,954		
30	2048	87	84	25	54,348	932		104,483	72,561	3,386	180,430		64,002		
31	2049	88	85	26	55,280	932		109,708	76,189	3,556	189,452		67,202		
32	2050	89	86	27	56,211	932		115,193	79,998	3,733	198,925		70,562		
33	2051	90	87	28	57,143	932		120,953	83,998	3,920	208,871		74,090		
34	2052	91	88	29	58,075	932		127,000	88,198	4,116	219,314		77,795		
35	2053	92	89	30	59,006	932		133,350	92,608	4,322	230,280		81,685		
36	2054	93	90	31	59,938	932		140,018	97,238	4,538	241,794		0		
37	2055	94	91	32	60,870	932		147,019	102,100	4,765	253,884		0		
38	2056	95	92	33	61,801	932		154,370	107,205	5,003	266,578		0		
39	2057	96	93	34	62,733	932		162,088	112,565	5,253	279,907		0		
40	2058	97	94	35	63,665	932		170,193	118,194	5,516	293,902		0		
41	2059	98	95	36	64,597	932		178,702	124,103	5,792	308,597		0		
42	2060	99	96	37	65,528	932		187,637	130,308	6,081	324,027		0		
43	2061	100	97	38	66,460	932		197,019	136,824	6,385	340,228		0		
44	2062	101	98	39	67,392	932		206,870	143,665	6,705	357,240		0		
45	2063	102	99	40	68,323	932		217,214	150,848	7,040	375,102		0		
46	2064	103	100	41	69,255	932		228,074	158,391	7,392	393,857		0		
47	2065	104	101	42	70,187	932		239,478	166,310	7,762	413,550		0		
48	2066	105	102	43	71,118	932		251,452	174,626	8,150	434,227		0		
49	2067	106	103	44	72,050	932		264,024	183,357	8,557	455,939		0		
50	2068	107	104	45	72,982	932		277,226	192,525	8,985	478,736		0		
51	2069	108	105	46	73,913	932		291,087	202,151	9,434	502,672		0		
52	2070	109	106	47	74,845	932		305,641	212,259	9,906	527,806		0		
53	2071	110	107	48	75,777	932		320,923	222,872	10,401	554,196		0		
54	2072	111	108	49	76,708			320,923	222,872	10,921	554,716		0		

This table shows income calculations for pension, Social Security, and investments. Column P shows the year, Column Q and R indicate the ages of Spouse 1 and Spouse 2, respectively. Column S is a year counter. Column T and U show the annual pension payment and annual pension increase for Spouse 1. Column W shows annual Social Security receipts for Spouse 1. Column X and Y show the annual Social Security receipts for Social Security accounts of Spouse 2. Column Z shows the joint Social Security receipts for the couple. Column AB shows withdrawals from the growing annuity element of the investment portfolio. Column AC shows special withdrawals to supplement Social Security receipts. Column AD shows the present value of special withdrawals. Presented in Worksheet 'M'.

Returning to Table 5, Social Security computations begin in Column M:W. S1 SS indicates the annual Social Security for Spouse 1. S2 SS1 reports the annual Social Security for Spouse 2. S2 SS2 shows the second Social Security type account for Spouse 2. Calculations automatically adjust to reflect changes in earnings amounts and Social Security draw years. Table 10, presented in Worksheet 'SS' shows supporting Social Security calculations. Table 10 requires no user input. U.S. Social Security earnings statements show payment amounts in current dollars. The analysis requires future values of these figures. Table 10 provides calculations of future dollar social security amounts calculated using the user entered inflation rate provided in Cell M:C4 of Table 2.

Table 10 shows annual Social Security receipts for each initial draw year from age 62 through 70. Users enter the Social Security draw date in Table 2 Cells M:C23 through M:C25. The worksheet selects the column of data corresponding to the user inputted Social Security retirement year. Table 10 shows results for Spouse 1 only. The spreadsheet includes similar figures for Spouse 2 social security accounts 1 and 2. The later figures do not appear here to conserve space.

Returning to Table 5, Columns M:AB through M:AC report investment account withdrawals. Column M:AB reports withdrawals from the growing annuity. These withdrawals begin in the retirement year and increase at a rate equaling inflation through the couple's life expectancy. Table 11, shown in Worksheet A, requiring no user input, shows the supporting calculations. Consider a growing annuity with desired first year payment of, PMT, payment growth rate of G, return on investment of I, and life of N. Then Equation 1 calculates the growing annuity present value, PVGA, for the example annuity with a desired first year payment of $18,900, a payment growth rate of 5 percent, a return on investments of 7 percent and a lifetime of 31 years:

$$PVGA = \frac{PMT}{I-G}\left[1 - \left(\frac{1+G}{1+I}\right)^N\right] \tag{1}$$

$$PVGA = \frac{18,900}{.07-.05}\left[1 - \left(\frac{1+.05}{1+.07}\right)^{31}\right] = 418,494.43$$

The result indicates that achieving a growing series of payments starting at $18,900 requires a beginning balance of $418,494.13. Table 11 shows growing annuity calculations along with an amortization table that depicts the account earnings, withdrawals and balances in each year. Table 11 requires no user input.

In the event of delayed retirement, some growing annuity payments are not expended. Unused sums add to the reserve fund for other retirement needs and appear in Table 4 Cell M:C139. Table 12, shown in Worksheet O indicates the amount of these additions. Table 12 requires no user input.

Special withdrawals from the retirement account replace Social Security receipts between the retirement year and initial Social Security draw year. Amounts of these withdrawals depend upon an initial desired withdrawal rate, inflation, retirement date and Social Security collection date. Returning to Table 5, Column M:AC reports withdrawal amounts. Column M:AD calculates the present value of these withdrawal amounts discounted at the return on investments. Table 12 shows an amortization table for special funds set aside to replace Social Security receipts. The combined present value of these withdrawals reduce pension funds available to establish the growing annuity.

Table 6, presented in Worksheet M, shows rental income earned on real properties and the sale of those properties. Table 6 requires no user input. Calculations reflect entries noted in Tables 2-4. Columns M:AF-AJ report income for the five classes of property. User entries in cells M:A76-C89 drive reported figures. Rents increase annually at the inflation rate. Table 13, shown in Worksheet R shows supporting calculations which do not require user inputs.

