Nicolo Machiavelli and the Origins of Mechanism Design

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NICOLÒ MACHIAVELLI AND THE ORIGINS OF MECHANISM DESIGN[1]

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Abstract

In matters of public policy economists of ten design incentives and constraints to so that economic actors with unrestricted preferences (including the self interested motivations of *Homo economicus*) will implement socially desired allocations. . This paradigm, which dates to Machiavelli and somewhat later to Mandeville, Hume and Bentham, contrasts sharply with an earlier approach initiated by Aristotle, in which good governance entailed the cultivation of good citizens. Modern mechanism design, contract theory, and behavioral economics provide a critical perspective on the Machiavellian paradigm, and suggest a reformulation along more Aristotelian lines.

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JEL Codes: B1 (History of economic thought); C9 (Design of experiments) D7 (Microeconomics: welfare)

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Thorsten Veblen and J.R. Commons were both born before the Emancipation Act; and their lives spanned from last years of slavery in the U.S. all the way to the Bolshevik Revolution and the implementation of the First Five Year Plan in the Soviet Union. Theirs was a world of momentous crossroads and clashes among institutions and values. Nobody, then, celebrated "the end of history." Unlike their contemporaries who founded the neoclassical paradigm in economics, they proposed a dynamic understanding and critique of capitalism, one based on the integrated study of economics, history, psychology, and sociology.

We who today continue this project are greatly in their debt. I am honored to have my name linked with theirs and grateful to the Association for Evolutionary Economics for bestowing this award on me. When it comes to the provenance of ideas, however, I cannot claim to have much in common with these two great economists. My rejection of the neoclassical system had its intellectual roots in the writings of Marx and the potential for mathematics to illuminate human social dynamics, more than in the American institutional and evolutionary school.

But we do share a formative event in our early lives -- being declared *persona non grata* by the guardians of the conventional wisdom of the day. In retrospect, this was a fortuitous event that (I imagine in their case and I know in mine) made it a lot easier to avoid looking over the shoulder, anxiously checking out what "the profession" was thinking. My four decades at the University of Massachusetts have allowed me to set aside the neoclassical paradigm which I had so energetically taught in the first decade of my career, and to join with others – at UMass and around the world -- to construct an alternative. For this I am grateful to the University of Massachusetts, and more recently to the Santa Fe Institute and the University of Siena and my colleagues at these institutions.

My presentation today draws on my forthcoming book *Machiavelli's Mistake: Why good laws are no substitute for good* citizens (Bowles (2015)). What I will have to say is very much in the tradition of Veblen and Commons, as it concerns some shortcomings of the conventional economic understanding of good government, and particularly the role of incentives and constraints in sustaining a civic culture.

Political philosophers from Aristotle to Thomas Aquinas, Jean-Jacques Rousseau, and Edmund Burke recognized the cultivation of civic virtue not only as a test of good government, but also as its essential foundation. "Legislators make the citizen good by inculcating habits in them," Aristotle had written in the *Ethics*. "It is in this that a good constitution differs from a bad one."(Aristotle (1962):103*)*

Early in the sixteenth century, Nicolò Machiavelli gave a would be prince rather different advice: “Anyone who would found a republic and order its laws must assume that all men are wicked ... it is said that hunger and poverty make them industrious, laws make them good.”[2] For Machiavelli, the task of government was to not to uplift the moral character of the populace, but rather to induce citizens motivated by what he termed the “natural and ordinary humors” to act as if they were good. Machiavelli makes clear, especially in his *Discourses*, that it is not the goodness of its citizens that makes a well-governed city possible, but rather our capacity to “order the laws.” (Benner (2009))

Machiavelli's advice that princes and legislators should distinguish between motives and consequences was the key insight of Bernard Mandeville's, *The Fable of the Bees*, a text considered by some to be the founding work of classical economics. (Mandeville did not know that the genus *Apis* are among the most cooperative of all species and are genetically programmed not to compete.) The subtitle of the 1714 edition of the *Fable* announced that the work contained "..several discourses to demonstrate that human frailties...may be turn'd to the advantage of civil society, and made to supply the place of moral virtues,” with the result, he explains in the text (Mandeville (1924):24), that “the worst of all the multitude did something for the common good.”

