Grounding Multidisciplinary Public Policy Analysis in Methodological Individualism:
With an Illustrating Study of the Economic and Political Effects of Variations in a Nation's Average Work Ethic

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Abstract. This paper suggests that a relatively minor, but important generalization of the rational choice approach used in economics and game theory can provide sufficient flexibility, breadth, and realism to be used as the basis for interdisciplinary analysis. Multi-disciplinary analysis does not require abandoning the "rational" choice model of individual decision making worked out over the past century and a half by economists, game theorists, and other users of rational-choice models in sociology, political science, history, biology, and philosophy. This paper illustrates how this can be done by modeling the economic and political effects of the average strength of a nation's work ethic and testing some of its implications.

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I. Introduction: Multidisciplinary Policy and Methodological Individualism

Multidisciplinary policy analysis is, as the name suggests, the study of the origins and effects of public policies from the perspective of more than two of the contemporary natural sciences, social sciences, and liberal arts. Among the most likely candidates for such analyses are anthropology, sociology, political science, economics, psychology, biology, geology, physics, statistical theory, and history. In principle, any careful analysis of social or physical phenomena that includes theories or uses results from at least three of those fields can be

regarded as multidisciplinary. When such an analysis is focused on the origins, effects, or merits of alternative public policies, it is an exercise in multi-disciplinary policy analysis.

The main claim of this paper is not that multi-disciplinary analysis is entirely new or even necessarily under applied, but that the theoretical and methodological underpinnings of such analyses can be improved. An internally consistent theoretical foundation for multi-disciplinary research can bring greater coherence to such analyses and thereby increase the complementarity between such studies. This essay suggests that this can be most easily accomplished by assuming that the individual decisions that generate social phenomena are internally consistent within particular choice settings, including many that are relevant for policy analysis. Global rationality is not necessary. Even locally "rational" choices can make multi-disciplinary theories more internally consistent and more useful as sources of hypotheses about new or neglected empirical questions. It can also provide greater coherence to the results of studies undertaken by different scholars who focus on different issues in public policy analysis.

Multi-disciplinary analysis is not new. Multi-disciplinary analyses are commonplace in book-length efforts to explain long period developments in human history. For example, several recent widely read "big think" books by Pinker (2018), Fukuyama (2011, 2014), and Mearsheimer (2018, 2019) undertake multidisciplinary analyses of the course of human progress. All three of these widely read contemporary scholars attempt to construct grand unified theories of multi-disciplinary phenomena and largely succeed in producing internally consistent historical narratives of the course of human development. Fukuyama and Mearsheimer uses various findings from biological, anthropological, and sociological research to create historical narratives of changes in the nature of governance, the territories governed, and the relationships between governments through time. In their analyses, groups act as essentially unified actors that account for the emergence and nature of systems of territorial governance. In contrast with the Fukuyama and Mearsheimer approaches, Pinker's narrative is largely consistent with methodological individualism in that it focuses a good deal of attention on individual decision making and its ramifications. Pinker's account uses a somewhat eclectic mix of psychology, history, statistical analysis, and accounts of

innovation to account for human progress over the past several thousand years. Although he does not explicitly adopt or discuss a rational choice approach to social science, his account is consistent with the methodology suggested in this paper.

In economics, recent empirical work has also taken an increasingly multidisciplinary approach, although one that tends to be grounded in what might be called economic and social intuitions about interdisciplinary influences and effects, rather than specific models or hypotheses about how sociological, political, and economic factors interact to generate particular types of outcomes. For example, such non-economic factors as ideology, trust, race, religion, geography, and method of governance have increasingly been included in accounts of economic development. (See, for example, Knack and Zak, 2003, or Bjørnskov, C. , 2012).[1]

Such work demonstrates that a good deal of new light can be cast on both long-term human history and more recent instances of economic and political developments using multi-disciplinary approaches. This is not because uni-disciplinary or bi-disciplinary approaches are ill-conceived or always wrong, but because many causal relationships are complex and disciplinary boundaries often (although not always) cause some of those relationships to be ignored or misunderstood.

This paper suggests that similar misunderstandings may arise from multi-disciplinary analyses social phenomena that lack coherent foundations in methodological individualism. Most sociological approaches neglect the fact that groups (and governments) do not routinely act in unison to advance a single unified interest for reasons noted more than a half century ago by Mancur Olson (1965). Individual interests vary widely because of differences

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[1] Multidisciplinary approaches in earlier work are commonplace. Nearly every famous economist, sociologist, or philosopher prior to 1900 engaged in multidisciplinary research or analysis as with Aristotle's *Politics*, Smith's *Moral Sentiments*, Montesquieu's *Spirit of the Laws*, Marx's writings on class and economic development, Spencer's work on society, ethics, and social evolution, and the writings and speeches of the Japanese businessman and scholar, Shibusawa Eiichi (see Sager 1918 for an overview of the latter). Twentieth century examples from economics include Schumpeter (2013/1942), Hayek (1976/1944), Buchanan (1978), and North, Weingast and Wallace (2009), among many others.

in insights, experience, education, and genetically transmitted capacities and associated propensities of various kinds.

If individuals are the ultimate decisionmakers rather than groups, then social phenomena are best considered to be consequences that emerge through various interdependencies among the decisions, actions, and outcomes of relevant individuals at both given moments in time and through time. Social outcomes are joint products of many independent decisions, rather than products of a unified social or public interest.

Although the latter may seem obvious, for the most part, multi-disciplinary analysis has not been rooted in methodological individualism. This may be partly because the models used by most proponents of methodological individualism lack sufficient flexibility to account for many of the determinants of individual decisions. Most rational choice models take preferences as given and assume that maximizing wealth or power (broadly construed) are the main determinants of human choices. However, such an approach neglects causal factors that appear to be obvious in daily life, in laboratory experiments, and in historical accounts of individual contributions to policy making. Thus, persons who intend to undertake a multi-disciplinary analysis may reject methodological individualism, because it seems unrealistic or too limited to shed light on the puzzles that attract their interest.

This paper suggests that a relatively minor, but important generalization of the rational choice models used in economics and game theory can provide sufficient flexibility, breadth, and realism to satisfy such scholars, without abandoning the "rational" choice model of individual decision making worked out over the past century and a half by economists, game theorists, and other users of rational-choice models in sociology, political science, history, biology, and philosophy.

In particular, a rational choice model that I refer to as "homo constitutionalus" can provide foundations for rational choice models that account for how internalized rules systematically affect the choices of individuals. The homo-constitutionalus model of decision making is an extension and generalization of James Buchanan's papers on human nature (Buchanan, 1979, 2005), evolutionary psychology, and some of my own papers on the effects of both natural and rational ignorance on human decisionmaking. It also is compatible with

North and Denzau's (1994) mental models explanation of human decision making and the information processing strands of contemporary psychology.

I have shown in several recent papers and a recent book how the homo constitutionalus model can shed new light on important topics in social science (Congleton, 1992, 2020, 2022), and also how it can be employed in policy analysis (Congleton, 2007, Batinti and Congleton, 2018, and Congleton, 2021, forthcoming). However, rather than survey that and other related research, this paper provides a short overview of the homo constitutionalus model and then uses that model as the foundation for another illustrating research project.

It should be noted that this paper does not argue that narrower analyses are necessarily mistaken or a waste of time. Indeed, a multidisciplinary analysis may simply demonstrate that a uni-disciplinary analysis is the appropriate one, because few linkages exist beyond those focused on by a particular social science. There are many other cases in which linkages among the behaviors focused on by the various social sciences do not exist—and in those cases, uni-disciplinary analysis is completely appropriate. This is the main reason that such largely independent fields of study exist. However, to determine whether this is the case or not usually requires a preliminary multidisciplinary analysis.

The main body of the paper begins with an overview of the homo-constitutionalus model and then develops a model of how an internally consistent "work ethic" can affect both economic and political outcomes. The illustrating example is not a complete study of all such interdependencies, which would take book length treatment to do reasonably well. Rather, it is intended to illustrate how an extended rational choice model can be used to undertake a multi-disciplinary analysis of both the origins and effects of public policy within democracies that is grounded in methodological individualism. Some empirical evidence that is consistent with the model is provided after the theoretical analysis.

By doing so, the present paper attempts to show how additional light can be cast on important relationships within society that affect both economic outcomes and public policy choices through a unified multi-disciplinary analysis grounded in methodological individualism.

## II.	Homo Constitutionalus as a Foundation for Multidisciplinary Analysis

The usual rational-choice-based approach to analyzing public policy is grounded in a model of human nature that is often called "homo-economicus." It usually begins with a series of assumptions about preferences. These assumptions provide the basis for a self-interest model of human decisionmaking that is assumed to account for all the decisions of interest. To sharpen the analysis, the grounding assumptions abstract from the origins of preferences and many human idiosyncrasies. Any idiosyncratic variation among persons in a given society is assumed (implicitly) to have an average effect of zero on the outcomes observed. The preferences that determine behavior are assumed to be permanent features of the individual. Such assumptions allow the preferences of an "average" or "representative" individual to be used to characterize the decisions and policies of interest. Examples include the choice of strategies in games, the purchase and production of goods and services in markets, and votes for particular candidates and policies in mass elections.

In most inter-disciplinary approaches based on the homo-economicus model, the focus of analysis is bi-disciplinary, rather than multi-disciplinary. For example, most of the analysis undertaken in public choice research attempts to explain the political and economic motivations for public policies and their consequences. The consequences of public policy are assumed to be largely endogenous and intentional. They are the ones anticipated by the pivotal decision makers at the moment when the policy of interest is chosen. The analysis is "bi-disciplinary" in that it focuses on issues of interest to two social sciences: political science and economics.