Table 6: Property Rental and Sales

	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
1												
2		RENTAL						PROP SALES				
3		RE 1	RE 2	RE 3	I1	RP		RE1	RE2	RE3	I1	RP
4	Year	Rental Inc.	Rental Inc	Rental Inc	Rental Inc	Rental Inc		Sale	Sale	Sale	Sale	Sale
5	2023	0	12,000	0	0	0		0	0	0	0	0
6	2024	0	12,600	0	0	0		0	0	0	0	0
7	2025	0	13,230	0	0	0		0	0	0	0	0
8	2026	0	13,892	0	0	0		0	0	0	0	0
9	2027	0	14,586	0	0	0		0	0	0	0	0
10	2028	0	15,315	0	0	0		0	0	0	0	0
11	2029	0	16,081	0	0	0		0	0	0	0	26,453
12	2030	0	0	0	0	0		0	0	0	0	0
13	2031	0	0	0	0	0		0	0	0	0	0
14	2032	0	0	0	0	0		0	0	0	0	0
15	2033	0	0	0	0	0		0	0	0	0	0
16	2034	0	0	0	5,131	0		0	0	0	0	0
17	2035	0	0	0	5,388	0		0	0	0	0	0
18	2036	0	0	0	5,657	0		0	0	0	0	0
19	2037	0	0	0	5,940	0		0	0	0	0	0
20	2038	0	0	0	6,237	0		0	0	0	0	0
21	2039	0	0	0	6,549	0		0	0	0	0	0
22	2040	0	0	0	6,876	0		0	0	0	0	0
23	2041	0	0	0	7,220	0		0	0	0	0	0
24	2042	0	0	0	7,581	0		0	0	0	0	0
25	2043	0	0	0	7,960	0		0	0	0	0	0
26	2044	0	0	0	8,358	0		0	0	0	0	0
27	2045	0	0	0	8,776	0		0	288,723	0	0	0
28	2046	0	0	0	9,215	0		0	0	0	0	0
29	2047	0	0	0	9,675	0		0	0	0	0	0
30	2048	0	0	0	10,159	0		0	0	0	0	0
31	2049	0	0	0	10,667	0		0	0	0	0	0
32	2050	0	0	0	11,200	0		0	0	0	0	0
33	2051	0	0	0	11,760	0		0	0	309,533	0	0
34	2052	0	0	0	12,348	0		0	0	0	0	0
35	2053	0	0	0	12,966	0		0	0	0	0	0
36	2054	0	0	0	13,614	0		0	0	0	0	0
37	2055	0	0	0	14,295	0		0	0	0	0	0
38	2056	0	0	0	0	0		0	0	0	246,907	0
39	2057	0	0	0	0	0		0	0	0	0	0
40	2058	0	0	0	0	0		0	0	0	0	0
41	2059	0	0	0	0	0		0	0	0	0	0
42	2060	0	0	0	0	0		1,500,587	0	0	0	0
43	2061	0	0	0	0	0		0	0	0	0	0
44	2062	0	0	0	0	0		0	0	0	0	0
45	2063	0	0	0	0	0		0	0	0	0	0
46	2064	0	0	0	0	0		0	0	0	0	0
47	2065	0	0	0	0	0		0	0	0	0	0
48	2066	0	0	0	0	0		0	0	0	0	0
49	2067	0	0	0	0	0		0	0	0	0	0
50	2068	0	0	0	0	0		0	0	0	0	0
51	2069	0	0	0	0	0		0	0	0	0	0
52	2070	0	0	0	0	0		0	0	0	0	0
53	2071	0	0	0	0	0		0	0	0	0	0
54	2072	0	0	0	0	0		0	0	0	0	0

This table shows real estate rental income and real estate sales prices. Sales prices equal the future value of current real estate values calculated using the user entered return on real estate investments, Cell M:C6. Sales prices are reduced by user entered real estate transaction fees, Cell M:C7. RE1-RE3 equal real estate properties 1-3 respectively. I1 indicates an inherited property. RP indicates a property bought for retirement use. Presented in Worksheet 'M'.

As noted earlier, retirees may sell real estate over time to supplement their income needs. Returning to Table 6, Columns M:AI-AP reflect these sales. Sales amounts equal the future value of the property, calculated with interest rate equal to the return on real estate property noted in cell M:C6. Real estate transaction fees input in cell M:C7 reduces sales receipts.

Table 7, presented in Worksheet M, reveals total income in Column M:AT. Columns M:AR and M:AS segregate income into ordinary and capital gain components, respectively. Column M:AV reports Federal taxes due and Column M:AW reports State taxes due. Column M:AX shows the total tax due. Net for spending, reported in Column M:AY, indicates after-tax funds available for spending in each year.

Tables 14-17 show supporting Federal tax calculations, as reported on Worksheet F. The spreadsheet provides corresponding computations for State of Hawaii taxes; however, to conserve space this manuscript excludes these calculations. Tables 14-17 require no user inputs.

Unknown future tax rates and taxable income ranges complicate tax calculations. To address these issues, the analysis here assumes rates remain unchanged, however, standard deductions and tax rate income ranges increase with inflation. These assumptions generally correspond to current tax policies.

A three-step process simplifies the tax calculations. Step 1: calculate the present value of future taxable income streams. Step 2: Calculate the tax due at current rates. Step 3: Calculate the future value of taxes due. Table 14 shows 2022 Federal tax rates. The worksheet shows tables for each filing status (Married Filing Separately and Head of Household tables not reported to conserve space). The spreadsheet selects the appropriate table based on user entries in Table 4: Cell M:C133. For future use, the template should be modified to reflect relevant tax rates.

Table 15 reports the gain on sale for each real estate property owned and totals these gains. The worksheet completes the calculations based on user entered figures in Table 3: Rows M:67-72. Tables 16 and 17 show further tax calculations. The analysis divides income into capital gains and ordinary income components. Calculations show taxes due on each income type separately then combines them to reach the total taxes due.

Table 7: Total Income, Tax and Net Funds for Spending Calculations

	AQ	AR	AS	AT	AU	AV	AW	AX	AY
1									
2		TOTAL INCOME				TAXES			
3		Gross	Gross	Gross					Net For
4	Year	Ord. Inc.	C.G. Inc.	Total Inc.		Fed Tax	State Tax	Total Tax	Spending
5	2023	82,956	0	82,956		7,554	1,561	9,115	73,841
6	2024	86,483	0	86,483		7,857	1,794	9,651	76,832
7	2025	90,139	0	90,139		8,170	2,054	10,224	79,915
8	2026	93,932	0	93,932		8,493	2,344	10,837	83,095
9	2027	97,868	0	97,868		8,826	2,669	11,496	86,372
10	2028	114,530	0	114,530		9,971	605	10,576	103,954
11	2029	149,458	26,453	175,911		10,172	1,229	11,401	164,510
12	2030	139,145	0	139,145		6,767	1,100	7,868	131,277
13	2031	145,155	0	145,155		6,897	1,299	8,197	136,958
14	2032	151,419	0	151,419		7,024	1,524	8,548	142,871
15	2033	157,949	0	157,949		7,146	1,775	8,921	149,028
16	2034	169,891	0	169,891		8,393	1,984	10,377	159,514
17	2035	177,252	0	177,252		8,563	2,294	10,857	166,394
18	2036	184,934	0	184,934		8,732	2,641	11,372	173,562
19	2037	192,954	0	192,954		8,899	3,152	12,050	180,904
20	2038	201,328	0	201,328		9,063	3,606	12,670	188,659
21	2039	210,075	0	210,075		9,226	4,113	13,339	196,736
22	2040	219,212	0	219,212		18,605	4,049	22,655	196,557
23	2041	228,760	0	228,760		19,366	4,636	24,002	204,758
24	2042	238,738	0	238,738		20,159	5,290	25,449	213,289
25	2043	249,169	0	249,169		20,987	6,033	27,020	222,149
26	2044	260,074	0	260,074		21,850	6,876	28,726	231,348
27	2045	271,479	288,723	560,202		22,750	23,471	46,221	513,981
28	2046	283,407	0	283,407		23,690	8,863	32,553	250,853
29	2047	295,885	0	295,885		24,671	10,066	34,738	261,147
30	2048	308,940	0	308,940		25,696	11,409	37,105	271,834
31	2049	322,601	0	322,601		26,767	12,904	39,671	282,930
32	2050	336,899	0	336,899		27,885	14,567	42,452	294,447
33	2051	351,865	309,533	661,398		29,054	34,381	63,435	597,963
34	2052	367,532	0	367,532		30,276	18,471	48,747	318,786
35	2053	383,937	0	383,937		31,553	20,754	52,307	331,630
36	2054	315,346	0	315,346		22,596	0	22,596	292,750
37	2055	329,048	0	329,048		23,478	0	23,478	305,570
38	2056	328,379	246,907	575,287		22,597	14,768	37,365	537,921
39	2057	342,640	0	342,640		23,468	0	23,468	319,172
40	2058	357,567	0	357,567		24,377	0	24,377	333,190
41	2059	373,194	0	373,194		25,326	0	25,326	347,868
42	2060	389,555	1,500,587	1,890,142		26,316	60,044	86,360	1,803,782
43	2061	406,688	0	406,688		27,351	0	27,351	379,338
44	2062	424,631	0	424,631		28,431	0	28,431	396,200
45	2063	443,425	0	443,425		29,560	0	29,560	413,865
46	2064	463,112	0	463,112		30,740	0	30,740	432,372
47	2065	483,736	0	483,736		31,973	0	31,973	451,763
48	2066	505,346	0	505,346		33,263	0	33,263	472,083
49	2067	527,989	0	527,989		34,611	0	34,611	493,378
50	2068	551,717	0	551,717		36,021	0	36,021	515,696
51	2069	576,586	0	576,586		37,496	0	37,496	539,090
52	2070	602,651	0	602,651		39,039	0	39,039	563,612
53	2071	629,973	0	629,973		40,654	0	40,654	589,319
54	2072	631,425	0	631,425		39,570	0	39,570	591,855

