

TURNING "CITIZENS" INTO "CONSUMERS:" ECONOMIC GROWTH
AND THE LEVEL OF PUBLIC DISCOURSE¹

By

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There is little hope that the Italians will achieve a state of prosperity and internal calm until they start to be more interested in the respective merits of cornflakes and cigarettes than in the relative abilities of their political leaders.

American official, 1947 (quoted in Mazower, 1998, p. 308)

Individualism, at first, only saps the virtues of public life; but, in the long-run, it attacks and destroys all others, and is at length absorbed in downright egotism.

Tocqueville, Second Book, Chapter II (p. 620, [1835] 2000)

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1 Introduction

Gathered around a big table, a company consisting mostly of young adults produces much noise and fury. They are arguing about some, in the big scheme of things, inconsequential legislation proposed in parliament. There is much talking past each other, the stentorian voice of the conversation's would-be monopolist, the repetition of cliches from the mass media, but also much wit and belly-laughs. After the company's break-up, discussions linger at home, in some cases threatening domestic tranquility. Bits of the topic are picked up at subsequent gatherings in which new controversies might emerge as the center of argument. Newspapers and magazines, aware of the underlying demand, provide plenty of both serious and lightweight fodder for argument in such gatherings.

This is the spice of life for the folks trying to find respite from the drudgery of trying to make a living. As a by-product, the prime-minister's propagandists and media consultants feel restrained in the sleek claims they can make about the white being black and the black being white because of the ridicule they are likely to receive in such gatherings as well as elsewhere; or, at least, they are more restrained than foreign spin doctors from whom they have learned the art. Debate with friends, relatives, and acquaintances therefore play a dual role: as a simple consumption good which has the attributes of a collective good and as a contributor to public political discourse.

One prerequisite of course for such forums of public debate is that one does not live in a police state, there is some openness, although having all the characteristics of a full-fledged democracy is unnecessary. Another prerequisite is that some basic material needs are satisfied and people do not go to bed on an empty stomach - the level of material well being of Western Europe during the late 1940s would probably be a safe lower bound for which the hypotheses developed in this article would apply. Then, given some openness and the satisfaction of basic material necessities, it appears that, other things being equal, increases in material welfare are associated with a decline in public discourse and political participation.² A smaller percentage

²For the United States, Chapter 2 of Putnam (2000) provides quantitative evidence on about a dozen measures of political participation, all pointing to declining levels over time. For Europe and elsewhere, the trends appear to be similar but no doubt with significant variation across countries. For example, political discourse in France and Denmark still appears to have a feisty component that has disappeared elsewhere, although the trends might be similar there too.

of the electorate votes; political debate becomes less contentious; time spent getting together, and arguing, with friends and relatives is reduced; newspapers and other media devote less space to politics; television news turns into "infotainment;" in some advanced cases, if any debate occurs at all, it is focused on the less contentious, "horse-race" aspects of political campaigns as norms develop against openly disagreeing with others on substantive issues and against advocating of a particular position; major decisions about governance, like the Maastricht treaty, are agreed upon with virtually no public debate or even reaction.³ Along the way, gradually and imperceptibly, the primary designation of a human being changes from "citizen" into "consumer."⁴

I will try to make sense of this trend in this paper by formally showing how material growth increases the time spent working in the market while it reduces the time spent in gatherings, in *symposia*, with others. Public discourse requires time, to read, think, and interact with others. It is also assisted by the presence of a public space, the agora, the corner cafe, bar, or tavern, as well as the presence of media that can provide fodder for debate. Public discourse could be considered akin, or perhaps even a subset, of "social capital" (Putnam, 1993, 2000) and similar types of collective goods. However, whereas the formal analysis that follows can apply to other types of collective goods that have time as an input, public discourse does not necessarily require the presence of the formal voluntary associations that have been primarily associated with social capital.⁵

One corollary of our analysis is that individual welfare could decline even though material well-being increases. This outcome could occur because welfare depends on a public good that requires the time of others, and whose provision can collapse at higher levels of material well-being. Such an outcome is consistent with the evidence reported by Easterlin (1998) and others, according to which reported measures of subjective well-being often do not

³A major exception to this absence of wide debate on the Maastricht treaty has been France.