The bi-disciplinary approach of public choice has clearly demonstrated that public policies are not simply economic phenomena nor political phenomena but are jointly determined by political and economic interests and consequences. That research program

has thereby demonstrated that the boundaries of political science and economics had previously prevented a complete understanding of the causes and effects of public policy.[2]

During the last few decades, there have been efforts to take account of the effects of other philosophical and cultural factors on political and economic decisions. Examples include ideology, social capital, and trust. With very few exceptions, these extensions have been ad hoc and inductive rather than grounded in an internally consistent theory. Nonetheless, the empirical literature provides a good deal of evidence that such considerations matter—that is to say, that factors in addition to economic and political ones affect both the nature of public policies and their consequences.

By focusing on the behavior of adults, most rational choice models ignore how individuals come to their understandings of their choice settings, how individuals come to make more or less systematic choices, and why those choices tend to differ among individual with similar backgrounds. They include no processes through which acculturalization or personal innovation can affect behavior.

Homo Constitutionalus

The homo constitutionalus model provides an internally consistent foundation for incorporating such effects into analyses grounded in methodological individualism and also provides a logical (ex ante) rationale for including such effects in models of individual choice and social phenomena. Rather than start with individuals that are fully developed adults as the homo economicus model does, the homo constitutionalus model begins at the beginning of life and takes account of the learning that takes place during one's lifetime. It is the

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[2] Bi-disciplinary models have long been employed by economists. Rational choice-based socio-economic models were pioneered by Becker's (1968, 1973). Rational-choice based political-economy models were pioneered by Black (1958), Downs (1965), Buchanan and Tullock (1962) and Olson (1965)—to mention just a few of the early contributors to a field that came to be called public choice in the 1970s. Some aspects of Olson's (1965) analysis can be considered multi-disciplinary insofar as his classic rational choice-based work on the logic of collective action had implications for sociological, political, and even biological controversies.

process of learning and innovation before and during adulthood that accounts for most of the systematic and idiosyncratic aspects of human decision making. The same processes also account for cultural differences that have non-trivial effects on both individual deliberations and social outcomes. The plethora of "fixed effects" in contemporary econometric research is, implicitly, an effort to account for such differences, yet most fixed effects are ignored when recounting statistical results.

In the homo constitutionalus model "preferences" emerge from systems of rules that have been internalized and refined as individuals grow to adulthood. We are born "naturally ignorant." We know nothing of the world, our possibilities, and have only very unsophisticated ways of making decisions. We have our genetically determined sources of data—our senses—and also associated predispositions to interpret the data provided in particular ways—as with color, shape, texture, sound, odor, location, distance, and movement—but these propensities are not sufficient to support life, nor to fully understand the world. We need the succor of our mothers and the lessons passed onto us by our parents, family, friends, and teachers to survive. In the absence of their support and many lessons learned, none of us would live for long. (This will be obvious to everyone that has raised a family.)

Our abilities to teach others, learn from others, and to invent new rules (not all of which, unfortunately, are true) dwarf those of other creatures on earth. That these abilities account for human survival and its relative success in nature's competition among species implies that these are among the most important features of humankind—although they have not been given much attention by economists or political scientists.

This process of learning and knowledge transfer accounts for regional differences in language, religion, ethical systems, and also for differences in ideas about which features of the world are permanent, which features can be altered by human action, and how to best choose among those possibilities. Overlaps and similarities among cultures exist because humans confront many similar problems and social dilemmas and, in many cases, have solved them with similar rules. Yet there are many differences. Linguists estimate that there are more than 7000 languages in the world, which implies that there are at least 7000

different regional cultures, each with systems of rules that include unique features that are passed on from one generation to the next. Out of those 7000 languages, the one spoken in our home(s) while growing up is nearly always the one that we know best.

It is through the lessons passed on to us that what sociologists refer to as socialization occurs. We are all socialized to some degree because we have been taught many facts and relationships from our families, friends, teachers, and our society's mass media. Most of our ideas about "good or proper" food, dress, and personal conduct are learned in through our home languages by the same persons also taught us to read and write. Many of these lessons reflect the long histories and many innovations of the persons living in particular regions.

Differences in regional environments and in the associated processes of learning and innovation, in combination with social evolution, explains the existence of regional differences in what economists refer to as "preferences."

Rules and the Internalization of Rules

The use of the term "rules" to describe what individuals learn requires a bit broader definition than the ones normally used. Indeed, the term "rules" is often used without definition. For the purposes of this paper (and other research that I have undertaken along similar lines), rules are "if-then" relationships.

Humanity has an amazing ability to invent and internalize if-then relationships. We use if-then relationships to characterize facts. If an object has a certain shape, color, and taste, then it is, for example, an orange. If a person wants paid employment, but does not have it, although he or she actively seeks such employment, then he or she is unemployed. If a government's policy makers at its highest levels are selected through open, fair, and competitive elections, then the system of governance is democratic.

We also use if-then relationships to evaluate the relative merits of alternative actions. If experience or scientific research informs us that eating oranges is good for our health, then we'll be more likely to eat them—especially if we are interested in good health and trust

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the science upon which such recommendations are based, where the meanings of "good" and "trust" are characterized by other if-then relationships.

If-then relationships are also used to evaluate public policies and political institutions. For example, economists often use benefit-cost analysis. If a project has more benefits than costs (measured in a nation's currency), then it is a good policy. In other cases, better and worse policies are judged based on less quantitative ideas about the good society, such as "a good society is democratically governed and assures basic civil liberties." Policies that move us closer to a good society (however conceived) are good and those that move us further away are bad. In other cases, voters may apply normative theories of a "virtuous" or "good life" for their electoral choices. Voters usually (although not always) vote against politicians known to lie about important issues or to take bribes. Such normative theories are important determinants of public policy whenever they at least partially motivate the decisions of voters and/or government officials.

Rules that we have learned influence our behavior when they are internalized—that is to say when they are routinely used (without much thought) by individuals to determine their possibilities in the circumstances that they find themselves and to determine which of those possibilities to undertake. When internalized, such rules at least partially determine the meaning of one's "self-interest." In this manner, one's perceived self-interest comes to include many ideas about proper and ethical behavior as well as ideas about their practical interests.

That voters have normative interests does not imply that those interests always trump their practical or pecuniary interests. Most voters are inclined to support politicians and policies whose ideas about the good society, good life, and good character are similar to their own—that is to say they tend to vote for persons that are "ideologically" similar to themselves. However, they also take account of the extent to which a candidate's or party's policies are likely to advance their practical or economic interests. Conversely, that pecuniary interests are often decisive does not imply that normative interests are never determinant.

The rules that humans apply have changed through time and are constantly changing at the margin because of individual variations in interpretation and other innovations. That

we live far longer and more comfortable lives today than most humans did a century ago demonstrates that our systems of internalized rules can systematically improve through time—not simply change. Rule innovations that contribute to economic development, for example, have made longer, more fruitful lives far more likely than earlier rules that discouraged or impeded economic development (Congleton 2022).

Together with our ability to learn from others, this implies that homo constitutionalus is rule bound but not fully rule determined. We are all "self-programmed" at what economists refer to as "the margin." Humans are not mere instances of the cultures in which they grow to maturity. They are active participants in the transmission and development of that culture. Thus, departures from the average or typical are always possible—and indeed are necessary if cultures are to evolve. If it were not, we would all be "cavemen" and "cave women" and human progress would be impossible.

Nonetheless, the process of cultural evolution is slow, although it tends to be far faster than humanity's genetic evolution.[3]

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[3] There are many reasons for this. For example, very few of us are truly "quick studies." Most of us spend much of our adult lives attempting to become proficient in our chosen professions. Economists, for example, often invest several decades simply to master particular sub-fields of economics. In addition, our systems of rules include many interdependencies. Thus, many rules and relationships may have to be altered to fully account for a new fact or principle. Minor changes are often fairly easy to internalize, as with many changes in dietary rules or simple extensions of rules already internalized. Major changes can be extremely difficult to fully internalize because they undermine many other internalized rules that have been worked tolerably well in the past. And, there are often advantages associated with being predicable—which is especially true of the rules that tend to elicit respect and praise from others in our societies. Stable systems of rules are useful in many ways.

III. An Application: Economic and Political Implications of a Work Ethic and Its Supportive Culture of Work

The remainder of this paper provides an illustrating example of how the homo constitutionalus perspective can be used in multidisciplinary policy analysis. The example examines how a society's collection of transmitted norms with respect to work can affect social, economic, and political outcomes.

Virtually every family and community encourages the internalization of norms that encourage a variety of productive activities. Without at least some productive activities, we would not have food to eat, cloths to wear, a roof over our heads, and the ability to repel roving bandits and would-be conquerors. In earlier times, by increasing the effective supply of labor, such norms were productive because they enhanced prospects for family and community survival by increasing the reserves needed for weathering crises of various kinds.

In more recent times, such norms tend to increase material comforts through effects on the productivity of economic organizations. They reduce agency problems and shirking within organizations. By making economic organizations more productive, internalized work ethics tend to increase wage rates and increase material comforts by increasing real individual and family incomes—other things being equal (An example of the effect of internalized norms is my efforts to get this paper written for my presentation at the 2022 JEPA conference. It was one of my main research-related duties for several months, although I do not work for Kobe University; nor would I obtain much social or economic support for writing an original paper for the JEPA conference from my home university. I accepted the offer and had a duty to deliver on the implicit promise made.)