This table shows taxable ordinary, capital gains and total income. It also shows approximate tax calculations of Federal and State taxes. Tax calculations incorporate user entered filing status data in cell M:C133 and number of exemptions noted in cell M:C126. The final column indicates after-tax funds available for the retiree to spend. Presented in Worksheet 'M'.

Table 8, presented in Worksheet M, presents figures showing spending patterns and fund balances. Column M:BA shows actual spending of the couple. Actual spending figures reflect annual increases to support a constant inflation adjusted spending pattern throughout the retirement years. Users enter the current dollar, desired annual spending level in Cell M:C93 of Table 3. Table 3, Cell M:C94 and Table 8, cell M:BA5 show the inflation adjusted annual spending amount in the first year of retirement. Returning to Table 8, initial spending increases at the inflation rate throughout retirement as noted in Column BA entries. Column BB calculates differences in spending between actual spending noted in Column BA and funds available for spending reported in Column M:AY. The 2023 calculation shows that actual spending exceeds funds available for spending by $10,159. Money to accommodate the excess spending, noted in Column M:BB, comes from the reserve account noted Table 4, Cell M:C141. Pre-tax accounts hold the reserve funds, requiring tax payment on their withdrawal. Returning to Table 8, Column M:BS shows tax due on excess spending withdrawals, calculated at the relevant marginal tax rate.

The Fund Balance part of Table 8 shows funds held in various retirement accounts. Column M:BD shows funds withdrawn from all accounts in each year. Careful readers will note some negative figures in Column M:BD which indicate a surplus for the year. Surpluses generally occur upon sale of properties or when a major new income stream becomes available. Column M:BE shows total fund earnings for the year. Fund earnings occur based on the stock market investment return rate entered in Table 2, Cell M:C5. Returning to Table 8, Column M:BF indicates total year-end fund balances held in all accounts. The calculation incorporates previous year fund balances along with withdrawals and earnings on the account.

Columns M:BG, M:BH and M:BI indicate details of the Total Fund Balance. Columns M:BG, M:BH and M:BI indicate growing annuity, Social Security, and reserve fund balances respectively. Finally, Column BJ indicates the present value of all funds held. These present values allow users to visualize their future financial position in terms relatable to their current financial position.

Table 8: Spending and Fund Balances

	AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ
1											
2		SPENDING			FUND BALANCE						
3		Actial	Excess	Tax on Ex.	Total Fund	Total Fund	All Funds		SS Act.	Res Fnd	PV All
4	Year	Spending	Spending	Spending	Draws	Earnings	Balance	GA Bal.	Bal.	Balance	Funds Balance
5	2023	84,000	10,159	1,910	51,969	40,152	561,783	428,889	80,147	52,746	561,783
6	2024	88,200	11,368	2,137	55,401	39,325	545,707	439,066	63,708	42,933	519,721
7	2025	92,610	12,695	2,387	59,071	38,199	524,836	448,964	45,015	30,857	476,041
8	2026	97,241	14,146	2,659	62,994	36,738	498,580	458,512	23,856	16,212	430,692
9	2027	102,103	15,731	3,020	67,249	34,901	466,231	467,635	0	-1,404	383,569
10	2028	107,208	3,253	569	27,945	32,636	470,923	476,247	0	-5,325	368,980
11	2029	112,568	-51,942	0	-26,615	32,965	530,502	484,257	0	46,245	395,869
12	2030	118,196	-13,080	0	13,514	37,135	554,123	491,561	0	62,562	393,805
13	2031	124,106	-12,851	0	15,072	38,789	577,839	498,046	0	79,793	391,104
14	2032	130,312	-12,559	0	16,761	40,449	601,527	503,589	0	97,938	387,750
15	2033	136,827	-12,201	0	18,585	42,107	625,049	508,054	0	116,994	383,726
16	2034	143,669	-15,845	0	16,480	43,753	652,322	511,293	0	141,029	381,399
17	2035	150,852	-15,542	0	18,399	45,663	679,585	513,142	0	166,443	378,418
18	2036	158,395	-15,167	0	20,472	47,571	706,684	513,423	0	193,262	374,770
19	2037	166,314	-14,589	0	22,831	49,468	733,321	511,942	0	221,379	370,377
20	2038	174,630	-14,029	0	25,263	51,332	759,390	508,486	0	250,905	365,280
21	2039	183,361	-13,375	0	27,882	53,157	784,666	502,824	0	281,843	359,465
22	2040	192,530	-4,028	0	39,291	54,927	800,302	494,702	0	305,600	349,169
23	2041	202,156	-2,602	0	42,883	56,021	813,440	483,846	0	329,594	338,001
24	2042	212,264	-1,025	0	46,734	56,941	823,646	469,956	0	353,691	325,945
25	2043	222,877	728	140	51,015	57,655	830,287	452,705	0	377,581	312,926
26	2044	234,021	2,672	513	55,840	58,120	832,566	431,740	0	400,826	298,843
27	2045	245,722	-268,259	0	-212,972	58,280	1,103,818	406,675	0	697,144	377,340
28	2046	258,008	7,155	1,374	66,580	77,267	1,114,505	377,090	0	737,415	362,851
29	2047	270,908	9,761	1,913	72,629	78,015	1,119,892	342,532	0	777,360	347,242
30	2048	284,454	12,619	2,473	79,095	78,392	1,119,189	302,507	0	816,682	330,500
31	2049	298,677	15,746	3,086	86,035	78,343	1,111,498	256,480	0	855,017	312,598
32	2050	313,610	19,164	3,756	93,482	77,805	1,095,820	203,872	0	891,949	293,514
33	2051	329,291	-268,672	0	-194,582	76,707	1,367,110	144,052	0	1,223,057	348,741
34	2052	345,755	26,970	5,286	110,051	95,698	1,352,756	76,341	0	1,276,416	328,647
35	2053	363,043	31,413	6,157	119,255	94,693	1,328,195	0	0	1,328,195	307,314
36	2054	381,195	88,445	11,852	100,297	92,974	1,320,871	0	0	1,320,871	291,067
37	2055	400,255	94,685	12,688	107,373	92,461	1,305,960	0	0	1,305,960	274,077
38	2056	420,268	-117,654	0	-117,654	91,417	1,515,031	0	0	1,515,031	302,813
39	2057	441,281	122,109	16,363	138,472	106,052	1,482,611	0	0	1,482,611	282,222
40	2058	463,345	130,155	17,441	147,596	103,783	1,438,797	0	0	1,438,797	260,840
41	2059	486,513	138,644	18,578	157,223	100,716	1,382,290	0	0	1,382,290	238,663
42	2060	510,838	-1,292,944	0	-1,292,944	96,760	2,771,995	0	0	2,771,995	455,815
43	2061	536,380	157,042	21,044	178,086	194,040	2,787,948	0	0	2,787,948	436,608
44	2062	563,199	166,999	22,378	189,377	195,156	2,793,728	0	0	2,793,728	416,679
45	2063	591,359	177,494	23,784	201,278	195,561	2,788,010	0	0	2,788,010	396,025
46	2064	620,927	188,555	25,266	213,822	195,161	2,769,350	0	0	2,769,350	374,642
47	2065	651,973	200,210	26,828	227,038	193,854	2,736,166	0	0	2,736,166	352,527
48	2066	684,572	212,489	28,474	240,963	191,532	2,686,735	0	0	2,686,735	329,674
49	2067	718,801	225,423	30,207	255,630	188,071	2,619,176	0	0	2,619,176	306,080
50	2068	754,741	239,044	32,032	271,076	183,342	2,531,442	0	0	2,531,442	281,741
51	2069	792,478	253,388	33,954	287,342	177,201	2,421,301	0	0	2,421,301	256,650
52	2070	832,102	268,490	35,978	304,467	169,491	2,286,325	0	0	2,286,325	230,803
53	2071	873,707	284,387	38,108	322,495	160,043	2,123,873	0	0	2,123,873	204,194
54	2072	917,392	325,537	43,622	369,159	148,671	1,903,384	0	0	1,903,384	174,281