⁴In some cases the term "citizen" might not have enough time to establish itself. The transition into "consumer" might therefore take place directly from "subject," the most common designation of human beings before democracy's "citizens."

⁵The absence of formal associations might be due precisely to the fact that people satisfy their need to associate and engage in discourse with others through informal gatherings. This view has been proposed, for example, by Cancian (1961, p.15) in his critique of Banfield (1958).

increase, and sometimes decline, with economic growth. However, though this issue is important, since it is tangential to the focus of this paper we do not analyze it in any detail.

Before we go on, let us very briefly outline another hypothesis that could also possibly provide insight into the relationship between economic growth and public discourse. Such a hypothesis would be based on Michels' (1962) "iron law of oligarchy" and its main argument would go as follows. At earlier stages of economic growth, political systems, just as political parties are in earlier stages of development, are not well-organized and consolidated allowing a broader range of opinions to be heard and more democracy. As the political system matures, though, the leadership learns how to manage opinion better and since the people, just as the rank-and-file of political parties, do not have much time or expert knowledge, debate is increasingly stirred towards the direction that the leadership desires. Gradually, the people's old passions become spent and discourse abates. We will not pursue this idea further, but it is worth keeping it in mind as a hypothesis which is complementary to the one we pursue here, emphasizing the informational mechanism through which reductions in public discourse can occur.

The next section develops the basic model about the effects of economic growth on public discourse and derives the basic findings. Section 3 allows for feedbacks from the level of public discourse back to economic growth and shows that the basic findings are not altered. Section 4 briefly ponders what the future might hold.

2 When public discourse is just consumption

We begin with a simple model in which public discourse, participation in symposia, is a public good which however just increases the welfare of each participant directly and does not have any external effects on growth. Each individual i has one unit of time that is allocated between *labor*, l_i , and participation in *symposia*, s_i :

$$1 = l_i + s_i \tag{1}$$

Individual utility is a function of a material good that is obtained through labor and a spiritual or psychic good that is derived from participation in symposia. The quantity of the material good consumed equals wl_i , where w is

the exogenously given wage rate and is the indicator of the level of economic growth that we use in this paper. The good derived from participation in symposia is modelled for simplicity as a pure public good, so that for a group with N potential participants the quantity obtained by each participant is $S = b \sum_{i=1}^N s_i$.⁶ b is a positive "productivity" or "public space" parameter that can be thought as representing the "infrastructure" for symposia, the presence of public spaces and ease with which the potential participants to a symposium can get together. Whereas in each particular instance the participants consider this parameter exogenous, it could be influenced by growth and by the choices made in the past, and we shall discuss how such an endogeneity of the "public space" parameter affects participation in symposia later. Although the parameter N represents literally the number of participants, we shall occasionally interpret the parameter as an index of the level of "publicness" of the public good, with higher levels of its value representing higher levels of that characteristic. For concreteness, in order to obtain explicit solutions, we employ the CES utility function:⁷

$$U_i = [(wl_i)^\rho + (b \sum_{j=1}^N s_j)^\rho]^{1/\rho} \quad \text{where } 0 \leq \rho < 1 \quad (2)$$

Using (1) to eliminate s_i , the utility of individual i can be written as a function of the choices of labor time made by all participants:

$$U_i(l_i, l_{-i}) = [(wl_i)^\rho + (b \sum_{j=1}^N (1 - l_j))^\rho]^{1/\rho} \quad \text{where } l_{-i} = (l_1, \dots, l_{i-1}, l_{i+1}, \dots, l_N) \quad (3)$$

We first examine the case in which choices are made by each individual noncooperatively. We then discuss how norms of cooperation, public pressure, and of public space could mediate the effect of economic growth on the level of public discourse.

⁶All results would follow through, but at much greater analytical expense, if participation in symposia were modelled as a congestible public good.

⁷The elasticity of substitution is $\sigma = \frac{1}{1-\rho}$. Given the restrictions we assume in (2), we allow the elasticity of substitution to take values between 1 and ∞ and, thus, do not consider the cases with elasticities of substitution between 0 and 1. The reason for this choice is that elasticities of substitution in that range yield some perverse effects. For example, an increase in w reduces the share of total expenditures going to the material good that comes from work. Effectively, the assumption on the elasticity of substitution ensures that the two goods are normal.