The internalization of duties with respect to industry, diligence, and promise keeping are at the core of the system of internalized rules that Max Weber termed "the work ethic." Such duties may be bounded ("do your 'fair' share") or unbounded ("do as much as you can") and may be more or less strongly internalized. Thus, there is a spectrum of work ethics among individuals and communities, with some stronger than others. The stronger the

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work ethic is, the more diligently and longer persons tend to perform their job-related duties. Weber argued that an internalized work ethic was a hallmark of an industrialized society.[4]

A community with a bounded work ethic supports particular ideal (or proper) levels and types of work effort. In such communities where bounded duties to work are most common, people with weaker than average dispositions to work may be informally disparaged as being "lazy" and people with a stronger than average disposition to work may informally disparaged as being "workaholics." In contrast, a community where most individuals have internalized an essentially unbounded norm will praise those who work long hours, rather than disparage them. Indeed, the latter types ("workaholics") may be used as role models or even praised as heroes by their colleagues, friends, and families.

Both the strength of internalized work norms and community support for such norms tend to increase work efforts beyond those associated with direct financial rewards, because they "top up" financial rewards with benefits from self-esteem or pride or with social approval or praise. Extra work effort may also produce more opportunities for promotion in both commercial and political bureaucracies, but those rewards cannot be the main explanation for the extraordinary efforts of individuals or groups of individuals with little prospect for further advancement.

It bears noting that truly unbounded work ethics have risks associated with them. If such norms or internalized duties are so strong that labor-leisure choices become

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[4] Max Weber (1930) observes that: From a purely business point of view, too, **low wages fail as a principle of capitalist development** whenever the manufacturing process demands qualified (skilled) labor or perhaps the operation of expensive and easily damaged machines, or indeed any reasonable level of close attention and initiative. Here low wages do not pay; in fact, they have the opposite effect. **Here a well-developed sense of responsibility is absolutely indispensable, along with a general attitude** which, at least during working time, does not continually seek ways of earning the usual wage with the maximum ease and the minimum effort, but **performs the work as though it were an absolute end in itself—a "calling."** An attitude like this is not, however, something which occurs naturally. It cannot be directly produced either by high wages or by low wages, but has to be the product of a long, slow "process of education."

Weber, Max. The Protestant Ethic and the Spirit of Capitalism (Penguin Twentieth-Century Classics) (p. 17). Penguin Publishing Group. Kindle Edition.

lexicographic—e.g., supreme duties—an individual may work so hard and long that it undermines their health and productivity. "Over work" may be possible for short periods without lasting harm, but in the long run it can lead to a variety of illnesses and even early death. In Japan, such behavior is sufficiently common that there is a word for over-work induced illnesses, *karoshi*. Recent government policies in Japan have attempted to reduce this form of health risk by limiting hours of overtime (to 80 hours a month).[5] Such behavior is not the most common in Japan (or elsewhere), but it provides evidence that a subset of Japanese workers has internalized a very strong and unbounded duty to work.

It is for such reasons that a bounded duty to work hard and diligently is culturally more common than an unbounded one (even in Japan), although the bounds (ideal or proper work effort) vary among communities and cultures. The higher a community's "ideal" level of work effort is, the "stronger" is a community's work ethic or work ethos. And, the higher is an individual worker's internalized "ideal" is and more "strongly" it is internalized, the stronger an individual's work ethic is said to be. Max Weber argued that a relatively strong work ethic had become commonplace in societies that successfully industrialized during the 19th century, but not elsewhere.

Variations in the strength of a work ethic, thus, provides a useful illustration of how social, political, and economic systems can interact and can affect one another.

IV.   A Model of the Economic and Political Effects of Variations in a Work Ethic

There are several consequences associated with cultural support for work, the internalization of work norms, and with variations in the average internalized work norms through time. A subset of these are relevant for multidisciplinary policy analysis. For example, the economics literature on a work ethic demonstrates that a strong work ethic can increase the productivity of firms and other organizations by solving social dilemmas within those organizations (Congleton 1991). Increases in the average strength of strong work

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[5] See, for example, this piece from Wired: https://www.wired.co.uk/article/karoshi-japan-overwork-culture.

ethics in a community thereby tends to increase the scope of networks of production and consumption and therefore increase the extent of specialization and the size and efficiency of a nation's economy (Buchanan and Yoon, 1994). A work ethic may also affect voting behavior on issues that concern work and leisure. Examples include various conclusions that voters might reach about the optimal scope of a welfare state and the best modes for public education. Analysis of the effects of a work ethic on public policy thus requires a multidisciplinary approach that includes social, economic, and political effects. There has not, to my knowledge, been an effort to characterize the policy relevant effects of a work ethic that takes all those effects into account.

The remainder of this part of the paper develops a model and provides some statistical evidence that the strength of an average worker's internalized work ethic and the degree of social support provided for work within a given society have both economic and political effects. The analysis relies upon an extended rational choice model that is grounded in the homo-constitutionalus model for reasons developed in the first parts of the paper. When internalized norms and social support produce choices that are locally consistent with one another, extended rational choice models (utility maximizing models) can be used to characterize the kinds of choices made. This allows one to characterize the typical effects of a work ethic on average work years, aggregate economic output, and electoral support for various public policies.[6]

That individual workers have internalized systems of rules or norms regarding work implies that their work-related decisions are partly consequences of those rules. This effect is implemented by including indicators for the strength of one's internalized work ethic and the extent of social support for a work ethic into individual utility functions.

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[6] It should also be acknowledged that in the long run, public policies may alter both the extent of informal cultural support for work and the level of work supported. Such long-term effects are largely neglected in the analysis that follows, although they are not entirely ignored. The homo-economicus model suggests that such policies would normally take a decade or two to have noticeable effects on internalized work ethics.

It is assumed that a typical worker's utility is a function of his or her leisure (L), social support (S), material comforts (C), and government services (G), $U = u(L, S, C, G)$. The strength of an individual's work ethic is inversely related to the marginal utility generated by leisure. The stronger one's internalized work ethic is, the less value is attributed to an additional unit of leisure. One way to represent this effect is simply to multiply the quantity of leisure by a term such as $(1-\alpha)$ where α is the strength of the individual's work ethic (with $1 > \alpha > 0$). This changes the marginal utility of leisure from U_L to $(1-\alpha)\, U_L$. Changes in α, thereby directly affect a worker's labor-leisure choice. In a culture that values a work ethic, informal social support rises with work effort (through praise and status), which, in turn, increases utility, $S = s(W)$.[7]

Suppose that government services are paid for with a roughly proportional tax (t) on labor income and that little saving is undertaken by the typical worker. This allows personal consumption to be represented as a function of after-tax income, $C = (1-t)Y$. (A fixed moderate or high savings rate could easily be added to the model in a manner similar to that used for the work ethic, but it is not done herein to simplify the analysis and discussion.) Pretax income (Y) is determined by the average wage rate (w) and hours worked (W). Thus, the average worker's pretax income is $Y = wW$. A worker of age A has $D(A)$ hours to allocate between leisure and work, thus $D(A) = L + W$. The potential workday or work year is assumed to decline with age after adulthood is reached. As one ages, one's endurance first

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[7] As in any model-based analysis, much is abstracted from in order to focus on essential relationships. For example, to simplify the model and discussion, it is assumed that real wage rates are not much affected by the existence of a work ethic. Also, for the purposes of this paper, the direct effect of a work ethic is assumed to be on the number of hours that workers labor diligently at their job, whether as employees or self-employed. This effect potentially increases total economic output even if it has no effect on the average productivity of the organizations that workers are employed at. Effects on organizational productivity and real wage rates would simply increase the effects of variations in a work ethic and social support for a work ethic on economic output (material comforts).

rises a bit and then falls a bit, which alters the time that is available for work and active forms of leisure. [8]

Government services are assumed to increase with the tax revenues (T) collected, as with G=g(T). The taxes collected can be characterized as T=tNwW where w is the average wage rate, W is the average number of hours that a worker works in a year, t is the average tax rate, and N is the number of workers. Modelled in this way, no assumptions about government policy makers are necessary—only that tax revenues are spent on government services that are available to the typical person in the country of interest rather than used for debt reduction. An extension of this model with an elected government is developed in the next section of the paper.

Given all the assumptions, definitions, and constraints, the typical (average) worker's utility function can be written as:

$$U = u(\ (1-\alpha)\ (D(A)\ -W),\ s(W),\ (1-t)wW,\ g(NtwW)) \qquad\qquad (1.0)$$

Utility rises with leisure, social support, material comforts (personal consumption) and government services. Notice that by imbedding the constraints and definitions into the utility function, a single control variable, W, (the hours worked) indirectly determines all four sources of utility for the typical worker modeled.

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[8] This model neglects capital and capital accumulation, although these play important roles in determining wage rates and income from capital is also taxed to some degree in most countries. Savings or investments (i) can easily be added to the model by including it in the consumption function to make C = (1-t)(1-i)wW where "i" is the steady state level of investments made by the average worker. In the long run, net capital investments would, in turn, tend to increase the marginal productivity of labor, wage rates, and subsequent purchase of goods and services (e.g., consumption) by the typical worker.

These dynamic effects are neglected to simplify both the modeling and narrative— which is used to illustrate cultural, economic, and political linkages rather than to provide a complete socio-politico-economic model of the society of interest. Such simplifications and others should be considered aspects of the "other things being equal" nature of the analysis undertaken. (It bears noting that most models of labor supply ignore the long run effects of capital accumulation on that supply, as well as the effects of a society's work ethos.)