In case any reader might fail to decipher the verses of the *Fable*, Mandeville provided a prose commentary in which he explained:

> Hunger, Thirst and Nakedness are the first Tyrants that force us to stir; afterwards our Pride, Sloth, Sensuality and Fickleness are the great Patrons that promote all Arts and Sciences, Trades, Handicrafts and Callings; while the great Taskmasters Necessity, Avarice, Envy and Ambition ... keep the Members of the Society to their labour, and make them submit, most of them cheerfully, to the Drudgery of their Station; Kings and Princes not excepted. (Mandeville (1988):366)

To Mandeville, the benign consequence of “the ordinary humors” is not a natural fact about human society. Just as Machiavelli saw the foundation of good government in the human capacity to order the laws, Mandeville explained that it was “the dextrous Management of a skilfull Politician” that allowed the “Private Vices” to be “turned into Publick Benefits.” (Mandeville (1988):369) In contrast to the Aristotelian view that good laws make good citizens, Mandeville's *Fable* suggested that the right institutions might harness shabby motives to elevated ends.

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[2] *... e' necessaria a chi dispone una repubblica e ordina leggi in quella, presuppone tutti gli uomini rei .. si dice che la fame e la povertà fa gli uomini industriosi, e le leggi gli fanno buoni.* Machiavelli (2001):30-31 (translation SB).

It was left to Adam Smith to explain how this improbable alchemy might be accomplished. Competitive markets and well defined property rights, he explained, would let the invisible hand do its magic: "It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest" (Smith (1976 [1776]), Book 1, Chapter 2).

Not only a new theory of the economy, but also novel foundations for law and public policy issued from the Machiavelli-Mandeville axis.. Thus in his *Essays*: *Moral, Political and Literary* (1742), David Hume (1964) :117-118 recommended the "maxim" that

> in contriving any system of government ... every man ought to be supposed to be a *knave* and to have no other end, in all his actions, than private interest. By this interest we must govern him, and, by means of it, make him, notwithstanding his insatiable avarice and ambition, cooperate to public good.

In similar spirit, Jeremy Bentham offered his "*Duty and Interest* junction principle: Make it each man's *interest* to observe ... that conduct which it is his *duty* to observe"(Bowring (1962):380). His *Introduction to the Principles of Morals and Legislation* is arguably the first text in what we now call public economics. In it Bentham laid out the public policy implications of Hume's maxim.

Thinking among jurists paralleled the economists. "If you want to know the law and nothing else," Oliver Wendell Holmes, Jr., told students in 1897 (and every entering law school class since, it appears) "you must look at it as a bad man, who cares only for the material consequences which such knowledge enables him to predict, not as a good one, who finds his reasons for conduct, whether inside the law or outside it, in the vaguer sanctions of conscience ... The duty to keep a contract at common law means a prediction that you must pay damages if you do not keep it — and nothing else." (Holmes (1897).)

The classical constitutional challenge posed by Bentham, Hume, Smith and others was to find laws and other public policies that would simultaneously facilitate peoples' private pursuit of their own ends, while inducing each (for the most part unwittingly) to take adequate account of the effects of their actions on others. In posing the challenge this way they correctly identified the source of the market failures (and other coordination failures) that to this day provide an important rationale for government interventions in the economy.

In the early 20th century Alfred Marshall and Arthur Pigou spelled out the microeconomic theory underpinning this approach, advocating taxes on industry for the environmental damages it imposed on others, and subsidizing a firm's worker training activities that benefit other firms when workers change jobs. What came to be called optimal taxes and subsidies were those that recompensed an economic actor for the benefits that his actions conferred on others, and also made him liable for the costs of his actions borne by others, when these benefits and costs would not otherwise appear in the actor's private revenues and costs. Green taxes that "make the polluter pay" for environmental spillovers are an example. Optimal incentives of this type exactly implement Bentham's Duty and Interest principle: altering the material incentives under which the individual acts so as to align self interest with public objectives.

In the intervening years economists have considerably sharpened our understanding of what it means to that people "take adequate account of the effects of their actions on others" and why, when they do not, the resulting decentralized allocations will be inefficient. The result is a coherent guide for Machiavelli's modern day prince, clarifying what it might mean to induce citizens to act if they were good, namely to provide incentives and constraints such that a self regarding individual would act as if he valued the effect of his actions on others in the same manner that those that are effected would evaluate them. This remains the Holy Grail of policy design for the decentralized implementation of socially desirable allocations.

