

# Endogenous Reversals of Fortune

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## Abstract

The phenomenon of systemic changes in the fortunes of social groups, such as aristocracy versus the bourgeoisie in the nineteenth century Europe or, contemporarily, second-generation immigrants versus native population, is hard to reconcile with traditional macroeconomic models of intergenerational mobility. This paper, therefore, proposes a theory of endogenous reversal of fortune, whereby instilling strict work norms is an instrument to address moral hazard in poor families more so than in rich families, which is consistent with empirical regularities pertaining to work attitudes. The mechanism implies that hard-working children of the poor may eventually overtake leisure prone children of the rich. This evolution, in particular, of work norms, is endogenously determined and is, therefore a better explanation of the rise and the fall of population groups than the existing theories relying on exogenous ability variations.

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## 1. Introduction

Intergenerational mobility issues have long been of interest for economists both theoretically and empirically (e.g., Becker, 1981, Becker and Tomes, 1988, Loury, 1981). Typically, innate ability differences play an essential role in theories explaining intergenerational mobility, see e.g., Maoz and Moav, 1999, Mookherjee and Napel, 2006, for recent models. This, however, is difficult to reconcile with historical rise and fall of entire groups of individuals.<sup>1</sup> The fall of historically established social elites is one such prominent example. The European nobility, so much dominant in earlier centuries, completely gave away its power in the course of the nineteenth century. Likewise, the landowner class lost much of its economic significance (see Bertocchi, 2006, for a detailed discussion). In contrast, the bourgeoisie and the intelligentsia, rose from a negligible social and economic status to become dominating social classes. Another set of important examples constitute religious or ethnic groups as well as immigrants. In particular, the latter - typically without much physical capital or educational background – often are more upward socially mobile than the locals in the host societies.<sup>2</sup>

Social thinkers, when put to the task of addressing these phenomena, have often singled out norms, such as hard work or the drive for educational attainment, as an explaining factor. The famous Weberian work ethic argument is just one, the most prominent of such theories.

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<sup>1</sup> Among the many factors that work against mobility are differential access to credit between the poor and the rich, especially coupled with opportunities for private schooling, and differential access to influential social networks.

<sup>2</sup> Specific examples include ethnic Indians in Africa and ethnic Chinese in Malaysia, see Sowell, 1996, for a more detailed account.

This line of reasoning, however, leaves unexplained the emergence of such norms, in particular, among relatively disadvantaged individuals.

Recent research in economics has attempted to endogenize culturally transmitted norms that may lead to economic progress. For example, Bisin and Verdier, 2001, offer a general approach to the intergenerational transmission of preferences; Gradstein and Justman, 2002, discuss its implications in the context of comparison of schooling systems; Botticini and Eckstein, 2005, 2006, deal with some of its labor market implications; and Becker and Woessmann, 2007, empirically argue that the leading factor behind the Weberian work ethic attributed to Protestantism was not its religious inclination, but its emphasis on human capital acquisition.

This paper's goal is to provide a framework for the analysis of the dynastic "reversal of fortune" across generations, especially focusing on an endogenous mechanism for its emergence. In particular, we study incentive issues within a family and parental instilling of work attitudes as the means to boost up children incentives.<sup>3</sup> We exhibit the possibility of such attitudes being inversely related to family wealth – implying spoiled children of rich parents and hard working children of poor parents. Survey based evidence, discussed below, strongly indicates such inverse relationship, both across and within countries. This, in turn, may imply impoverishment of rich dynasties relative to the poor ones, which is consistent with the decline

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<sup>3</sup> The evolving literature on the formation on social norms has proceeded mainly along two lines. One line emphasizes cultural evolution; Galor and Moav, 2002, is a seminal contribution that applies this approach to study long run economic growth. This paper is along the second line that focuses on deliberate socialization as in the above cited papers.

of European aristocracy and with the success of second generation immigrants well documented in the literature, see Carliner, 1980, Chiswick, 1977, Card, 2005.

The paper is related to the literature on intergenerational income mobility, as in Becker and Tomes, 1986, Loury, 1981, Maoz and Moav, 1999, Mookherjee and Napel, 2006. The emphasis here, however, is on the endogenization of the rise and fall of dynasties, as opposed to attributing it to random variations in abilities. This, of course, is not to suggest that the latter is not relevant, and the two approaches should be rather viewed as complementary. Bertocchi, 2006, and Galor and Moav, 2006, are the only papers we are aware of that pursue the endogenization route, both to address the demise of the traditional class structure. The former paper focuses on the changes in the inheritance laws, whereas the latter paper attributes it to the (endogenous) emergence of public education in the context of economic growth; here, in contrast, the emphasis is on the evolution of work attitudes. While the paper provides a complementary to the above work explanation to the demise of aristocracy, it is also consistent with economic successes of second generation immigrants, as discussed more in detail in the concluding section.