If the utility function is strictly concave. the utility-maximizing work year can be characterized by differentiating utility with respect to W and setting the result equal to zero. The average workers ideal work week and work year satisfies:

$$(\alpha-1)U_L + \alpha U_S S_W + (1-t)wU_C + Ntw\, U_G G_T = 0 \equiv H \qquad (1.1)$$

Subscripts denote partial derivatives with respect to the variable subscripted. The first term is the subjective marginal cost of time spent working, and the last three terms are the subjective marginal benefit of working. The ideal work week sets the marginal subjective sacrifice in reduced leisure equal to the marginal subjective benefits associate with working longer hours. Working longer hours also increase economic rewards in the form of after-tax income and thereby its associated private material comforts, and very slightly increases government services. In a community that supports a work ethic, working additional hours also increases social support.

The implicit function theorem allows the ideal work year (W^*) to be characterized as a function of the parameters of a typical worker's optimal choice among employment opportunities (with average work weeks or work years in mind).

$$W^* = f(w, t, \ \alpha, A, N) \qquad (1.2)$$

The average worker's ideal work year varies with wage rates, tax rates, the strength of his or her internalized work ethic, his or her age, and the population sharing the cost of government services.

Interdependencies among the four terms included in the typical worker's utility function illustrate why a multi-disciplinary approach is necessary in this case, and also indicates some of the complexities generated by such an analysis. These interdependencies become more obvious when one characterizes the effects of changes in the predetermined variables that characterize the typical worker's choice setting.

Suppose, for example, that the strength of the internalized work ethic (α) increases. If we define H as the first order condition (equation 1.1), the implicit function differentiation rule implies that the effect of an increase in α on hours worked is simply:

$$W_\alpha^* = H_\alpha/-H_W \qquad (1.3)$$

The usual assumptions about utility functions (strict concavity) implies that the second derivative of the utility function with respect to work hours (H_W) has a negative sign and thus the sign of the qualitative effect of an increase in the strength of the work ethic is determined by the numerator of equation 1.3.

Intuitively, we would expect that an increase in the strength of a work ethic would increase the length of a typical worker's work year, by reducing the marginal cost of additional work. However, this conclusion, perhaps surprisingly, requires some additional assumptions about the second derivatives and cross partial derivatives of the typical worker's utility function. The derivative H_α is more complex than might be expected.

The implicit function differentiation rule reveals a number of interdependencies between the average strength of the work ethic and the four endogenous variables. An increase in the strength of an internalized work ethic does not only affect the opportunity cost of work, but also the marginal benefits from work through effects on the marginal utility of social support, material comforts, and government services. Recall that the term α appears in the first argument of each partial derivative function.

$$H_\alpha = U_L + (\alpha-1)(W-D)U_{LL} + U_S S_W + \alpha(W-D)U_{SL}S_w$$
$$+ (1-t)w(W-D)U_{CL} + Ntw (W-D)U_{GL}G_T \qquad (1.4)$$

The first term is the marginal utility of leisure and is greater than zero. The second term includes three terms that are less than zero and so is negative. The third term is the effect of an increase in the average work ethic on marginal social support, which is positive. The fourth term is the negative $(W-D(A) < 0)$ of a positive term and a term that is likely to be less than zero (U_{SL}) in a society that supports diligent work efforts, and so is also likely to be positive. An increase in social support for a work ethic tends to diminish the marginal utility of leisure. The fifth term includes two positive terms (1-t and w), a negative one $(W-D(A))$, and a term that could conceptually take any sign (U_{CL}), but is most likely to be positive, which implies that the overall sign is negative. The last term includes four positive terms (N, t, w, and G_T), a negative term (W-D) and a term that could conceptually take any sign (U_{GL}),

although again it is most likely to be positive. The ultimate effect of an increase in the strength of a work ethic on the labor supply depends on whether the positive terms (the first, third, and fourth terms) are larger than the others or not.

Normally, it is convenient to assume that cross partials are either positive or zero, because this assures that the utility function is strictly concave and that ordinary demand curves slope downward. Cross partials are often assumed to be relatively small (at the margin or zero in less general characterizations of utility functions. If cross partials are approximately zero, as assumed when utility is written as a separable function of the activities or goods included in it, then only the first three terms would matter. It could be argued that the marginal utility of leisure and marginal utility of social support from longer hours are "normally" larger than the second term, especially for relatively high values of α. As α approaches one, the second term necessarily approaches zero. It could also be argued that the marginal utility of leisure diminishes only slowly and so U_{LL} is a small number and likely to be dominated by U_L and $U_S S_W$. Separability, thus, tends to favor the intuitive result, that work hours per year tend to increase as the average strength of the work ethic increases.

In such cases, the model implies that an increase in the average strength of a work ethic increases work effort, and also increases material consumption and government services through effects on labor supply and aggregate output, other things being equal. An increase in the average strength of a work ethic increases average consumption in this case because $C^* = (1-t)wW^*$, which increases whenever an increase in α increases W^* (the average work year). Likewise, government services tend to rise because tax revenues increase which increases government expenditures in the political setting modelled.

These economic and political implications are fairly straight-forward effects of a model that explicitly takes account of the effects of a work ethic on labor-leisure choices. However, they would be missed in a uni-disciplinary model and also in most bi-disciplinary models because such possibilities would be ignored.

The effect of an increase in social support for working long hours on the number of hours worked per year is similar to that of the work ethic. The implicit function theorem implies that this effect is: $W_S^* = H_S/-H_W$ and the strict concavity of the utility function

implies that the qualitative effect of a change in a community's culture of work is determined by the numerator. This derivative is similar to (but a bit simpler than) that the one for a work ethic:

$$H_S = (\alpha-1)U_{LS} + \alpha U_{SS}S_w + (1-t)wU_{CS} + NtwU_{GS}G_T \qquad (1.5)$$

The first term is positive, the second is negative, and the third and fourth are positive. Thus, unless the marginal utility of social support falls very rapidly, the overall effect of an increase in social support for working long hours is an increase in the length of the work year and the effective supply of labor. This in turn, tends to increase economic output, the average level of material comforts, and the extent of government services (through effects on tax revenues).

The above analysis demonstrates that even a relatively straightforward mathematical model of the effects of a work ethic reveals linkages between culture, economic outcomes, and public policies. Economic, political, and social systems are all interconnected—although not necessarily everywhere or significantly enough to affect every research question of interest. Moreover, in addition to what might be considered the obvious interactions, there are also more subtle aspects that emerge from a multi-disciplinary approach grounded in methodological individualism.

Even relatively straightforward rational-choice models can reveal possibilities that would be missed by even sophisticated intuitions about human behavior. The cross partials of utility functions are often important, and more than occasionally empirically relevant.

For example, it is possible that consumption and government services are gross substitutes for leisure rather than gross complements or entirely separate phenomena as is usually assumed. In such cases, both the cross partials for ordinary consumption and leisure and government services and leisure in the assumed utility function would be less than zero, rather than zero or greater than zero. These types of interdependencies increase the effect of an increase in the strength of the work ethic on the average length of work years, material welfare, and government services. Whereas the opposite types of interdependence tend to reduce those effects.

In a somewhat richer models with many consumer goods and government services, some private consumption expenditures may reduce the marginal utility of leisure and others may increase it. In such cases, changes in the strength of a work ethic will affect the pattern of private expenditures. Similarly, some government services may diminish the marginal utility of leisure by providing other sources of satisfaction or by diminishing the enjoyment of leisure, per se, while others increase it. In such cases, an increase in the average strength of an electorate's work ethic will affect the pattern of demands for government services. If government policy is influenced by electoral pressures, changes in the strength of the typical work ethic or support for work will also affect the distribution of government expenditures.

Such interdependencies are "obvious" only when a multi-disciplinary approach to public policy is adopted. And they are more obvious and easily defended when extended rational choice models are employed than when they are not. And, those extensions are more obvious when the homo constitutionalus model is used to account for the nature of preferences.

V.   The Ethos of Work and the Demand for Government Services

Although the above model of social, economic, and political behavior is not entirely unrealistic, it would be more faithful to the perspective of methodological individualism if the policy decisions of governments were given rational-choice foundations. This is relatively easy to do if one assumes that policy makers are elected in open competitive elections, and that to increase their probability of reelection, they adopt policies that advance the interest of pivotal voters in their electorate(s). In that case, a modest extension of the model developed in section IV of the paper can be used to characterize the interests of the average or median voter.

To characterize the average (or median) voter's interest in particular policies, the above model is extended by making the average tax rate a choice variable and substituting the W* function into the utility function to capture the pivotal voter's adjustments to various tax rates and government service levels that might be chosen. In this variation of the

model—where the average worker is also the median voter, his or her decisions when voting can be represented as those that maximize:

$$U = u((1-\alpha) (D(A)-W^*), s(W^*), (1-t)wW^*, G) \tag{2.0}$$

Where W^* is determine as above.

The government's budget constraint can be characterized as:

$$C(G) = (1-d)T = (1-d)NtwW \tag{2.1}$$

$C(G)$ is the cost of government services, and d is the customary degree of debt finance, which has long been greater than zero for developed countries with democratic governments, partly because of macro-economic policy decisions and partly because of domestic politics (Buchanan and Wagner 1977). If the public service is produced with constant returns to scale, the cost function can be simplified a bit, and equation 2.1 can be written as:

$$cG = (1-d)NtwW$$

where c is the average cost of government services, which implies that G can be written as:

$$G = (1-d)NtwW/c \tag{2.2}$$

Note that this special case of the governmental opportunity set or supply function has already been used in equation 1.0. Substituting this expression for G in equation 2.0 allows the voter's utility function to be written as a function of taxes:

$$U = u((1-\alpha) (D-W^*), s(W^*), (1-t)wW^*, (1-d)NtwW^*/c) \tag{2.3}$$

This characterization is a special case of equation 1.0 and so we can use that model's characterization of the workers ideal work week, $W^* = f(w, t, \alpha, D, N)$, in equation 2.3 with no reduction in the internal consistence of the model. In effect, the voter-worker utility function now has two independent choice variables, W and t, rather than one. We have used the first order condition with respect to work years to characterize W^* as a function of tax choices and have substituted it into the second derivative. This characterizes how different tax and service levels affect utility given the worker's adjustments in his or work year.