This table shows spending patterns and fund balances. GA indicates the growing annuity account balance. SS Act Bal. indicates retirement savings earmarked to replace income missed by delaying drawing Social Security until after retirement. Table entries require no user unput. Presented in Worksheet 'M'.

Table 9: Pension Income

	A	B	C	D	E	F	G	H	I	J	K
1	PENSION										
2											
3	Salary Gr. Rel. to Infl.		0.75								
4											
5	S1	S1	Pension	Pension	Gross	Post	Annual				
6	Age	Salary	Salary	Percent	Pension	Reduction	Raise				
7	60	80,000									
8	61	83,000									
9	62	86,113	83,038	0.44	36,537	31,056	932				
10	63	89,342	86,151	0.46	39,630	33,685	1,011				
11	64	92,692	89,382	0.48	42,903	36,468	1,094				
12	65	96,168	92,734	0.5	46,367	39,412	1,182				
13	66	99,774	96,211	0.52	50,030	42,525	1,276				
14	67	103,516	99,819	0.54	53,902	45,817	1,375				
15	68	107,398	103,563	0.56	57,995	49,296	1,479				
16	69	111,425	107,446	0.58	62,319	52,971	1,589				
17	70	115,604	111,475	0.6	66,885	56,852	1,706				
18											
19				Ret Year Ind		3					
20	Year	AGE	2023	2024	2025	2026	2027	2028	2029	2030	2031
21	2023	62	31,056	0	0	0	0	0	0	0	0
22	2024	63	31,988	33,685	0	0	0	0	0	0	0
23	2025	64	32,919	34,696	36,468	0	0	0	0	0	0
24	2026	65	33,851	35,706	37,562	39,412	0	0	0	0	0
25	2027	66	34,783	36,717	38,656	40,594	42,525	0	0	0	0
26	2028	67	35,714	37,727	39,750	41,777	43,801	45,817	0	0	0
27	2029	68	36,646	38,738	40,844	42,959	45,077	47,192	49,296	0	0
28	2030	69	37,578	39,749	41,938	44,141	46,353	48,566	50,775	52,971	0
29	2031	70	38,509	40,759	43,032	45,324	47,629	49,941	52,254	54,560	56,852
30	2032	71	39,441	41,770	44,126	46,506	48,904	51,315	53,732	56,149	58,558
31	2033	72	40,373	42,780	45,220	47,688	50,180	52,690	55,211	57,738	60,264
32	2034	73	41,305	43,791	46,314	48,871	51,456	54,064	56,690	59,327	61,969
33	2035	74	42,236	44,801	47,408	50,053	52,732	55,439	58,169	60,917	63,675
34	2036	75	43,168	45,812	48,502	51,235	54,007	56,813	59,648	62,506	65,380
35	2037	76	44,100	46,822	49,596	52,418	55,283	58,188	61,127	64,095	67,086
36	2038	77	45,031	47,833	50,690	53,600	56,559	59,562	62,606	65,684	68,791
37	2039	78	45,963	48,844	51,784	54,783	57,835	60,937	64,085	67,273	70,497
38	2040	79	46,895	49,854	52,878	55,965	59,110	62,311	65,563	68,862	72,203
39	2041	80	47,826	50,865	53,972	57,147	60,386	63,686	67,042	70,451	73,908
40	2042	81	48,758	51,875	55,067	58,330	61,662	65,060	68,521	72,041	75,614
41	2043	82	49,690	52,886	56,161	59,512	62,938	66,435	70,000	73,630	77,319
42	2044	83	50,621	53,896	57,255	60,694	64,213	67,809	71,479	75,219	79,025
43	2045	84	51,553	54,907	58,349	61,877	65,489	69,184	72,958	76,808	80,730
44	2046	85	52,485	55,917	59,443	63,059	66,765	70,558	74,437	78,397	82,436
45	2047	86	53,416	56,928	60,537	64,241	68,041	71,933	75,916	79,986	84,142
46	2048	87	54,348	57,939	61,631	65,424	69,316	73,307	77,394	81,575	85,847
47	2049	88	55,280	58,949	62,725	66,606	70,592	74,682	78,873	83,164	87,553
48	2050	89	56,211	59,960	63,819	67,788	71,868	76,056	80,352	84,754	89,258
49	2051	90	57,143	60,970	64,913	68,971	73,144	77,431	81,831	86,343	90,964
50	2052	91	58,075	61,981	66,007	70,153	74,420	78,805	83,310	87,932	92,670

This table shows pension calculations. Table entries require no user input. Initial pension payments depend upon the highest three-year average salary of the employee, a percentage based on the number of years worked and a reduction to extend the pension through the lifetime of a surviving spouse. Calculations by year show the pension amount for each candidate retirement year. Presented in Worksheet 'P'. Final rows removed for formatting.