The classical economists' response to the constitutional challenge of freedom and order that still resonates in juridical and economic thinking was not motivated by the belief that economic actors and citizens are amoral. Quite the contrary. Hume pioneered the study of the evolution of social norms; and in the sentence immediately following the passage quoted above about knaves, he mused that it is "strange that a maxim should be true in politics which is false in fact." Smith (1976 [1759]):3 in his *Theory of Moral Sentiments*, famously held that : "How selfish soever man may be supposed, there are evidently some principles in his nature that interest him in the fortunes of others, and render their happiness necessary to him, though he derives nothing from it except the pleasure of seeing it."

Just a few lines before directing law students' attention to the "bad man" Holmes insisted that "The law is the witness and external deposit of our moral life." Even Machiavelli's famously corrupt citizens were introduced as a prudent assumption for the prince based on a widespread proverbial expression of the time – "*it is said* that all men are wicked" – not as evidence of a malign human nature, an assumption that Machiavelli rejected as a matter of fact : "our reasonings are about those peoples among whom corruption is not very widespread and there is more of the good than of the spoiled" and "very rarely do men know how to be altogether bad or altogether good." (Machiavelli (2001):101, 139 see also Benner (2009)).

Thus Machiavelli, like the classical economists, did not assume away civic motivations. Instead they reasoned that when large numbers of strangers interact, ethical behavior would be an insufficient basis for good government, which therefore required a system of constraints and incentives to supplement the civic virtues. As a result, economists, political theorists and constitutional thinkers since the late 18th century have stressed competitive markets, well-defined property rights, as well as efficient, (and since the 20th century) democratically-accountable states as the critical ingredients of governance. Good institutions thus displaced good citizens as the *sine qua non* of good government. In the economy, prices would do the work of morals.

James Buchanan describing his visit to a farm stand near Blacksburg, Virginia explains why this is something to be celebrated.

> I do not know the fruit salesman personally, and I have no particular interest in his well-being. He reciprocates this attitude. I do not know, and have no need to know, whether he is in the direst poverty, extremely wealthy, or somewhere in between… Yet the two of us are able to…transact exchanges efficiently because both parties agree on the property rights relevant to them. (Buchanan (1975):71)

Subject to the often implicit proviso that property rights are well defined and contracts complete, markets thus came to boast a kind of moral extra-territoriality akin to the hiatus of national sovereignty claimed by foreign embassies. The voluntary nature of transactions and the optimality of the results (at least under the idealized conditions of the proviso) made competitive exchange a special domain in which one could suspend the substantive normative standards commonly applied to relationships among citizens or family members.

Generalizing Buchanan's observation, and invoking the status of the market economy as a morality-free territory David Gauthier (1986):96 held that: “morality has no application to market interactions under the conditions of perfect competition.” I am sure that Gauthier intended to say that the conditions making markets a morality free zone were that contracts are complete, thus echoing Buchanan’s proviso at his farm stand that “both parties agree on the property rights..”

Recognition that within firms and other large organizations and in the major markets of a modern economy – the markets for labor, credit, and knowledge – complete contracts are the exception significantly complicated the classical constitutional challenge. But the classicals’ response, with roots going back to Mandeville and Machiavelli, remains the canonical model of policy-making in economics.

Hume's maxim about knaves is beautifully illustrated by the theory of mechanism design

(Laffont (2000), Maskin (1985), Hurwicz (1975)). This branch of economics seeks to determine the contracts, property rights, prohibitions and other social rules – in short, constitutions – that will induce individuals with unrestricted preferences (including those captured by the term *Homo economicus*) acting in the absence of binding agreements to implement an outcome which is not sought by any of the individual participants, but which is socially valued. Green taxes and training subsidies of the kind already mentioned are an example, but far more complex and ingenious schemes have been developed. For example, to deter shirking among production team members in cases where an individual's work effort is not verifiable, pay each member the entire value of the output of the team, minus a constant sum. This seemingly bizarre formula ensures that any contribution by a member to the output of the team will be exactly compensated, giving each team member the Robinson Crusoe incentives of an isolated individual who owns the fruits of his labor.