The voter's (and elected official's) best choice of taxes and government services thus satisfies:

$$U_t = (\alpha -1)U_L W^*_t + U_{ssw}W^*_t + U_C[(1-t)wW^*_t - wW^*]$$

$$+U_G [(1-d)NwW^*/c + (1-d)NtwW^*_t/c = 0 \text{ at } t^* \qquad (2.4)$$

The implicit function theorem allows the voter's ideal tax rate, level of government services, and work year to be characterized as:

$$t^* = j(w, \alpha, A, N) \qquad (2.5)$$

$$G^* = (1-d)Nt^*wW^*/c \qquad (2.6)$$

And the worker's deal work week as:

$$W^{**} = f(w, t^*, \alpha, A, N) \qquad (2.7)$$

All three relationships are co-determined and thus are interdependent with one another through effects on electoral support for taxes (and implicitly government services) and the effects of taxes on workyear choices, and workyear choices on government revenues. The strength of the work ethic and extent of social support for the work ethic also indirectly affect the two policy variables. Note that equation 2.4 includes the effects of taxes on the work-year choices of the average voter in several places. That effect is partially determined by social support for work and the strength of the internalized work ethic of the average worker-voter-taxpayer.

The effect of taxes on the number of hours worked in a work year effect can be characterized by differentiating equation 1.1 with respect to taxes:

$$H_t = (1-\alpha)[(wW)U_{LC} + U_{LG}G_T (NwW)] - wU_C +$$

$$(1-t)w[(-wW)U_{CC} + U_{CG}G_T (NwW)] NwU_G G_T +$$

$$Ntw \, G_T[U_{GG} \, G_T(NwW) - U_{GC}(wW)] +$$

$$Nw \, U_G G_T + NtwU_G G_{TT}(NwW)] \qquad (2.6)$$

As usual in general models of voter driven public policies, one cannot analytically sign the effect of taxes on work effort, without further assumptions.

However, one can sign the effects of many of the partial derivatives that make up the total effect. Notice, for example, that the first term is not usually part of an analysis of the microeconomics of taxation. It indicates that the stronger an individual's work ethic is, the smaller is the effect of taxes on his or her work effort. A work ethic does so by diminishing the attractiveness of leisure and by reducing the effects of complementarities that may exist

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between leisure, government services, and private consumption. Thus, if the overall effect of an increase in tax rates on labor is negative, as most empirical analyses imply, an internalized work ethic tends to reduce the extent to which taxes reduce average work years. This in turn implies that the stronger a community's average work ethic is, the lower is the deadweight loss of income taxation and most other forms of taxation.

In longer-term analyses, the effects of public policies on both the strength of social support provided for work and on the strength of the internalized work ethic should be taken into account. For example, policies that reduce the average strength of the internalized work ethic or reduce social support for the behavior that such an ethic produces, would tend to increase the deadweight loss of taxes (through effects on W^*_t) and thereby tend to alter the demand and cost for government services. Policies that weaken the average work ethic would tend to reduce opposition to subsequent increases in those same policies.

In cases in which such effects are ignored by policy makers, elected officials may accidentally undermine their citizen's average work ethic (or other norms) in a manner that affects both the long run demand for and effects of those policies.[9]

VI.   Discussion: A Few Natural Extensions of the Models Developed

The models developed above imply that variations in the average strength of a polity's work ethos affects voter preferences over policies. When the effects are the intuitive ones, an increase in the average strength of a work ethic reduces leisure's contribution to a worker/voter's perceived welfare (utility), which implies that voters will demand fewer government services that tend to require leisure to use or that serve as complements to leisure. Conversely, worker-voters would demand relatively more services that enhance material comforts, make it easier to reach their jobs, or are complements to them—relative to residents of communities with a weaker average work ethic.

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[9] For an early examination of such effects see Lindbeck et al (1999).

Second, insofar as voters with a strong work ethic believe that others should also have one—either because it contributes to self-esteem and other non-material sources of personal welfare, or because it helps solve various social dilemmas in both the public and private sectors—they would favor policies that tend to strengthen their community's work ethic and oppose ones that tend to undermine them. For example, persons with a strong work ethic might favor a rigorous public education system where norms of diligence, honesty, and persistence are indirectly taught. In addition, they may oppose forms of redistribution and social insurance that appear to undermine, rather than strengthen a typical person's work ethic. Contrariwise, when the average strength of a work ethic diminishes, the former policies may be deemed less important and polices that tend to weaken the average work ethic would be less opposed or increasingly favored.

Third, the policy effects of a work ethic might be misunderstood by political scientists. Political scientists may regard such policy positions to be "ideologically" determined—e. g., based on well-developed ideas about the "good society—rather than rooted in personal virtue ethics or similar internalized beliefs about a dutiful or "good life." Many conclusions about public policies are reached without a grand "ideological" vision of the good society, but rather through generalizations of what might be termed internalized codes of conduct, norms, or ideas about virtue. Such misclassifications may affect the campaigns of political parties and their candidates as well as the research of political scientists.

Fourth, when public policy is influenced by cultural differences (here differences in the average strength of a work ethic), it would clearly be mistaken to leave such effects out of one's analysis, except when the cultures of interest are constant during the period of interest or within the regions of interest—and thus (partially) captured by regional fixed effects. However, such normative effects cannot be simply brushed aside through assumptions about "fixed effects" in empirical tests of theories or inductive exercise in policy analysis, because norms often affect the coefficients as well as intercepts in linear estimation, as demonstrated below.

VII.   Some Evidence of the Effects of a Work Ethic on Economic and Political Systems

To illustrate both the potential fruitfulness and difficulties of a rational-choice based multi-disciplinary policy analysis, this section of the paper uses the models of labor-leisure and policy choices developed above as the foundation for some statistical analysis of the economic and political effects of variations in support for the work ethic in three countries: Japan, Sweden, and the United States. The empirical analysis attempts to answer several questions. First, is there evidence that a work ethic exists? Second, is there evidence that some societies provide greater support for work than others? Third, are there systematic effects generated by differences in support with respect to economic and political outcomes? And fourth, do differences among a society's work ethos matter as implied by the above analysis? The preliminary empirical analysis undertaken suggests that the answer is yes to all of these questions.

The preliminary empirical analysis undertaken is not to suggest that sophisticated multi-disciplinary empirical work has never been undertaken. However, it is to suggest that such work has not, to my knowledge, been done from the perspective of methodological individualism. Moreover, to the best of my knowledge, no analysis of the effects of a culture of work on economic and political outcomes has previously been undertaken. Thus, even preliminary results should be of interest.

Some Survey Evidence

As developed in part 2, internalized rules affect every person's character, personality. or constitution. However, the rules of conduct that individuals have internalized may not be obvious even to themselves. Many of those rules have long been part of the individuals' outlook, and so seem "natural" or "intuitively" obvious. Thus, answers to survey questions such as "do you have a work ethic," and "how strong is your work ethic on a scale of 1 to 10" may not elicit useful responses. Being less than fully self-aware of the normative principles that they have internalized, respondents to such surveys may also differ in their interpretations of questions asked. Their answers may be truthful, without necessarily

directly answering the question that those creating the survey had in mind. These problems are amplified when polls are conducted across regions or nations. Both the questions and answers may be interpreted differently.

Nonetheless, a reasonable place to look for evidence about the existence and strength of social support for a work ethic is the World Values Survey. There have been 7 waves of international surveys undertaken by the World Values Survey Association, a non-profit academic institution currently headquartered in Stockholm Sweden. As funding improved over the years, the breadth and depth of the surveys increased from about 25 countries in the first wave to well over a hundred in the seventh. This section and the next focus on three liberal democracies that were surveyed in all seven waves: Japan, the USA, and Sweden. All three are societies with prosperous commercial systems and stable liberal democratic governance. Thus, much about their cultures is fundamentally similar. For example, their typical resident's daily life is determined by the prevailing workday and workyear. Social rewards tend to encourage literacy, honesty, self-discipline, and hard work. Public policies reflect electoral pressures. These commonalities exist, even though each of these cultures (and their associated nation states) emerged through quite different historical paths.[10]

Table 1 lists the average answers to two questions that provide indications of the strength of support that the average respondent had for a work ethic and two others that provide some indications of the extent of their own internalized work ethics. The first and third questions in the table indicate the extent of social support for a work ethic. The fifth row of each country (in italics) is the average of these two answers. Support for a work ethic increases as that average value increases. The second and fourth questions provide some

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[10] Although contemporary work in economics tends to stress the importance of very large samples, this emphasis comes with a cost. By treating national and regional outcomes as consequences of essentially similar incentives, circumstances and regions, it tends to neglect differences that exist among the territories included in the sample. For example, the effects of changes in particular factors (income, weather, taxes, etc.) are assumed to be the same across all the peoples in the study. Even the relatively simple model developed above suggests that this is not usually the case. The evidence developed in this section tends to affirm that prediction.

indirect evidence of a respondent's own work ethic. A person with a strong work ethic tends to be less concerned with the hours worked or the pressures worked than a person with a weaker work ethic. The sixth row for each country is the average of the second and fourth rows. A person's own work ethic diminishes as those numbers increase, in that average indicates increasing concern with work hours and work pressures. The second to last column notes changes in the answers from the first wave to the seventh (when the same questions were asked in all seven waves). Those for the personal work ethic indicators are changes from the first to the fourth waves, after which those job-related questions were generally dropped from the survey. The last column ranks countries according to the changes in average support for a work ethic and the average extent of the internalized work ethic.