2.1 Noncooperative contributions

Here we suppose that each individual i chooses how much to work, and therefore how much to participate in symposia, noncooperatively. Accordingly, we are interested in finding combinations of choices that form a Nash equilibrium so that no individual has an incentive to change their choices. One such combination of choices is the one in which each individual spends all of his or her time working and does not participate in any symposia. Since in this starkly atomistic equilibrium there are no symposia regardless of the level of economic growth, there is not much to learn from it and we shall therefore not consider this equilibrium any further.

By differentiating (3) with respect to l_i and setting equal to zero, any interior equilibrium $(l_1^*, l_2^*, \dots, l_N^*)$ must satisfy the following equation for all $i = 1, \dots, N$:

$$(wl_i^*)^{\rho-1}w - (b \sum_{j=1}^N (1 - l_j^*))^{\rho-1}b = 0 \quad (4)$$

We concentrate on the focal, symmetric equilibrium, whereby each individual works the same number of hours. Therefore, by solving (4) we obtain the following equilibrium levels of labor (l^*) and participation in symposia (s^*):

$$l^* = \frac{w^{\frac{\rho}{1-\rho}} N}{w^{\frac{\rho}{1-\rho}} N + b^{\frac{\rho}{1-\rho}}} \quad s^* = 1 - l^* = \frac{b^{\frac{\rho}{1-\rho}}}{w^{\frac{\rho}{1-\rho}} N + b^{\frac{\rho}{1-\rho}}} \quad (5)$$

Time spent working rises with economic growth (that is, with an increase in w) whereas participation in symposia diminishes with economic growth. Naturally, as public space becomes more accommodating (when b is higher), less time is spent on work and more in symposia.⁸

By substituting the expressions in (5) back into the utility function in (3), we obtain the maximized level of utility, or the indirect utility function which

⁸Although average working hours for individuals might have fallen in the West for some periods during the past fifty years, with the massive increase in female labor participation household working hours have increased during the same period. Thus, the effect of wages on working hours we find here is consistent with the post-war experience at the household level. I thank a referee for raising this issue.

can be considered a function of the growth and public space parameters w and b :

$$V(w, b) = U_i(l^*, l^*, \dots, l^*) = \frac{N(w^{\frac{\rho}{1-\rho}} + b^{\frac{\rho}{1-\rho}})^{\frac{1}{\rho}}}{w^{\frac{\rho}{1-\rho}}N + b^{\frac{\rho}{1-\rho}}} \quad (6)$$

Normally, we would expect economic growth to induce higher welfare, higher utility. However, growth reduces contributions to a public good - public discourse - and it is theoretically possible for the reductions to its provision being so precipitous so as to overcome the increase in utility that comes from material growth. For the particular utility function we use in this paper, we can search for this possibility by differentiating $V(w, b)$ with respect to the growth parameter w :

$$\frac{\partial V(w, b)}{\partial w} = A \frac{Nw^{\frac{\rho}{1-\rho}}(1-\rho) + b^{\frac{\rho}{1-\rho}}(1-N\rho)}{w^{\frac{\rho}{1-\rho}} + b^{\frac{\rho}{1-\rho}}} \text{ where } A \text{ is a positive number} \quad (7)$$

This derivative can be negative if the numerator is negative, which can occur if N or b are large enough. By inspecting (7), we can identify two possibilities for maximized utility as a function of the growth parameter w . First, there is the possibility that maximized utility is strictly increasing in growth. This would occur if public discourse had not had a strong enough "publicness", one could satisfy the need with a small number of symposium participants N , or the infrastructure, the public space, as measured by the parameter b were not large enough. The second possibility is that the relationship between growth and maximized utility is U-shaped, with utility first decreasing and then increasing after a certain level. This possibility would occur if the "publicness" of public discourse were high enough or public space were accommodating enough for symposia.