This initial promise of this approach was that the incentives provided by a combination of market prices, prohibitions, governmental taxes and subsidies, and perhaps more complex mechanisms could implement desirable social outcomes based on individual utility maximization, and that this could be done irrespective of individual preferences. By "giving the invisible hand a helping hand" (as *The Economist* put it, challenged to translate the gist of the challenging mathematics of mechanism design), well designed publically provided incentives seemingly would dispense with virtue entirely as a foundation of good government. This would spare the policy maker or constitution writer the liberal embarrassment of seeking to foster some values – a concern for the environment or future generations, for example – over others. The job description of the wise policy maker was no longer that of than Aristotle's Legislator tasked with uplifting the population. Thanks to mechanism design, the job could be more like that of Machiavelli's prince – ordering the right laws to induce the citizens to act as if they were good.

It was just a short step to the complacent combination of a professed indifference toward the nature of individual preferences with an inflated idea of the ability of clever incentives to induce even the entirely amoral and self interested citizen to act in the public interest. A skeptic of this view, the political philosopher Leo Strauss (1988):49 wrote: "Economism is Machiavellianism come of age." But the working assumptions and hubristic overconfidence of the neoclassical policy paradigm can hardly be traced to the 16th century Florentine.

Nor have mechanism designers oversold their product. Just as the "invisible hand theorem" did little to vindicate a laissez faire policy toward the economy, and instead demonstrated just how implausible were the axioms required to demonstrate this result, modern mechanism design has clarified the limits of the "constitutions for knaves" approach. The capacity of the mechanism designer to correct market failures depends, we now know, on his access to extraordinary information that is typically private, and his ability to impose unlimited financial or other penalties. Even if one assumed that those designing public policy are paragons of the very civic virtues that this approach would like to dispense with in the rest of the population, the claims for the solutions offered by mechanism design would be quite limited in a liberal society. Among the reasons are the legal and moral constraints – against whipping the lazy, or imprisoning the debtor – combined with the fact that an individual's ability to pay fines is limited by his wealth, as well as the limited extent of intrinsically private information that may be placed in the hands of those designing incentives

Thus mechanism design is not likely – especially in a liberal society – to provide incentives that make ethical and other regarding preferences redundant. In a paper explaining his (and Gerard Debreu's) invisible hand theorem, Arrow (1971):22) writes:

> In the absence of trust ...opportunities for mutually beneficial cooperation would have to be foregone...norms of social behavior, including ethical and moral codes (may be) ...reactions of society to compensate for market failures

The market failures to which Arrow refers are precisely those ubiquitous cases in which contracts are absent or incomplete. In these cases markets – in credit, labor, information -- function as well as they do in part because social norms and other-regarding motives foster a positive work ethic, an obligation to tell the truth about the qualities of a project or a piece of information, and a commitment to keep promises.

This raises difficulties for the idea that public policy and economic organization should be designed *as if* citizens were entirely self interested. This is not because the as if clause is factually incorrect – it was never intended as an empirical statement. The difficulties arise because the resulting policies – for example, the use of explicit monetary incentives to induce pro-social behavior – may fail to recruit the ethical and other regarding motives that are essential to a well-governed society. Indeed, incentives may reduce the behavioral salience of these civic motives.

Consistent with this view, evidence from natural settings and behavioral laboratories shows that incentives seeking to induce public spirited action are sometimes counterproductive (Bowles and Polania-Reyes (2012)) In a recent experiment, even the sight of money and the discussion of coins (rather than non monetary objects) induced children to behave in less pro-social ways in an experiment and to be less helpful towards others in a natural setting (Gasiorowska, Zaleskiewicz and Wygrab (2012).)

An iconic behavioral experiment illustrates this crowding out process. In Haifa, at six randomly chosen day care centers, a fine was imposed parents who were late in picking up their children at the end of the day (in a control group of centers no fine was imposed). Parents responded to the fine by significantly greater tardiness: the fraction picking up their kids late more than doubled (Gneezy and Rustichini (2000)). When after 16 weeks the fine was revoked, their enhanced tardiness persisted, showing no tendency to return to the *status quo ante*. Over the entire 20 weeks of the experiment, there were no changes in the degree of lateness at the day care centers in the control group. The counter-productive imposition of the fines appears to illustrate crowding out: using a market mechanism (the fine) seems to have undermined the parents' sense of personal obligation to avoid inconveniencing the teachers.

Had the Israeli day care centers eschewed the tradition emanating from Machiavelli and instead donned the hat of Aristotle's Legislator, things might have worked out better. To see why, consider a problem of governance that the Athenians faced just at the end of Aristotle's life. When in 325 BCE the Athenian citizens' Assembly decided to set up a colony and naval station in the Adriatic far to the west of Greece, they took on a project of enormous proportions: thousands would undertake the mission in 289 ships (Ober (2008):124-134). And they had little time to spare, as the window for safe navigation around the Peloponnesus en route would close in a matter of weeks.