Table 1: Responses to World Values Survey with Relevance to a Work Ethic

Midyear of 4-year Waves (midpoint years for 3- and 5-year waves rounded down)									
Japan	**1982**	**1991**	**1996**	**2001**	**2007**	**2012**	**2019**	**Change**	
Future decline in Work Ethic a Bad Thing (%)	83.00	80.00	10.00	74.00	78.00	77.00	57.00	-26.00	
Good Hours are Important in a Job (% not mentioned)	55	45	24	28					
Important that children work hard (% yes)	16.00	31.00	24.00	27.00	32.00	35.00	25.00	9.00	
Important that Job has no pressure (% yes)	38	42	70	69					rank
Average of first and third row	*49.50*	*55.50*	*17.00*	*50.50*	*55.00*	*56.00*	*41.00*	*-8.50*	2
Average of second and fourth rows	*46.5*	*43.5*	*47*	*48.5*				*+2*	3
Most People Can be Trusted (% yes)	37	38	40	40	37	36	34	-3.00	
Sweden	**1982**	**1991**	**1996**	**2001**	**2007**	**2012**	**2019**	**Change**	
Future decline in Work Ethic a Bad Thing	76.00	58.00	42.00	23.00	36.00	36.00	40.00	-36.00	
Good Hours are Important in a Job (% not mentioned)	50	36	62	56	52	30			
Important that children work hard (% yes)	4.00	5.00	7.00	4.00	10.00	14.00	8.00	4.00	
Important that Job has no pressure (% yes)	36	48	23	35	33				rank
Average of first and third rows	*40.00*	*31.50*	*24.50*	*13.50*	*23.00*	*25.00*	*24.00*	*-16.00*	3
Average of second and fourth rows	*43*	*42*	*42.5*	*45.5*	*42.5*			*-0.5*	2
Most People Can be Trusted (% yes)	52	60	57	64	64	60	63	11.00	
USA	**1982**	**1991**	**1996**	**2001**	**2007**	**2012**	**2019**	**Change**	

Future decline in Work Ethic a Bad Thing	68.00	14.00	44.00	32.00	29.00	33.00	30.00	-38.00	
Good Hours are Important in a Job (% not mentioned)	42	45	48	34					
Important that children work hard (% yes)	26.00	49.00	52.00	61.00	62.00	66.00	68.00	42.00	
Important that Job has no pressure (% yes)	38	33	34	38					rank
Average of first and third row	*47.00*	*31.50*	*48.00*	*46.50*	*45.50*	*49.50*	*49.00*	*2.00*	*1*
Average of second and fourth row	*40*	*39*	*41*	*36*				*-4*	*1*
Most People Can be Trusted (% yes)	44	50	35	36	39	35	37	-7.00	

The survey responses indicate that support for a strong work ethic diminished in two of the three countries, although not monotonically. It increased somewhat in the USA and diminished in the other two countries. Although the last wave may have been influenced by the worldwide Covid pandemic, it did not noticeably affect support for a work ethic. Support levels in the 6th wave are approximately the same as those in the 7th wave.

A shorter time series is available for the indicators of the average strength of internalized work ethics—and the questions answered are admittedly less on point that the ones used as indicators of support of a work ethic. Two of the three averages are quite stable suggesting a stable or slightly increasing internalized work ethics. Only the Japanese responses provide evidence of a significant decline in the average strength of a respondent's own work ethic.

One of the surprising features of the table is that the within-country responses are less correlated with one another than one might expect. There are often outliers in the sequence of responses reported. Examples include the average answer to the first question in Japan during the 1996 wave, Sweden in the 2001 wave, and the USA in the 1991 wave. The outliers probably reflect sampling errors (variance within the population's surveyed), although there may have also been unique circumstances at the time the surveys were conducted.

In general, the questions focused on provide evidence that an internalized work ethic exists (questions 2 and 4) and that social support for a work ethic also exists (questions 1 and 3). The averages of these pairs of questions reveal that both the course of support and the

strength of the average internalized work ethic has varied among each nation's respondents through time. Two countries show an increase in the average strength of their internalized work ethic (the United States and Sweden) during the first through 4th waves. The latter suggests that internalized work ethics are not entirely generated by the strength of general social support for a work ethic. Of the three countries, only respondents in Japan showed a decline in both social support and in the average strength of their internalized work ethics.

Evidence of the Economic Effects of Support for a Work Ethic

Support for a work ethic plays a role in the model above that is similar to that of the work ethic itself. It tends to decrease the net marginal utility of leisure. The greater a nation's informal social support for a work ethic, the longer a nation's average work year tends to be in the "intuitive" cases developed above. And, as support falls, the average work year tends to become shorter. Social support for work is simply one of many factors that influence the labor-supply decisions of the typical worker in a society, but it is a non-trivial one that is normally neglected in economic research on labor markets.

The OECD collects annual data on the average number of hours worked per worker per year by member states. The OECD warns data set users that differences in methodology makes comparisons across countries less than perfectly reliable, although trends within countries are reliably represented. Figure 1 in the appendix plots average worker work years for the period from 1980-2020.

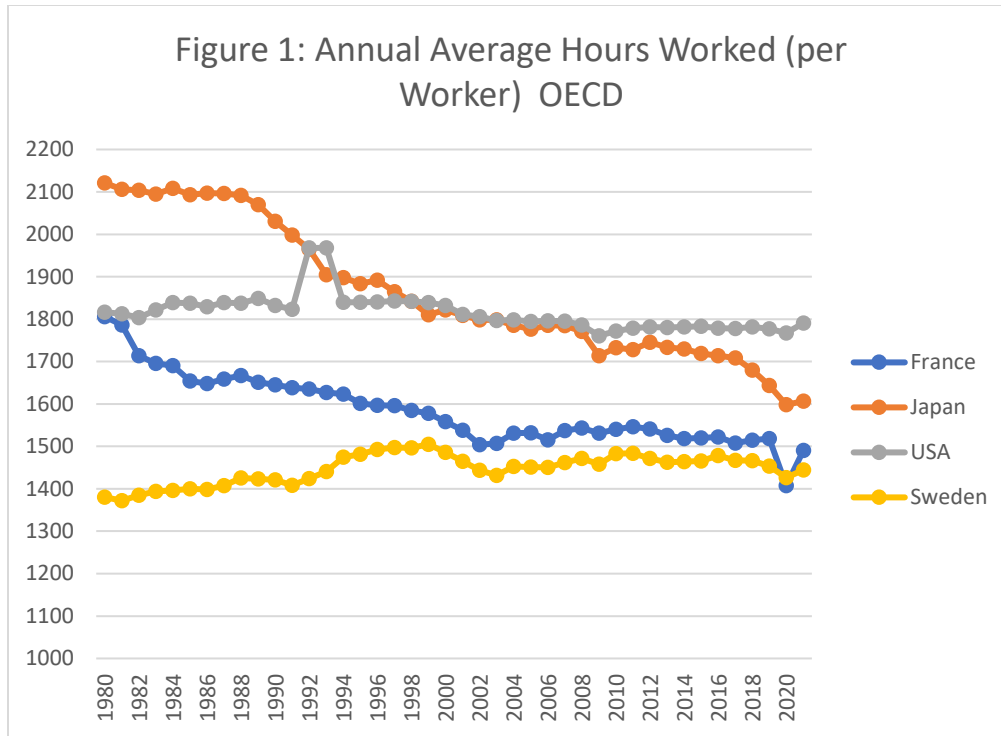Figure 1: Annual Average Hours Worked (per Worker) OECD

Table 2 lists annual hours worked per worker in 10-year intervals during roughly the periods as the 7 waves of the World Values Survey. Notice that the general pattern of hours worked per year is similar to those of general support for a work ethic in Japan and the United States, but not in Sweden, where support fell substantially, but average hours worked per year actually increased somewhat. The latter suggests—although it does not prove—that the internalized work ethics of Swedes are more stable than is social support. (This was also suggested by the indicator for the strength of internalized work ethics developed above.) This indication is consistent with the homo constitutionalus model sketched out above Once internalized, norms tend to be quite stable.

Table 2: Average Hours Worked Per Year Per Worker							
	1980	1990	2000	2010	2020	Change	Rank 2020
Japan	2121	2031	1821	1733	1598	-523	2
Sweden	1380	1421	1486	1483	1426	46	3
USA	1816	1833	1832	1772	1767	-49	1

Note also that the ranking of hours worked in 2020 corresponded exactly with both average social support in the seventh wave of the World Value's Survey and the ranking of changes in the extent of average social support from the first to the seventh survey wave listed in Table 1. The strength of the average level of social support for work are correlated with the hours worked per year per worker, which provides some preliminary support for the hypothesis that the extent of social support for a work ethic affects labor-leisure decisions.

The World Bank's World Development Indicator data set includes numbers for real per capita gross domestic product (computed with the purchasing price parity index) from 1990 to the present. These can be used to compute annual growth rates and average growth rates for various sub-periods of that data set. Table 3 lists average annual real growth rates in per capita gross national product for Japan, Sweden, and the USA. Sub-period averages were also calculated for the first and last ten-year sub-periods (which leaves out the great recession of 2008-10) to see if a decline in support for a work ethic and hours worked per year shown in the previous two tables is correlated with changes in real economic growth rates.