Another relevant literature is on the implications of the transmission of social norms as in Botticini and Eckstein, 2005, 2006, and Becker and Woessmann, 2007. Of most direct relevance here is Doepke and Zilibotti, 2007 (also Doepke and Zilibotti, 2005), who also study the implications of time preference as well as work norms on social mobility focusing on the

occupational choices.<sup>4</sup> While closely related to this paper's interest, Doepke and Zilibotti's, 2007, mechanism is very much different from the one exhibited below; in particular, they consider the slope of the earnings' profile across generations as the determining factor, ignoring family incentives – which are crucial here. Specifically, in Doepke and Zilibotti, 2007, the poor prefer their children to be patient and hard working in anticipation of their choosing an occupation with a steep wage increase, so that aspects of preferences and occupation choices are mutually reinforcing. Here, in contrast, the poor instill in their children working habits as a commitment device, to minimize children dependence on parental transfers.<sup>5</sup> The two approaches should be viewed as complementary.

A third related strand is the literature on family interaction, starting with Becker's 1974, seminal work. Gatti, 2005, and Lindbeck and Weibull, 1999, for example, discuss the efficiency implications of parental inability to commit to transfers. In a more specifically related work, Lindbeck and Nyberg, 2006, analyze instilling work norms as parental instrument to reduce children moral hazard; but they ignore the effect of parental wealth in this regard, as well as its dynamic implications. In the model below, aspects of family interactions featured in the literature are exploited and imbedded in a dynamic dynastical context to address the issue at hand.

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<sup>4</sup> On the latter aspect, see also Galor and Tsiddon, 1997, whose model's implications are remarkably consistent with the swings in the US income distribution.

<sup>5</sup> There some additional, more minor differences, such as the modeling of the motivation behind instilling of work attitudes: in Doepke and Zilibotti, 2007, this is driven solely by altruism, whereas in the model below, the parents also value their children sharing similar work attitudes.

The rest of the paper proceeds as follows. The model is introduced in the next section, followed by its analysis, in Section 3. Section 4 extends the basic analysis to consider the determination of work attitudes in the context of redistributive societies, and Section 5 concludes.

## 2. The model

Consider an OLG economy, with an infinite number of households, indexed  $i$ , consisting each of a parent and a child, operating in discrete time  $t$ . A household is initially characterized by income  $y_{i0} > 0$  and by a work norm,  $0 < \delta_{i0} < 1$ , whose both distributions are given and are uncorrelated; incomes and work norms in future periods will be endogenously determined in the model. The family's child is endowed with one unit of time.

In each generation income is disposed by the parent, and is allocated between consumption,  $c_{it}$ , and bequest transfers to the child,  $b_{it+1}$  while respecting the budget constraint

$$y_{it} = c_{it} + b_{it+1} \tag{1}$$

The parents also instill in children work attitudes or work norms, represented by the parameter  $\delta_{it+1}$ , normalized to lie in the unit interval. This assumption is consistent with the theories of deliberate socialization, as in, for example, Bisin and Verdier, 2001, Gradstein and Justman,

2002. Most of the literature views the parents as the primary source of social influence, see also Lindbeck and Nyberg, 2006, and work cited there. This cited work, specifically, testifies to parental socialization of work attitudes, see Eccles et al., 2000. Augmenting the model with aspects pertaining to potential peer influence does not add fundamentally new insights.

The young individual allocates time between effort  $n_{it+1}$  and leisure,  $1 - n_{it+1}$ . The effort could be interpreted as work, and it generates income of  $an_{it+1}$  where  $a$  is the productivity parameter. Identical productivities are assumed to differentiate the analysis from the vast literature where intergenerational mobility is generated exogenously, due to productivity differences, e.g., Loury, 1981.