Table 10: Social Security Calculations

	A	B	C	D	E	F	G	H	I	J	K
1	Initial Retirement From SS Statement										
2		S1		S2							
3		Initial	Future	Initial	Future						
4	Age	Draw	Valuie	Draw	Value						
5	62	20,000	21,000	15,000	17,364						
6	63	21,600	23,814	16,200	19,691						
7	64	23,328	27,005	17,496	22,330						
8	65	25,194	30,623	18,895	25,321						
9	66	27,209	34,726	20,407	28,715						
10	67	29,385	39,379	22,040	32,563						
11	68	31,736	44,656	23,803	36,926						
12	69	34,275	50,640	25,707	41,874						
13	70	37,015	57,422	27,763	47,484						
14											
15											
16											
17											
18	S1 Ret Yr Ind		8				Initial Draw Year				
19			2023	2024	2025	2026	2027	2028	2029	2030	2031
20		S1 Age	62	63	64	65	66	67	68	69	70
21	2023	62	21,000								
22	2024	63	22,050	23,814							
23	2025	64	23,153	25,005	27,005						
24	2026	65	24,310	26,255	28,355	30,623					
25	2027	66	25,526	27,568	29,773	32,155	34,726				
26	2028	67	26,802	28,946	31,262	33,762	36,463	39,379			
27	2029	68	28,142	30,393	32,825	35,450	38,286	41,348	44,656		
28	2030	69	29,549	31,913	34,466	37,223	40,200	43,415	46,889	50,640	
29	2031	70	31,027	33,509	36,189	39,084	42,210	45,586	49,233	53,172	57,422
30	2032	71	32,578	35,184	37,999	41,038	44,321	47,865	51,695	55,830	60,294
31	2033	72	34,207	36,943	39,899	43,090	46,537	50,258	54,279	58,622	63,308
32	2034	73	35,917	38,790	41,894	45,245	48,863	52,771	56,993	61,553	66,474
33	2035	74	37,713	40,730	43,988	47,507	51,307	55,410	59,843	64,631	69,797
34	2036	75	39,599	42,767	46,188	49,882	53,872	58,180	62,835	67,862	73,287
35	2037	76	41,579	44,905	48,497	52,377	56,566	61,089	65,977	71,255	76,952
36	2038	77	43,657	47,150	50,922	54,995	59,394	64,144	69,276	74,818	80,799
37	2039	78	45,840	49,508	53,468	57,745	62,364	67,351	72,739	78,559	84,839
38	2040	79	48,132	51,983	56,142	60,632	65,482	70,719	76,376	82,487	89,081
39	2041	80	50,539	54,582	58,949	63,664	68,756	74,254	80,195	86,611	93,535
40	2042	81	53,066	57,311	61,896	66,847	72,194	77,967	84,205	90,942	98,212
41	2043	82	55,719	60,177	64,991	70,190	75,803	81,866	88,415	95,489	103,122
42	2044	83	58,505	63,186	68,240	73,699	79,593	85,959	92,836	100,263	108,279
43	2045	84	61,430	66,345	71,653	77,384	83,573	90,257	97,478	105,276	113,692
44	2046	85	64,502	69,662	75,235	81,253	87,752	94,770	102,352	110,540	119,377
45	2047	86	67,727	73,145	78,997	85,316	92,139	99,508	107,469	116,067	125,346
46	2048	87	71,113	76,803	82,947	89,582	96,746	104,483	112,843	121,871	131,613
47	2049	88	74,669	80,643	87,094	94,061	101,584	109,708	118,485	127,964	138,194
48	2050	89	78,403	84,675	91,449	98,764	106,663	115,193	124,409	134,362	145,104
49	2051	90	82,323	88,909	96,021	103,702	111,996	120,953	130,630	141,081	152,359
50	2052	91	86,439	93,354	100,822	108,887	117,596	127,000	137,161	148,135	159,977

This table shows Social Security calculations for Spouse 1. No user input is required in the table. The table incorporates initial payments based on year of retirement. These initial payments increase each year at the rate of inflation.   The table shows Social Security payments for each candidate initial claim year and for each subsequent retirement year. Presented in Worksheet 'SS'. Final rows removed for formatting.

Table 11: Growing Annuity Calculations

	A	B	C	D	E	F	G	H	I	J	K	L
1	Growing Annuity Calculations				Age S1	Year	Seq.	Val	Gain	End	Withdraw	End Value
2					62	2023	1	418,494	29,295	447,789	18,900	428,889
3	Inflation	G	0.05		63	2024	2	428,889	30,022	458,911	19,845	439,066
4					64	2025	3	439,066	30,735	469,801	20,837	448,964
5	Earned on Investments	I	0.07		65	2026	4	448,964	31,427	480,391	21,879	458,512
6	Years of Retirement Life	N	31		66	2027	5	458,512	32,096	490,608	22,973	467,635
7	Desired 1st Yr Withdrawal	PMT	18,900		67	2028	6	467,635	32,734	500,369	24,122	476,247
8					68	2029	7	476,247	33,337	509,585	25,328	484,257
9					69	2030	8	484,257	33,898	518,155	26,594	491,561
10	PV Calculations				70	2031	9	491,561	34,409	525,970	27,924	498,046
11					71	2032	10	498,046	34,863	532,909	29,320	503,589
12	PMT/(I-G)		945,000		72	2033	11	503,589	35,251	538,841	30,786	508,054
13					73	2034	12	508,054	35,564	543,618	32,325	511,293
14	(1+G)/(1+I)		0.9813		74	2035	13	511,293	35,790	547,083	33,942	513,142
15					75	2036	14	513,142	35,920	549,062	35,639	513,423
16	{(1+G)/(1+I)]^N		0.5571		76	2037	15	513,423	35,940	549,362	37,421	511,942
17					77	2038	16	511,942	35,836	547,778	39,292	508,486
18	PVGA = PMT/(I-G) *[1-{(1+G)/(1+I)]^N]		418,494		78	2039	17	508,486	35,594	544,080	41,256	502,824
19					79	2040	18	502,824	35,198	538,021	43,319	494,702
20					80	2041	19	494,702	34,629	529,331	45,485	483,846
21					81	2042	20	483,846	33,869	517,715	47,759	469,956
22					82	2043	21	469,956	32,897	502,853	50,147	452,705
23					83	2044	22	452,705	31,689	484,395	52,655	431,740
24					84	2045	23	431,740	30,222	461,962	55,287	406,675
25					85	2046	24	406,675	28,467	435,142	58,052	377,090
26					86	2047	25	377,090	26,396	403,486	60,954	342,532
27					87	2048	26	342,532	23,977	366,509	64,002	302,507
28					88	2049	27	302,507	21,175	323,683	67,202	256,480
29					89	2050	28	256,480	17,954	274,434	70,562	203,872
30					90	2051	29	203,872	14,271	218,143	74,090	144,052
31					91	2052	30	144,052	10,084	154,136	77,795	76,341
32					92	2053	31	76,341	5,344	81,685	81,685	0
33					93	2054	32	0	0	0	0	0
34					94	2055	33	0	0	0	0	0
35					95	2056	34	0	0	0	0	0
36					96	2057	35	0	0	0	0	0
37					97	2058	36	0	0	0	0	0
38					98	2059	37	0	0	0	0	0
39					99	2060	38	0	0	0	0	0
40					100	2061	39	0	0	0	0	0
41					101	2062	40	0	0	0	0	0
42					102	2063	41	0	0	0	0	0
43					103	2064	42	0	0	0	0	0
44					104	2065	43	0	0	0	0	0
45					105	2066	44	0	0	0	0	0
46					106	2067	45	0	0	0	0	0
47					107	2068	46	0	0	0	0	0
48					108	2069	47	0	0	0	0	0
49					109	2070	48	0	0	0	0	0
50					110	2071	49	0	0	0	0	0
51					111	2072	50	0	0	0	0	0

This table shows the growing annuity calculations. Entries in this table require no user input. The growing annuity present value (PVGA) equals:
$$PVGA = \frac{PMT}{I-G}\left[1-\left(\frac{1+G}{1+I}\right)^N\right]$$ *where PMT equals the desired first year payment, having payment growth rate of G, return on investment of I, and life of N. The table also shows an amortization table for the growing annuity. Presented in Worksheet 'A'.*

Table 12: Miscellaneous Calculations

	A	B	C	D	E
1	Unused Growing Annuity Funds				
2					
3	Retirement Year		Sum	PV	
4	2023	0			
5	2024	1	18,900	17,664	
6	2025	2	38,745	33,841	
7	2026	3	59,582	48,637	
8	2027	4	81,461	62,146	
9	2028	5	104,434	74,460	
10	2029	6	128,556	85,662	
11	2030	7	153,884	95,831	
12	2031	8	180,478	105,040	
13					
14	SS Fund Amortization Table				
15					
16	Year	Beg Bal	Draw	Interest	End Bal
17	2023	94,530	21,000	6,617	80,147
18	2024	80,147	22,050	5,610	63,708
19	2025	63,708	23,153	4,460	45,015
20	2026	45,015	24,310	3,151	23,856
21	2027	23,856	25,526	1,670	0
22	2028	0	0	0	0
23	2029	0	0	0	0
24	2030	0	0	0	0

This table shows the unused growing annuity funds at each potential retirement age. The table also shows amortization of the Social Security supplement fund balance. Presented in Worksheet 'O'

Novice users may experience a sense of intimidation and confusion regarding the plethora of figures presented in the analysis. The analysis goal is accommodating a long retirement, with income that increases at the rate of inflation, achieved by using all assets available and without exhausting the total portfolio value or reserve fund value. Users examine the total of fund balances presented in Table 8, Column M:BF and reserve fund balances noted in Column BI to determine the success of their plan. The presence of all positive figures in these two rows indicates success.