Table 3: Average Annual Growth Rates in Real GNP (PPP) (As Fractions)					
	Full period	**1993-2003**	**2010-2020**	**Change**	**Rank**
Japan	0.0241	0.0307	0.0180	-0.0127	2
Sweden	0.0386	0.0448	0.0316	-0.0132	3
USA	0.0354	0.0419	0.0331	-0.0088	1

It turns out that the average growth rates fell in each country from the first decade in the sample to the last decade. Of greater relevance for this paper is the finding that the rank order of the declines was the same as the rank order of declines in social support for a work ethic in Table 1. Sweden's reduction in economic growth rates is the largest, Japan's the second largest and the USA's the third largest.

Reductions in work years tends to reduce economic growth rates in two ways—other things being equal. They do so directly through effects on the supply of labor and marginal product of labor (partly through effects on team productivity), and indirectly through effects

on rates of innovation (which are usually produced by specialized teams). Thus, a weakening of social support and/or of the strength of the average internalized work ethic tends to reduce average rates of economic growth.[11]

Of course, the reduction in support for the work ethic is not the only factor that affects real growth rates, but the correlation revealed by these three tables are consistent with the hypothesis that a general decline in support for a work ethic reduces average hours worked per year and thereby economic growth rates during the period covered. Reductions in social support for an internalized work ethics tends to reduce the effective supply of labor in both the production and innovation sectors of the three national economies, and thereby tends to reduce economic growth rates as well—other things being equal.

On the Public Policy Effects of Support for a Work Ethic

The model developed in the first half of the paper implies that both the strength of a nation's work ethic and support for a work ethic are likely to affect public policies through effects on the support for various kinds of public policies. For example, persons with a strong work ethic are less likely to support policies that tend require leisure as a complement for their use. Voters with a strong work ethic are likely to favor policies that inculcate and reinforce a work ethic—such as a rigorous system of public education, with its requirements for honesty, diligence, and study—and they would be less supportive of forms of social insurance that tend to reduce support for a work ethic. These effects operate through the cross-partials of the typical utility function and so are less intuitive than the economic predictions.

Some preliminary statistical insights about the interdependencies between social support for work ethics, workyears, and social insurance can be obtained with a series of

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[11] This effect has previously been noted by Hayashi and Prescott (2002) in their discussion of the decline in Japanese growth rates in the 1990s. Hoshi and Kashyap (2020) note that changes in the labor market have also reduced wage growth rates and the extent to which rising wages drive overall inflation rates.

Granger Causality Tests between average hours worked per year and social spending for each of the three countries. That data on workyears is available annually, whereas the survey data used to approximate support for a work ethic and the strength of internalized work ethics are available only erratically during the seven waves of the world values surveys. Hours worked tends to include the effects of both social support for a work ethic and changes in the average strength of the work ethic in the society of interest. The OECD collects annual data on social spending as a fraction of GDP for its member states, which is subdivided into private and public amounts.

The Granger causality test simply determines whether observations of one variable in time t can be explained by values of a second variable in earlier periods, and whether the time series of the second variable can be accounted for by earlier values of the first variable. Granger causality can be unidirectional or bidirectional. In the table below, a single lag is used, partly because this is the simplest causal chain, but also because of the small samples. Shorter lags are plausible from social spending to hours worked insofar as workers tend to learn quickly about the benefits available to them personally under a government's social insurance plans and can adjust their hours worked to take advantage of them. Insofar as an internalized work ethic affects voting behavior, such electoral effects would also tend to be quickly taken into account by elected members of the government.

Table 4 includes Granger Causality Tests for Japan, Sweden, and the USA. The results suggest that the predicted patterns of influence are evident but differ among the three countries in our small sample. Rejecting the null hypothesis of "does not cause" implies that some causality is evident.

Table 4: Granger Causality Tests: Work Years vs. Social Spending			
Null Hypothesis:	Observations	F-Statistic	Prob.
JAPANWKYR does not Granger Cause Japanese Social Spending	37	6.24237**	0.0175
JAPANSOCSP does not Granger Cause Japanese Work Years		2.46236	0.1259
SWEDENWKYR does not Granger Cause Swedish Social Spending	39	4.1799**	0.0483

SWEDENSOCSP does not Granger Cause Swedish Work Years		16.8443***	0.0002
USAWKYR does not Granger Cause USA Social Spending	39	0.82387	0.3701
USASOCSP does not Granger Cause USA Work Years		3.04455*	0.0895
Asterisks denote F-statistics that reject the null hypotheses that the true fit is zero. A single asterisk, * ,denotes significance at the 0.1 level, ** at the 0.5 level, and *** at the 0.01 level.			

The Granger results are consistent with the model developed above although the results differ by country. Social spending evidently affects work hours in the USA, but not vice versa. Work hours evidently affect social spending in Japan but not vice versa. In Sweden, both directions of influence are in evidence. It bears noting that the average length of a work year is not significantly affected by variations in economic growth rates—although unemployment and employment are more affected. (See figure 1 above and figures 2 and 3 in the Appendix.) The average length of a typical worker's work year is considerably more stable than their nation's real growth rates.

The Granger test does not, of course, prove causality. Such causal connections would exist, for example, if other factors play a role in causing each of the variables included in the test. In this case, the model above suggests that the extent of support for and average strength of internalized work ethics affect both variables. Granger causality in this case provides indirect evidence that such factors may be affecting both Social Spending and/or Work Years.[12]

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[12] A review of this paper suggested undertaking a search for the optimal lag length for the Granger tests. However, I elected not to use one of the standard procedures for doing so for three reasons. First, the data set is so small, there is a significant risk of over fitting and generating entirely spurious results. Second, I experimented with different lags fore calculated the Granger tests, and a single lag produced the most traction in the data (the most statistically significant causality results). Third, there are several methods for

A more direct statistical test is limited by the survey data available. The extent of social support for a work ethic is available for only 7 of the 40 years that the economic and political data cover. Even less data is available on the extent of the internalized work ethic.

If one interpolates the values in between successive waves, an annual series can be constructed for social support that can be used to approximate the course of support for a work ethic in each of the three countries. However, all interpolated series suffer from various problems when used as data. The time series are necessarily correlated within each of periods of interpolation. In the case of social support, there are other problems. Table 1 suggests that the time series of social support for a work ethic may exhibit significant sampling errors that will affect the constructed annual time series. Nonetheless, such interpolated series are often used in empirical research and will be used here to provide some additional, and more conventional, evidence of the influence of social support for a work ethic on average work weeks and tax-financed social spending.

Table 5 provides preliminary econometric results. Support for a work ethic is arguably more likely to be a causal element than to be caused by social spending or average work weeks, except in the very long run. Another exogenous determinant of average work week and social spending according to the models developed above is the number of individuals over the age of 65. Data on the fraction of each nation's population over the age of 65 is available from the OECD data sets on population. Such persons would generally work less and qualify for various tax-financed pension and health benefits that others in their societies do not.

If these two factors are exogenous during the period of interest, the estimates included in Table 5 can be regarded as reduced form estimates of average hours worked in a work year and of social spending. In this case, the results should be considered long-term

identifying the "best" lag structure, but they are not close to perfectly reliable as shown by the Monte Carlo simulations of Ozcicek and Mcmillin (1999).

estimates that neglect the effects of short-term business cycles such as the great recession of 2008-10.

Table 5: Exploratory Regressions (1980-2019)						
	Japanese Workyear	Swedish Workyear	USA Workyear	Japan Soc. Spend	Swedish Soc. Spend	USA Soc. Spend
C	2154.99 [39.56] (54.47)***	1433.27 [77.21] (18.56)***	2153.16 [59.28] (36.31)***	1.799 [0.68] (2.64)**	34.234 [7.05] (4.85)***	-6.346 [2.74] (-2.31)**
Work Ethic Support (-1)	2.506 [0.72] (3.41)***	-2.855 [0.56] (-5.05)***	-6.071 [1.12] (-5.39)***	0.019 [0.01] (1.47)	0.0121 [0.05] (0.24)	0.131 [0.05] (2.75)***
%Population older than 65 (-1)	-223.42 [1.21] (-19.34)***	5.193 [4.12] (1.26)	-5.081 [4.73] (-1.07)	0.762 [0.02] (21.49)***	-0.404 [0.38] (1.06)	1.253 [o.23] (5.55)***
Sample Size	38	38	38	35	37	37
R-Square	0.915	.455	0.562	.970	0.036	0.655
F-Statistic	187.62***	14.59***	22.41***	529.86***	0.635	32.32***
Asterisks denote test statistics that reject the null hypotheses that the true coefficient value or fit of the model is zero. A single asterisk * denotes significance at the 0.1 level, ** at the 0.5 level, and *** at the 0.01 level. T-statistics are in parentheses and standard errors of coefficient estimates are in brackets. (The T-statistics are not exact ratios of the standard errors and coefficient values tabulated because they were calculated with greater precision than the values tabulated.)						

First, note that the Japanese results fit the "intuitive case" very well. An increase in support for a work ethic increases the average length of the work year and an increase in the oldster population tends to reduce it. Support for a work ethic plays a statistically significant role in the average length of a work week in the other two cases as well, although the correlation is the opposite of what one would expect for the Sweden and the USA. (Recall, however, that table 1 suggests that the average internalized work ethic in those two countries is more stable than is the level of social support for a work ethic. It is also possible that the effect on government revenues may dominate in those two cases.) The relative size of the

population older than 65 plays little or no statistically significant role in the average number of hours worked in a work year in these two countries.