Neither the personnel nor the ships were at the moment under public orders; the settlers, oarsmen, navigators, or soldiers would have to be recruited from their private lives, and the ships outfitted for the mission (some would carry horses, as cavalry were involved). We know how they accomplished this because the Assembly decree was preserved. *Trierachs* (ship commanders and equippers) were to be appointed and required to bring a ship fully outfitted and crewed to the docks in Piraeus by a given date.

Those who felt unjustly burdened could appeal their assignment (called a liturgy) by challenging some (also wealthy) individual to take on their liturgy, or else to exchange all of their real and personal property holdings with the challenger. If the target of the challenge refused to do either, then a popular jury would determine which man's estate was the larger and should therefore bear the costs of the liturgy(Christ (1990)). The decree continues: "The demos is to crown the first (*trierach*) to bring his ship with a crown of 500 drachmas and the second with a crown of 300 drachmas and the third with a crown of 200 drachmas," adding that "the herald of the Council [of 500] is to announce the crowns at the contest of the Thargelia [a festival], in order that the competitive zeal of the *trierachs* towards the demos may be evident." Others responsible for the timely dispatch of the mission would also be honored.

Lest there be any doubt about the elevated purpose served by these incentives, the decree went to considerable lengths spelling out the benefits expected from the Adriatic colony and naval base: "the demos may for all future time have its own commerce and transport of grain and

[a] guard against the Tyrrhenians [Etruscan pirates].” And for those unmoved by the honors and rewards that timely performance of one's duty as a citizen would garner, there was this warning: “but if anyone to whom each of these things has been commanded does not do them in accordance with this decree, whether he be a magistrate or a private individual, the man that does not do so is to be fined 10,000 drachmas” with the proceeds going to honor Athena. (The prizes for timely arrival of the ships in Piraeus would also have most likely been donated by the prizewinner as an offering to Athena.)

Collectively, the Athenian *polis* was an accomplished mechanism designer. (There is record suggesting that Aristotle was personally involved). Imagine that a time machine had also allowed them to visit Haifa in the late 1990s and to design the day care centers' response to parental tardiness in picking up their children. The sign on the door of the centers would not have read “Since some parents have been coming late we, with the approval of the Authority for Private Day Care Centers in Israel, have decided to impose a fine on parents who come late to pick up their children. As of next Sunday a fine of NIS [new Israeli shekels] 10 will be charged every time a child is collected after 16.10.”

As a result of the intervention of the Athenian mechanism design team, the sign on the door instead would have read: “The Council of Parents wish to thank everyone for arriving on time to pick up your children, as this will reduce the anxiety that the children sometimes feel and will allow our staff to leave in a timely manner to be with their own families. We will recognize all parents who have a perfect record unblemished by lateness for the next 3 months with an award of 500 NIS to be given at our annual parents and staff Holiday party, with an option to donate your award to making possible the school's Teacher of the Year celebration.” But that would not have been all: “Those who arrive more than 10 minutes late, however, will pay a fine of 1000 NIS, with the payment of the fine to be publically transmitted also at the Holiday party (the fines paid will also support the Teacher of the Year celebration).” And the message would have closed with: “Of course sometimes it is impossible for reasons beyond your control to arrive on time; and should this occur, you may appeal your fine before a group of parents and staff, and in case of unavoidable lateness or if the fine would cause extreme hardship, the lateness will be publically reported but no fine will be imposed.” (In fairness to the Haifa children's centers, the somewhat cryptic sign that they placed on the door was not their idea of good public policy; it was an attempt not to frame the lateness problem as a moral issue, which would have confounded the effect of the fine and effect of the moral message.)

Commons and Veblen, whose greatness this Award celebrates, both knew that the invisible hand needed a helping hand, and they would have welcomed the insights of modern mechanism design, whether to be employed by Veblen’s “soviet of technicians” or Commons’ fellow citizens of the upper Midwest, as they pioneered progressive social legislation a century ago. But in their good hands, mechanism design, like the mobilization of resources for the new Athenian colony and naval station, would have looked a lot more Aristotelian than Machiavellian (Bowles and Hwang (2008),Hwang and Bowles (2013).)

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