To simplify this process, Table 18, presented in Worksheet M provides an easy-to-understand summary of results. Table 18 shows total portfolio and reserve fund values at six future points along the retirement horizon. In addition, the worksheet provides present value calculations for both funds. Present value calculations allow users to relate results to their current financial perspective.

For a more detailed portfolio check, Table 18 identifies the number of years with negative outcomes in cells M:D158 and M:F158. A negative outcome indicates the number of years where the total portfolio or the reserve fund show negative balances. Results show a portfolio present value equal to $174,281 at Spouse 1 age 111 years. While this result suggests the possibility of additional spending, a cautious retiree might reserve these funds for unanticipated contingencies. The results reveal two negative outcomes. Closer examination of Table 8 shows reserve fund balances of -1,404 and -5,325 in 2027 and 2028, respectively. The retiree may choose to adjust their plan to eliminate these negative amounts. Alternatively, given the overall portfolio size and annual spending amounts, the negative balances could be managed by carefully timing certain expenses.

CONCLUDING COMMENTS

Retirement planning can overwhelm and intimidate individuals. Financial planning tools help reduce the complexity of financial planning. This paper provides a comprehensive lifetime retirement planning tool.

The approach here maintains constant, inflation adjusted, spending throughout the retirement years. The spreadsheet incorporates income from multiple sources and allows users to modify fifty-five parameters to most closely approximate their own financial situation. The spreadsheet is especially well suited for planning when the retiree faces a fixed annual dollar amount pension increase, not indexed to inflation. The spreadsheet utilizes a growing perpetuity to offset declining purchasing power of such a pension. The tool includes up to three pre-owned real estate properties, one inherited property and one property purchased at the time of retirement. The analysis incorporates rent on these properties and the ultimate sale of the properties.

As noted previously, the tool represents a starting place for retirement planning. Modifying certain parameters in the spreadsheet could produce unintended and erroneous results. For this reason, users should only utilize this spreadsheet in consultation with a licensed and qualified professional financial advisor who can fully evaluate the results and advise them on such matters.

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The authors encourage users to begin working with the tool independently. Doing so can assist them in accumulating necessary information and identifying issues for their consideration to assist the professional financial planner. Preparing this document in advance offers the possibility of reduced financial planning fees and provides the user a better understanding of their own finances. The user should present the completed template to their financial advisor for review and modifications.

This paper and the associated planning tools have limitations. In the current format, only one spouse may have a pension plan and only one spouse may have multiple Social Security income streams. Future iterations of the spreadsheet might allow for multiple pensions and multiple Social Security income streams for both spouses. State tax analysis incorporates only State of Hawaii taxes. Including other state tax systems would enhance the generality of the tool. Optimally, users could enter their state of residence and the analysis would incorporate relevant state tax rules. The current template does not allow for work income in retirement. However, many people continue to work in retirement. Allowing retirement work income presents an opportunity to further advance the tool. The technique assumes all retirement funds are held in pre-tax retirement accounts. Expanding the analysis to allow for post-tax retirement accounts represents an avenue for improvement. Finally, the spreadsheet currently requires both spouses to retire at the same time. Future iterations of the spreadsheet may allow multiple retirement dates.

Table 13: Real Estate Rental Income

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1		RE1	RE1		RE1		RE2	RE2		RE2		RE3	RE3		RE3
2	Year	Base	Rent	DV	Rnt Inc.		Base	Rnt	DV	Rnt Inc.		Base	Rnt	DV	Rnt Inc.
3	2023	0	0	1	0		12000	12,000	1	12,000		0	0	1	0
4	2024	0	0	1	0		12000	12,600	1	12,600		0	0	1	0
5	2025	0	0	1	0		12000	13,230	1	13,230		0	0	1	0
6	2026	0	0	1	0		12000	13,892	1	13,892		0	0	1	0
7	2027	0	0	1	0		12000	14,586	1	14,586		0	0	1	0
8	2028	0	0	1	0		12000	15,315	1	15,315		0	0	1	0
9	2029	0	0	1	0		12000	16,081	1	16,081		0	0	1	0
10	2030	0	0	1	0		0	0	1	0		0	0	1	0
11	2031	0	0	1	0		0	0	1	0		0	0	1	0
12	2032	0	0	1	0		0	0	1	0		0	0	1	0
13	2033	0	0	1	0		0	0	1	0		0	0	1	0
14	2034	0	0	1	0		0	0	1	0		0	0	1	0
15	2035	0	0	1	0		0	0	1	0		0	0	1	0
16	2036	0	0	1	0		0	0	1	0		0	0	1	0
17	2037	0	0	1	0		0	0	1	0		0	0	1	0
18	2038	0	0	1	0		0	0	1	0		0	0	1	0
19	2039	0	0	1	0		0	0	1	0		0	0	1	0
20	2040	0	0	1	0		0	0	1	0		0	0	1	0
21	2041	0	0	1	0		0	0	1	0		0	0	1	0
22	2042	0	0	1	0		0	0	1	0		0	0	1	0
23	2043	0	0	1	0		0	0	1	0		0	0	1	0
24	2044	0	0	1	0		0	0	1	0		0	0	1	0
25	2045	0	0	1	0		0	0	0	0		0	0	1	0
26	2046	0	0	1	0		0	0	0	0		0	0	1	0
27	2047	0	0	1	0		0	0	0	0		0	0	1	0
28	2048	0	0	1	0		0	0	0	0		0	0	1	0
29	2049	0	0	1	0		0	0	0	0		0	0	1	0
30	2050	0	0	1	0		0	0	0	0		0	0	1	0
31	2051	0	0	1	0		0	0	0	0		0	0	0	0
32	2052	0	0	1	0		0	0	0	0		0	0	0	0
33	2053	0	0	1	0		0	0	0	0		0	0	0	0
34	2054	0	0	1	0		0	0	0	0		0	0	0	0
35	2055	0	0	1	0		0	0	0	0		0	0	0	0
36	2056	0	0	1	0		0	0	0	0		0	0	0	0
37	2057	0	0	1	0		0	0	0	0		0	0	0	0
38	2058	0	0	1	0		0	0	0	0		0	0	0	0
39	2059	0	0	1	0		0	0	0	0		0	0	0	0
40	2060	0	0	0	0		0	0	0	0		0	0	0	0
41	2061	0	0	0	0		0	0	0	0		0	0	0	0
42	2062	0	0	0	0		0	0	0	0		0	0	0	0
43	2063	0	0	0	0		0	0	0	0		0	0	0	0
44	2064	0	0	0	0		0	0	0	0		0	0	0	0
45	2065	0	0	0	0		0	0	0	0		0	0	0	0
46	2066	0	0	0	0		0	0	0	0		0	0	0	0
47	2067	0	0	0	0		0	0	0	0		0	0	0	0
48	2068	0	0	0	0		0	0	0	0		0	0	0	0
49	2069	0	0	0	0		0	0	0	0		0	0	0	0
50	2070	0	0	0	0		0	0	0	0		0	0	0	0
51	2071	0	0	0	0		0	0	0	0		0	0	0	0
52	2072	0	0	0	0		0	0	0	0		0	0	0	0

This table shows real estate rental income. The table requires no user input.   Rental income reported here considers when the property will be rented as well as inflation adjusted rent amounts. Presented in Worksheet 'R'. Columns related to any inherited properties or retirement property purchases are excluded to conserve space.