2.2 Optimal Contributions

The atomistic, noncooperative contributions we have just discussed should probably represent a lower bound on the amount of contributions to symposia that we would expect to find (if we were ever able to examine empirically our theoretical findings here, which would be a highly dicey endeavor anyway).

In practice, communities and social groups invent many different ways of enforcing higher participation. In small groups, where everybody knows each other, the threat of ostracism and other pressures can easily induce contributions higher than the noncooperative ones. In larger groups and communities, there exist more sophisticated mechanisms, especially those that "hard-wire" choices in childhood. However, it would be difficult to deny that monitoring compliance in larger groups is not as easy as in smaller ones.

To have a sense of comparison, we now derive the choices of work and participation in symposia that would maximize the welfare of each individual. The optimal choices of work and participation in symposia can be shown to be the following:

$$l^\# = \frac{w^{\frac{\rho}{1-\rho}}}{w^{\frac{\rho}{1-\rho}} + N^{\frac{\rho}{1-\rho}} b^{\frac{\rho}{1-\rho}}} \quad s^\# = 1 - l^\# = \frac{N^{\frac{\rho}{1-\rho}} b^{\frac{\rho}{1-\rho}}}{w^{\frac{\rho}{1-\rho}} + N^{\frac{\rho}{1-\rho}} b^{\frac{\rho}{1-\rho}}} \quad (8)$$

Note that this optimal choice of labor is always lower than l^* . Moreover, it is decreasing in the "publicness" of the symposia, as represented by the parameter N , instead of being increasing as it is with l^* (because of the lower incentive to contribute to the public good as N increases). The maximized utility under these choices then equals:

$$V^\# = [w^{\frac{\rho}{1-\rho}} + N^{\frac{\rho}{1-\rho}} b^{\frac{\rho}{1-\rho}}]^{\frac{1-\rho}{\rho}} \quad (9)$$

Obviously this level of utility is higher than the maximized utility under noncooperative contributions ($V(b, w)$) in (6). Moreover, it is always increasing in economic growth (that is, as w increases) since the substitution away from participation in symposia is much less dramatic here.

2.3 Public Space

Regardless of the mechanism that generates contributions to symposia - non-cooperative, public pressure inducing optimal behavior, or anything in between - we can expect these contributions to decrease with economic growth. This may have implications for the provision of symposia not just in the present but also in the future. As symposia become less common, taverns, cafes, and publications that facilitate them - in short, the associated public space - become less common as well; even the architecture of building and

communities becomes less accommodating to symposia and encourages privacy. In turn, that reduction in public space which we can identify in our model as a reduction in the parameter b , induces a reduction in participation in symposia that goes beyond that reduction that is solely due to growth.

Suppose then that b is a decreasing function of w , denoted by $b(w)$. The total effect of economic growth on equilibrium utility when contributions to symposia are chosen noncooperatively is as follows.

$$\frac{dV(w, b(w))}{dw} = \frac{\partial V(w, b)}{\partial w} + B \frac{w^{\frac{\rho}{1-\rho}}(N - \rho) + b^{\frac{\rho}{1-\rho}}(1 - \rho)}{w^{\frac{\rho}{1-\rho}} + b^{\frac{\rho}{1-\rho}}} b'(w) \quad (10)$$

where B is a positive parameter

The second term of this expression is always negative since $b'(w)$ is negative and everything else in the term is positive. Given that $\frac{\partial V(w, b)}{\partial w}$ can be positive or negative and induce the two types of relationships between economic growth and maximized welfare discussed earlier, (10) shows that maximized utility can be increasing, have an inverted U-shaped with welfare maximized at particular level of w , or even be strictly decreasing everywhere. The same relationship between the level of growth and maximized welfare holds for $V^\#$ as well, although the range of parameters for which there is an inverted-U relationship holds for a narrower range of parameters.

We should note at this point that according to numerous measures of subjective well-being, the relationship between level of growth and subjective well-being is not monotonic. Easterlin (1998) interprets the evidence as showing an essentially flat relationship over time, whereas Lane (1998) considers the relationship to be negative for the US.⁹ Easterlin and Frank (1997) attribute the non-increasing relationship between money and happiness to status-seeking, the tendency to judge our own welfare relative to that of our neighbors. Whereas status-seeking appears to be at least partly responsible, there is no reason that other factors might not be come into play, like the reduction in the provision of public goods that have leisure as an input, which we have examined here.