Second, only in the USA does the extent of general support for a work ethic affect the extent of social spending, other things being equal. Demographics are evidently more important determinants of social spending in Japan and the United States than are the effects of support for a work ethic. Other factors evidently account for the extent of social spending in Sweden. (The other factors are likely to include political institutions and leftward trends in ideology. See Congleton and Bose (2010).)

Note that the counter-intuitive results are consistent with the predictions of the models developed above in when cross-partials and second derivatives are relatively important. The model provides a framework for the statistical analysis rather than specific predictions about the signs of coefficients.

VIII.   Some Conclusions: Rational Choice and Multi-disciplinary Policy Analysis

This paper has shown how extended rational choice models can be developed that support and encourage multi-disciplinary analysis. The homo-constitutionalus model implies that everyone internalizes systems of rules and that those rules include culturally and individually unique rules as well as more or less universal rules. When the rules lead to locally consistent choices, utility functions that include cultural factors can be used to model the kinds of choice generated by the rules that are most commonplace within a given culture (indeed such rules largely determine the "culture"). This approach allows relatively lean rational choice models for multi-disciplinary analysis to be developed.

There are several advantages to this rational-choice approach over the more intuition-based approaches that are commonplace in multi-disciplinary analyses. First, such rational choice models provide a source of insights and hypotheses about complex phenomena that include both intuitively obvious ones and others that are counter intuitive. Second, their tight logical foundations and implications often focus attention on a relatively small subset of the infinite number of factors that might possibly influence behavior. Third, they provide a basis for analysis that is consistent with the assumptions that underly the statistical theory that lies

behind most contemporary empirical methods. It provides the model that statistical theory assumes to be known beforehand, and it focuses attention on particular variables and relationships so that reasonably sharp empirical studies can be undertaken.

The model of the economic and political effects of a work ethic developed above illustrates how the effects of internalized rules can be incorporated into rational choice analysis. The model focused attention on several variables and independencies that tend to be ignored in uni-disciplinary work. And, in the general abstract form used in the theoretical analysis, it demonstrated that the effects of internalized work ethics and social support for work are not always the ones that intuition imply. The possibilities include intuitive cases, but others could emerge even when preferences have the standard properties—e.g., utility functions are drawn from the families of functions most often assumed in rational choice models.

The paper also showed that there are useful—if imperfect—data on internalized rules. The World Values Survey includes several questions that are relevant for characterizing the strength of the average internalized work ethic in the early waves. The same survey includes variables that provide direct evidence about the average extent of social support for relatively strong work ethics. A preliminary empirical analysis of a subset of the relationships implied by the models found correlations that were consistent with the theoretical analysis. It also provided some evidence that the counter-intuitive possibilities implied by the models may actually occur.

In addition, the results—albeit very preliminary ones—suggest that the national cultures of liberal democracies are sufficiently different from one another that the results from pooled samples across countries should be, as the American expression goes, "taken with a grain of salt." The estimated relationships were very different for the three countries included. They exhibited different trends, different averages, and different coefficients for the variables focused on. Thus, although national studies using annual data necessarily have more limited data sets than regional or global data sets, they are often the correct ones to use when undertaking policy analysis—even among countries that arguably have a similar base

culture. (All three countries focused on are stable democracies with sophisticated commercial systems.)

In general, the theoretical and empirical results imply that the three national social systems focused on—culture, economic, and political—have been sufficiently different during the past 40 or 50 years to be worthy of separate deeper studies. It is, of course, in such cases where a multidisciplinary approach is most likely to be fruitful.

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Appendix: Some Other Data Plots of Interest

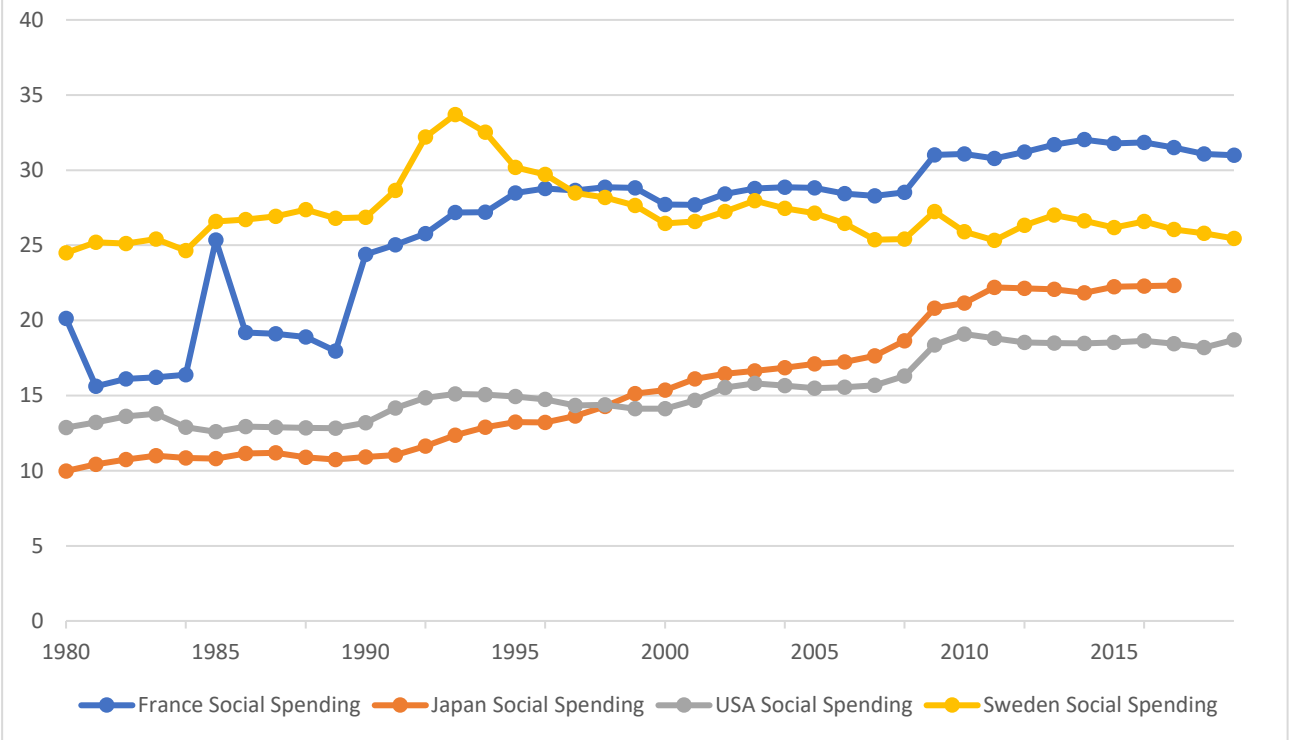Figure 2: Annual Social Spending as Fraction of GDP (OECD)

France Social Spending — Japan Social Spending — USA Social Spending — Sweden Social Spending

Figure 3: Annual Growth in Per Capita GDP WDI (4 year average)

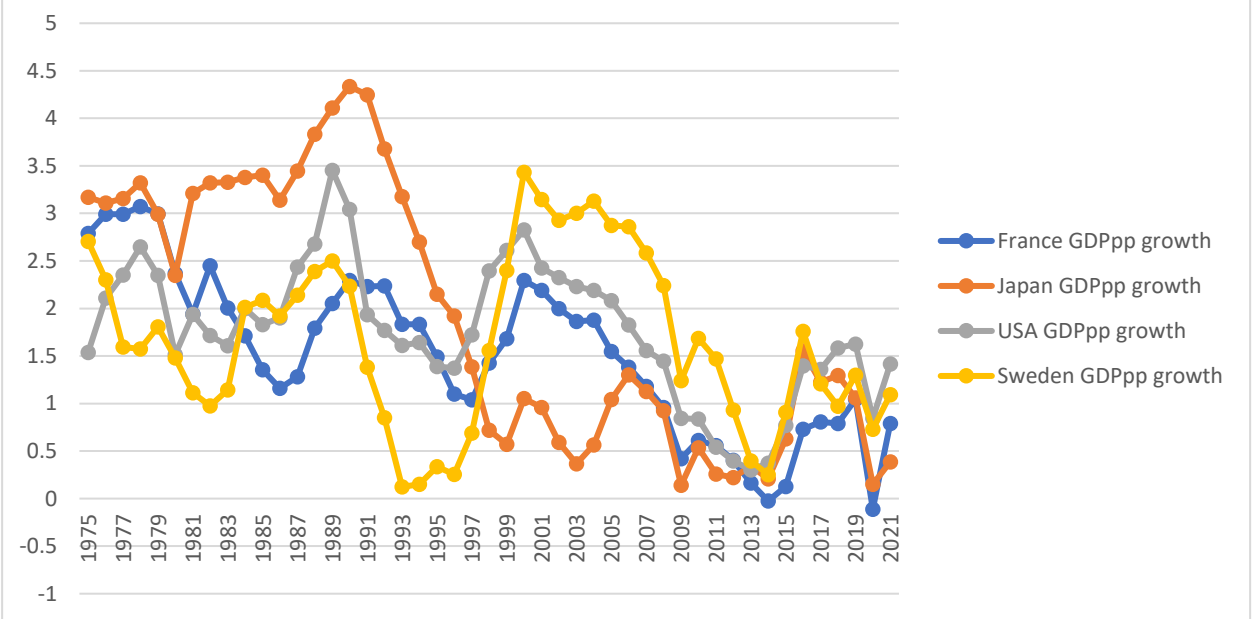France GDPpp growth — Japan GDPpp growth — USA GDPpp growth — Sweden GDPpp growth

Figure 4: Social Support for a Work Ethic