Table 14: Federal Taxes

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	FEDERAL TAXES												
2	Standard Deductions												
3													
4	Single	12,950											
5	MFJ	25,900											
6	MFS	12,950											
7	HH	19,440											
8													
9	2022 Ordinary Income Tax Table									Applied Tax Table			
10	Single		Base Tax		MFJ		Base Tax		Row	Tax Inc	Tax Inc	Base Tax	Tax Rate
11	0	10,275	0		0	10,275	0		1	0	10,275	0	10%
12	10,276	41,775	1,028		10,276	83,550	2,055		2	10,276	83,550	2,055	12%
13	41,776	89,075	4,808		83,551	178,150	9,615		3	83,551	178,150	9,615	22%
14	89,076	170,050	15,214		178,151	340,100	30,427		4	178,151	340,100	30,427	24%
15	170,051	215,950	34,648		340,101	431,900	69,295		5	340,101	431,900	69,295	32%
16	215,951	539,900	49,336		431,901	347,850	98,617		6	431,901	347,850	98,617	35%
17	539,901		162,718		647,851		174,254		7	647,851	0	174,254	37%
18													
19													
20	2022 Capital Gains Tax Table												
21	Single				MFJ				Row	Applied Tax Table			
22		Tax Inc	Base Tax			Tax Inc	Base Tax			Tax Inc	Tax Inc	Base Tax	Tax Rate
23	0	41,675	0		0	83,350	0		1	0	83,350	0	0%
24	41,676	459,750	0		83,351	517,200	0		2	83,351	517,200	0	15%
25	459,751		62,711		517,201		65,077		3	517,201	0	65,077	20%

This table shows Federal tax rates for each filing status. The spreadsheet selects the correct table based on user inputted filing status in Table 4 Cell M133. Presented in Worksheet 'F'. Tables for Married Filing Joint returns and Head of Household are excluded to conserve space.

Table 15: Federal Taxes (Continued)

	A	B	C	D	E	F	G	H
34			GAIN ON SALE					
35								
36		Tot Prop						Tot. Tax
37	Year	Sale	RE1	RE2	RE3	I1	RP1	Prop. Sale
38	2023	0	0	0	0	0	0	0
39	2024	0	0	0	0	0	0	0
40	2025	0	0	0	0	0	0	0
41	2026	0	0	0	0	0	0	0
42	2027	0	0	0	0	0	0	0
43	2028	0	0	0	0	0	0	0
44	2029	0	0	0	0	0	6,453	6,453
45	2030	0	0	0	0	0	0	0
46	2031	0	0	0	0	0	0	0
47	2032	0	0	0	0	0	0	0
48	2033	0	0	0	0	0	0	0
49	2034	0	0	0	0	0	0	0
50	2035	0	0	0	0	0	0	0
51	2036	0	0	0	0	0	0	0
52	2037	0	0	0	0	0	0	0
53	2038	0	0	0	0	0	0	0
54	2039	0	0	0	0	0	0	0
55	2040	0	0	0	0	0	0	0
56	2041	0	0	0	0	0	0	0
57	2042	0	0	0	0	0	0	0
58	2043	0	0	0	0	0	0	0
59	2044	0	0	0	0	0	0	0
60	2045	288,723	0	208,723	0	0	0	208,723
61	2046	0	0	0	0	0	0	0
62	2047	0	0	0	0	0	0	0
63	2048	0	0	0	0	0	0	0
64	2049	0	0	0	0	0	0	0
65	2050	0	0	0	0	0	0	0
66	2051	309,533	0	0	239,533	0	0	239,533
67	2052	0	0	0	0	0	0	0
68	2053	0	0	0	0	0	0	0
69	2054	0	0	0	0	0	0	0
70	2055	0	0	0	0	0	0	0
71	2056	246,907	0	0	0	196,907	0	196,907
72	2057	0	0	0	0	0	0	0
73	2058	0	0	0	0	0	0	0
74	2059	0	0	0	0	0	0	0
75	2060	1,500,587	800,587	0	0	0	0	800,587
76	2061	0	0	0	0	0	0	0
77	2062	0	0	0	0	0	0	0
78	2063	0	0	0	0	0	0	0
79	2064	0	0	0	0	0	0	0
80	2065	0	0	0	0	0	0	0
81	2066	0	0	0	0	0	0	0
82	2067	0	0	0	0	0	0	0
83	2068	0	0	0	0	0	0	0
84	2069	0	0	0	0	0	0	0
85	2070	0	0	0	0	0	0	0
86	2071	0	0	0	0	0	0	0
87	2072	0	0	0	0	0	0	0

This table shows capital gains on property sales. This table requires no user input. Presented in Worksheet 'F'.

Table 16: Federal Taxes (Continued)

	J	K	L	M	N	O	P	Q	R	S
36	Gross	SS Tax	Net Tax	PV Gross	PV Ord Net.			Tot. CG	PV Tax.	FV
37	Ord. Inc	Excl.	O. I.	O Tax Inc	Tax Income			Inc.	CG Inc.	Total Inc.
38	82,956	0	82,956	79,006	53,106			0	0	82,956
39	86,483	0	86,483	78,442	52,542			0	0	86,483
40	90,139	0	90,139	77,866	51,966			0	0	90,139
41	93,932	0	93,932	77,278	51,378			0	0	93,932
42	97,868	0	97,868	76,682	50,782			0	0	97,868
43	114,530	5,907	108,623	81,056	55,156			0	0	114,530
44	149,458	10,710	138,747	98,605	72,705			6,453	4,586	149,458
45	139,145	11,246	127,899	86,567	60,667			0	0	139,145
46	145,155	11,808	133,346	85,956	60,056			0	0	145,155
47	151,419	12,399	139,020	85,346	59,446			0	0	151,419
48	157,949	13,019	144,931	84,738	58,838			0	0	157,949
49	169,891	13,669	156,221	86,990	61,090			0	0	169,891
50	177,252	14,353	162,899	86,389	60,489			0	0	177,252
51	184,934	15,071	169,863	85,793	59,893			0	0	184,934
52	192,954	15,824	177,130	85,203	59,303			0	0	192,954
53	201,328	16,615	184,713	84,619	58,719			0	0	201,328
54	210,075	17,446	192,629	84,043	58,143			0	0	210,075
55	219,212	18,318	200,894	83,476	57,576			0	0	219,212
56	228,760	19,234	209,525	82,916	57,016			0	0	228,760
57	238,738	20,196	218,542	82,366	56,466			0	0	238,738
58	249,169	21,206	227,963	81,826	55,926			0	0	249,169
59	260,074	22,266	237,808	81,295	55,395			0	0	260,074
60	271,479	23,379	248,099	80,774	54,874			208,723	67,954	560,202
61	283,407	24,548	258,858	80,264	54,364			0	0	283,407
62	295,885	25,776	270,109	79,764	53,864			0	0	295,885
63	308,940	27,065	281,875	79,275	53,375			0	0	308,940
64	322,601	28,418	294,183	78,796	52,896			0	0	322,601
65	336,899	29,839	307,060	78,329	52,429			0	0	336,899
66	351,865	31,331	320,534	77,873	51,973			239,533	58,194	661,398
67	367,532	32,897	334,635	77,427	51,527			0	0	367,532
68	383,937	34,542	349,395	76,992	51,092			0	0	383,937
69	315,346	36,269	279,077	58,569	32,669			0	0	315,346
70	329,048	38,083	290,966	58,156	32,256			0	0	329,048
71	328,379	39,987	288,393	54,897	28,997			196,907	37,482	575,287
72	342,640	41,986	300,654	54,506	28,606			0	0	342,640
73	357,567	44,085	313,482	54,125	28,225			0	0	357,567
74	373,194	46,290	326,904	53,755	27,855			0	0	373,194
75	389,555	48,604	340,951	53,395	27,495			800,587	125,376	1,890,142
76	406,688	51,034	355,654	53,045	27,145			0	0	406,688
77	424,631	53,586	371,045	52,705	26,805			0	0	424,631
78	443,425	56,265	387,160	52,376	26,476			0	0	443,425
79	463,112	59,079	404,033	52,056	26,156			0	0	463,112
80	483,736	62,032	421,704	51,745	25,845			0	0	483,736
81	505,346	65,134	440,211	51,444	25,544			0	0	505,346
82	527,989	68,391	459,598	51,152	25,252			0	0	527,989
83	551,717	71,810	479,907	50,869	24,969			0	0	551,717
84	576,586	75,401	501,185	50,594	24,694			0	0	576,586
85	602,651	79,171	523,480	50,328	24,428			0	0	602,651
86	629,973	83,129	546,844	50,071	24,171			0	0	629,973
87	631,425	83,207	548,217	47,807	21,907			0	0	631,425