⁹Oswald (1997) qualifies Easterlin's interpretation of the evidence, but also introduces additional evidence against the assumption that more money brings more happiness. This basic assumption of economics texts was also scrutinized by Scitovsky (1976), one of the first economists to do so in the postwar period.

It should also be mentioned that the evidence discussed is time series. At any point in time, richer folks tend to report that they are happier.

Overall, when public discourse is just consumption and regardless of how the choice between participation in symposia and work is determined, participation in symposia decreases and work increases with economic growth. Because public discourse is a public good which decreases with economic growth, the effect of economic growth on welfare is ambiguous. When public space itself becomes negatively affected by economic growth, welfare can be strictly decreasing in economic growth, especially at higher levels of material well-being. Persons in such cases become richer, more private, and less happy. Public discourse, however, may affect well-being not just as consumption. We then turn next to the more intricate effects public discourse could have, especially its possibly reverse causality on economic growth, and see how our findings are affected.

3 When discourse also matters for growth

We could consider the exogeneity of economic growth that we have supposed thus far to be the outcome of technological change. While we will continue to consider this technological effect as exogenous, we will now consider effects that public discourse could have on institutional aspects of growth. Disentangling such effects is not a simple affair. What our aim is to take account of the different effects that have been proposed, incorporate them into our model by assuming the least we can, and then determine the extent to which our previous findings continue to hold qualitatively.

The first quote at the beginning of this article is indicative of a view about the effect of political discourse on the economy that was common in the immediate postwar period. That view reflected the fear that the postwar prospects for democracy in Europe were no better than the interwar period, when democracy lost ground in most countries very quickly. During that time the perceived or real ineffectiveness of parliaments combined with economic malaise helped identify the term "democracy" with mob rule, just as Plato had done some time before that. Churchill thought that the parliamentary tradition was not for export out of the UK (Mazower, 1998, pp.16,17) and George Kennan, a young American diplomat then, thought that "benevolent despotism .. had greater possibilities for good" than democracy (as quoted in Mazower, 1998, p.27).

Public discourse can become all-consuming in some cases, with physical fights in parliaments as well as in the streets, possibly taking too much time,

energy, and resources away from other endeavors and inducing political instability that saps economic growth. Such intensity of public discourse may also be considered an almost necessary outcome of the transition to more democratic forms of governance. Perhaps it is not an accident that parliamentary fights – from many interwar European capitals to Ankara, Moscow, and Taipei of a few years back – take place when the lid of political repression has come out recently and both the form of governance in the future is uncertain and rules and norms for compromise and cooperation are yet undeveloped. Regardless of the particulars though, it might be reasonable to hypothesize, as the American official in postwar Italy had done, a negative effect on economic growth when public discourse is too high.

Considering the opposite end of the spectrum, however, with Leibnizian monads never getting together for a symposium, cannot be an optimal state either. The quote from Tocqueville, the second one at the beginning of this article, hints at the problems of extreme individualism.

As with the external effects of education that endogenous growth theory considers central to modern economic growth (e.g., Aghion and Howitt, 1998), so we can suspect that public discourse at reasonable levels does not just have consumption externalities but growth externalities as well. Lack of public discourse reduces the alternatives considered and allows small minorities to have inordinate influence and make public policy decisions that could adversely impinge on economic growth. Reductions in public discourse erode governance and bad governance is typically not good for the economy. At low levels of public discourse, then, we can expect economic growth to increase when public discourse increases.

We incorporate these two effects of public discourse on economic growth by assuming that w is determined in the following fashion:

$$w = \phi\omega(S) \text{ where } \phi > 0; \omega'(S) \geq 0 \text{ if } S \leq S_o \quad (11)$$

and $\omega'(S) \leq 0$ if $S \geq S^o$ for some S_o and S^o such that $S_o \leq S^o$

The parameter ϕ represents the exogenous technological effect on economic growth; it plays the same role that w plays in section 2. The effect of public discourse, S , on economic growth goes through the function $\omega(\cdot)$; for low levels of public discourse (that is, those below S_o) growth is increasing in public discourse, whereas for high low levels of public discourse (those above

S^o) growth is decreasing in public discourse.¹⁰

By substituting for S in the utility function we employed earlier, we obtain the following payoff function for agent i :

$$\begin{aligned} U_i^g &= [(\phi\omega(b \sum_{j=1}^N s_j)l_i)^\rho + (b \sum_{j=1}^N s_j)^\rho]^{1/\rho} \\ &= [(\phi\omega(b \sum_{j=1}^N (1-l_j))l_i)^\rho + (b \sum_{j=1}^N (1-l_j))^\rho]^{1/\rho} \end{aligned} \quad (12)$$

We now seek to determine the effect of exogenous technological change (that is, a change in ϕ) on the (noncooperative) equilibrium levels of labor and participation in symposia. Because the model of this section is more complex than the one of the previous section and we do not suppose a specific functional form for $\omega(\cdot)$, we cannot derive analytical solutions for these variables. We can derive comparative static results, however, which we do in the Appendix.

When $\omega'(S) \leq 0$, at high enough levels of public discourse, we can show that growth-inducing technological change always increases the amount of time devoted to labor and reduces the amount of time spent on symposia (provided that $\omega(\cdot)$ is concave). This is to be expected, as too much public discourse in this case is supposed to have a negative feedback on growth, through its institutional component.

When $\omega'(S) > 0$, at low levels of public discourse, even though we cannot in general sign the effect of ϕ without additional restrictions, there appears to be a strong tendency not to have the effect on labor time reversed. For instance, when $\omega'(S)$ is constant, say some positive number γ , we show in the Appendix that, again, an increase in ϕ is accompanied by an increase in time devoted to labor and a reduction in the time spent on symposia.

Therefore, regardless of how public discourse affects the institutional aspects of growth, growth that emanates from technological change has the

¹⁰Since we examine a static model the effect of public discourse on economic growth is assumed to be immediate. Of course, that effect in reality can take much time to work itself out. To allow for that long-term effect, we need to examine a dynamic model. That can be done, but we do not expect to find any effects that are qualitatively different from those we find here. If anything, because agents would tend to discount the effect of public discourse today on future growth, the underprovision of public discourse that we find would be accentuated in a dynamic framework.

same qualitative effects: it reduces the time spent on, and the level of, public discourse. Following the argument at the end of the previous section, we can thus expect public space to be reduced as well, an effect that we have seen to induce an additional reduction in public discourse. The effect of technological growth on maximized welfare is ambiguous, as it was in section 2. Overall, taking account of the possible feedback of public discourse on economic growth through institutional channels does not appear to change any of the qualitative results we found when public discourse is a consumption good only. Nevertheless, the quantitative effects and how public discourse is viewed can be important, especially when a society is at low levels of public discourse and additional reductions can have dramatic long-run effects through the erosion of its institutions; the danger of having democracy in name only would then become real.

4 What does the future hold? Sports, www, or idiocy?

Will public discourse continue to decline as material growth forges ahead? Or, are we at the dawn of a new era, in which self-governance and public debate, abetted by technology, can reach forms that we cannot now imagine? We are not in a position to answer such questions, but we can at least close by briefly discussing two sets of forces at work and how they might influence the future.

If we were to consider public discourse as a collective good that only yields consumption, it could be argued that with increasing material prosperity new goods emerge that have quasi-collective good components but which can be supplied privately through the market. For the right price you can take a white-water rafting trip in an exotic river where you can expect to find new friends and possibly temporarily bond with them over the fire at night. But, perhaps a more realistic alternative for most people is simply to cheer for the home team along with thousands of others. The effective invention and explosive growth of spectator sports during the twentieth century must surely be related to the secular decline of community over the same period. Therefore, one route that society and polity can take is one in which sports and other similar goods provided through the market could serve as substitutes for public discourse and other collective goods traditionally provided through

the time contributions of group members.