This table shows tax calculations. This table requires no user input. Future taxes due calculations require calculating taxes due on the present value of future income. The future value of the taxes due represent the estimate of future tax liabilities. Presented in Worksheet 'F'.

Table 17: Federal Taxes (Continued)

	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
34	ORDINARY INCOME TAX						CAPITAL GAINS TAXES						TOTAL TAX	
35														
36	O.I.	Base	Tax on		PV OI		CG	Base	Tax on		PV CG		PV Total	FV Total
37	Tax Bkt	Amount	Base	Rate	Tax		Tax Bkt	Amt	Base	Rate	Tax		Tax	Tax
38	2	10,276	2,055	0.12	7,195		1	0	0	0	0		7,195	7,554
39	2	10,276	2,055	0.12	7,127		1	0	0	0	0		7,127	7,857
40	2	10,276	2,055	0.12	7,058		1	0	0	0	0		7,058	8,170
41	2	10,276	2,055	0.12	6,987		1	0	0	0	0		6,987	8,493
42	2	10,276	2,055	0.12	6,916		1	0	0	0	0		6,916	8,826
43	2	10,276	2,055	0.12	7,441		1	0	0	0	0		7,441	9,971
44	3	83,551	9,615	0.22	7,229		2	83,351	0	0.15	0		7,229	10,172
45	3	83,551	9,615	0.22	4,580		2	83,351	0	0.15	0		4,580	6,767
46	3	83,551	9,615	0.22	4,446		2	83,351	0	0.15	0		4,446	6,897
47	3	83,551	9,615	0.22	4,312		2	83,351	0	0.15	0		4,312	7,024
48	3	83,551	9,615	0.22	4,178		2	83,351	0	0.15	0		4,178	7,146
49	3	83,551	9,615	0.22	4,674		2	83,351	0	0.15	0		4,674	8,393
50	3	83,551	9,615	0.22	4,541		2	83,351	0	0.15	0		4,541	8,563
51	3	83,551	9,615	0.22	4,410		2	83,351	0	0.15	0		4,410	8,732
52	3	83,551	9,615	0.22	4,280		2	83,351	0	0.15	0		4,280	8,899
53	3	83,551	9,615	0.22	4,152		2	83,351	0	0.15	0		4,152	9,063
54	3	83,551	9,615	0.22	4,025		2	83,351	0	0.15	0		4,025	9,226
55	2	10,276	2,055	0.12	7,731		2	83,351	0	0.15	0		7,731	18,605
56	2	10,276	2,055	0.12	7,664		1	0	0	0	0		7,664	19,366
57	2	10,276	2,055	0.12	7,598		1	0	0	0	0		7,598	20,159
58	2	10,276	2,055	0.12	7,533		1	0	0	0	0		7,533	20,987
59	2	10,276	2,055	0.12	7,469		1	0	0	0	0		7,469	21,850
60	2	10,276	2,055	0.12	7,407		1	0	0	0	0		7,407	22,750
61	2	10,276	2,055	0.12	7,346		1	0	0	0	0		7,346	23,690
62	2	10,276	2,055	0.12	7,286		1	0	0	0	0		7,286	24,671
63	2	10,276	2,055	0.12	7,227		1	0	0	0	0		7,227	25,696
64	2	10,276	2,055	0.12	7,169		1	0	0	0	0		7,169	26,767
65	2	10,276	2,055	0.12	7,113		1	0	0	0	0		7,113	27,885
66	2	10,276	2,055	0.12	7,059		1	0	0	0	0		7,059	29,054
67	2	10,276	2,055	0.12	7,005		1	0	0	0	0		7,005	30,276
68	2	10,276	2,055	0.12	6,953		1	0	0	0	0		6,953	31,553
69	2	10,276	2,055	0.12	4,742		1	0	0	0	0		4,742	22,596
70	2	10,276	2,055	0.12	4,693		1	0	0	0	0		4,693	23,478
71	2	10,276	2,055	0.12	4,302		1	0	0	0	0		4,302	22,597
72	2	10,276	2,055	0.12	4,255		1	0	0	0	0		4,255	23,468
73	2	10,276	2,055	0.12	4,209		1	0	0	0	0		4,209	24,377
74	2	10,276	2,055	0.12	4,164		1	0	0	0	0		4,164	25,326
75	2	10,276	2,055	0.12	4,121		1	0	0	0	0		4,121	26,316
76	2	10,276	2,055	0.12	4,079		1	0	0	0	0		4,079	27,351
77	2	10,276	2,055	0.12	4,039		1	0	0	0	0		4,039	28,431
78	2	10,276	2,055	0.12	3,999		1	0	0	0	0		3,999	29,560
79	2	10,276	2,055	0.12	3,961		1	0	0	0	0		3,961	30,740
80	2	10,276	2,055	0.12	3,923		1	0	0	0	0		3,923	31,973
81	2	10,276	2,055	0.12	3,887		1	0	0	0	0		3,887	33,263
82	2	10,276	2,055	0.12	3,852		1	0	0	0	0		3,852	34,611
83	2	10,276	2,055	0.12	3,818		1	0	0	0	0		3,818	36,021
84	2	10,276	2,055	0.12	3,785		1	0	0	0	0		3,785	37,496
85	2	10,276	2,055	0.12	3,753		1	0	0	0	0		3,753	39,039
86	2	10,276	2,055	0.12	3,722		1	0	0	0	0		3,722	40,654
87	2	10,276	2,055	0.12	3,451		1	0	0	0	0		3,451	39,570

This table shows Capital Gains and Ordinary Income taxes due along with the present and future values of taxes due. The FV Total Tax figure represents the final result and the input for income and spending calculations. Presented in Worksheet 'F'.

Table 18: Results

	A	B	C	D	E	F	G
148	RESULTS						
149					PV	Reserve	PV Res.
150		S1 Age	S2 Age	Port. Val.	Port.Val.	Fund	Fund
151		70	68	577,839	391,104	79,793	54,007
152		80	78	813,440	338,001	329,594	136,953
153		90	88	1,367,110	348,741	1,223,057	311,994
154		100	98	2,787,948	436,608	2,787,948	436,608
155		105	103	2,686,735	329,674	2,686,735	329,674
156		111	109	1,903,384	174,281	1,903,384	174,281
157							
158	Negative Outcomes			0		2	

This table show the final analysis results. This table requires no user input. The analysis goal is accommodating a long retirement, with income that increases at the rate of inflation, achieved by using all assets available and without exhausting the total portfolio value or reserve fund value. Negative outcomes indicate the reserve fund produces a negative balance in two years.   Presented in Worksheet 'M'.

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