However, as we have seen, that condition could eventually undermine material prosperity itself through the erosion of institutions that support the economy. Furthermore, spectator sports or white-water rafting trips might prove inadequate substitutes for symposia for at least some people. Could, as with everything else, the internet come to the rescue? This new medium allows unprecedented access to information and facilitates the formation of virtual communities; in other words, it could be considered to increase the public space that facilitates public discourse. And, by allowing almost instant and cheap interactive communication across the globe, it can help build the currently scarcer "bridging" social capital. Now holding the promise of impact comparable to those that print has had on thought and political practice over the past five centuries, but just as with print in its early stages we cannot imagine the avenues that thought and practice could take in the future.

In closing let us note an interesting linguistic tidbit. The etymology of *idiot* is that of private person, someone who does not participate in public affairs; gradually the word also acquired the connotation of someone who is incapable of participating in public affairs and that was the meaning that was passed through Latin into many modern European languages. Though the evolution of language as everything else involves many accidents, there is enough correlation between the two meanings to makes us pause. Erasing perhaps the temporary blip of Enlightenment thought, we could become, if we are not already, idiots in both senses, and of course we wouldn't know it. We would then come back, full circle, where we started - being "subjects," even if the name used to describe us were to be different.

5 Appendix

In this Appendix we derive the comparative static results reported in section 3.

As we did in section 2, we consider the symmetric interior equilibrium in which each agent i 's payoff function is defined in (12). Letting l^* denote the equilibrium level of work, differentiating (12), and setting it equal to zero, we obtain the following expression:

$$[\phi\omega(N(1-l^*))l^*]^{\rho-1}\phi[\omega(N(1-l^*)) - l^*\omega'(N(1-l^*))] - [N(1-l^*)]$$

To find the effect of exogenous technological change (ϕ) on the equilibrium level of work (l^*), we totally differentiate this expression with respect to these two variables and obtain the following expression:

$$\frac{\partial l^*}{\partial \phi} = -\frac{Z}{\Lambda}$$

$$\begin{aligned} \text{where } Z &= \rho[\phi\omega(N(1-l^*))l^*]^{\rho-1}[\omega(N(1-l^*)) - l^*\omega'(N(1-l^*))] \\ \text{and } \Lambda &= -[\phi\omega(N(1-l^*))l^*]\{(1-\rho)[\omega(N(1-l^*)) - l^*\omega'(N(1-l^*))]\phi \\ &\quad [\omega(N(1-l^*)) - Nl^*\omega'(N(1-l^*))] \\ &\quad + (N+1)\omega'(N(1-l^*)) - l^*\omega''(N(1-l^*))\} \\ &\quad - (1-\rho)N[N(1-l^*)]^{\rho-2} \end{aligned}$$

When $\omega'(S) \leq 0$, Z is always positive. It is also somewhat more tedious to show that, under the same assumption, all the terms of Λ , except one, contribute to a negative sign of Λ . The term that can contribute to ambiguity is the one involving the second derivative ω'' . To eliminate the ambiguity, however, we just need to assume concavity of $\omega(\cdot)$, so that ω'' is negative, which is a natural assumption (and also guarantees uniqueness of l^* , which we need to assume anyway).

Therefore, when $\omega'(S) \leq 0$ the effect technological growth on work ($\frac{\partial l^*}{\partial \phi}$) is positive. That is, growth-inducing technical change increases the time devoted to work and decreases the time devoted to public discourse.

When $\omega'(S) > 0$, the derivative in question cannot be signed in general. However, inspection of the expressions indicates that the effect is qualitatively similar, but quantitatively less important, than the effect when $\omega'(S) \leq 0$. In particular, when $\omega'(S) = \gamma > 0$ for some constant γ , the payoff function of player i over that range becomes:

$$b\sum_{j=1}^N(1-l_j)[(\phi\gamma l_i)^\rho + 1]^{1/\rho}$$

In the interior, symmetric equilibrium, we can show that

$$\frac{\partial l^*}{\partial \phi} = \frac{\rho l^{*3-\rho}(N(1-l^*)/l^* - 1)}{\phi[(1-\rho)N + 2\rho l^*]}$$

Because at an interior equilibrium we can show that $N(1-l^*)/l^* - 1$ is always positive, this derivative is positive as well.

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