The next-period income is then determined by parental transfers and young worker's effort,

$$y_{it+1} = an_{it+1} + b_{it+1} \quad (2)$$

The young individual's utility is defined over income and leisure, as follows:

$$V(y_{it+1}, 1 - n_{it+1}) = v(y_{it+1}) + (1 - \delta_{it+1})w(2 - n_{it+1}) \quad (3)$$

where  $0 \leq \delta_{it+1} \leq 1$  is interpreted as the work attitude or the work norm and is determined by the parents; and  $v', w' > 0$ ,  $v'', w'' < 0$ , and Inada conditions hold.

Parents are altruistic toward the children, and they derive utility from consumption; incur an emotional cost from having children with different work attitudes than themselves; and

their utility subsumes their child's one. While parents may have multiple motivations for instilling work attitudes in their children, sharing a common values systems is most likely one of these, see Lindbeck and Nyberg, 2006, for a fuller discussion of the literature in social psychology in this regard. We assume for illustrative purposes the following specification:

$$\begin{aligned}
 U(\delta_{it+1}, c_{it}, V) &= -C(\delta_{it} - \delta_{it+1}) + u(c_{it}) + V(y_{it+1}, 1 - n_{it+1}) = \\
 &-C(\delta_{it+1} - \delta_{it}) + u(c_{it}) + v(y_{it+1}) + (1 - \delta_{it+1})w(2 - n_{it+1})
 \end{aligned} \tag{4}$$

where  $C', C'' > 0$ , and  $u$  satisfies the same standard assumptions as the other sub-utilities.

A period describes a lifespan. In each period, the sequence of events is as follows. First, the parents instill work attitudes by setting  $\delta_{it+1}$ . Then the young individual allocates unit of time between effort and leisure. Finally, the parents determine the bequest transfers that jointly with the young individuals' efforts determine next period income. In equilibrium, these choices have to be mutually consistent.

The basic decision making structure within a period is similar to Lindbeck and Nyberg, 2006, with several main differences. First, our model considers the choice of the intensity of effort as opposed to the binary choice in Lindbeck and Nyberg, 2006. Also, there outcome is related to effort choice through random occurrence, whereas there is no uncertainty here. Additionally, Lindbeck and Nyberg, 2006, essentially assume group influences on the social norm; here, instead, parents value similarity in work attitudes to their children. Probably most

importantly, their utility assumptions essentially assume away potential income effects, which are viewed as crucial here.

### 3. Analysis

We proceed backwards. At the last stage, the parents leave bequests that maximize the utility (4), while taking account of (2), respecting the budget constraint (1) and treating prior choices as given. Simple manipulations reveal then that the optimal budget allocation is given as follows:

$$\begin{aligned}
 y_{it+1} &= F(y_{it} + an_{it+1}), \quad c_{it} = y_{it} + an_{it+1} - F(y_{it} + an_{it+1}), \\
 b_{it+1} &= \text{Max} \{0, F(y_{it} + an_{it+1}) - an_{it+1}\}
 \end{aligned} \tag{5}$$

where  $0 < F' < 1$  is parental demand function for the child's income.

Anticipating these decisions, the young now allocate the time unit between effort and leisure so as to maximize (4).

Assuming internal solutions for simplicity, the first order conditions are then as follows:

$$v'(F(y_{it} + an_{it+1}))F'(y_{it} + an_{it+1})a - (1 - \delta_{it+1}) w'(2 - n_{it+1}) = 0 \tag{6}$$

and the second order conditions are assumed to hold.

Clearly, as revealed by totally differentiating (6), young individuals' work time increases in the work norm parameter  $\delta_{it+1}$  and decreases in family income,  $dn_{it+1} / d\delta_{it+1} > 0$ ,  $dn_{it+1} / dy_{it} < 0$ . Both results are intuitive, as stricter work norms imply a lower marginal utility from leisure; and a higher level of family income leads to higher future bequests. It then also follows that future income,  $y_{it+1} = F(y_{it} + an_{it+1})$ , increases in the work attitude, as again revealed by differentiation,  $dy_{it+1} / d\delta_{it+1} = F' dn_{it+1} / d\delta_{it+1} > 0$ .

Before proceeding to analyze parental instilling of work norms, it is important to compare the solutions (5) and (6) to the corresponding values that would have been chosen by the parents had they control over children time allocation decisions. The following results are intuitive and are formally proved in the appendix:

**Proposition 1.** For given work norms, the chosen equilibrium effort by the young is smaller and the amount of parental transfer is larger than the ones preferred by the parents.

The key here is the moral hazard of the child, who – anticipating parental altruistic transfer – puts in too little effort from parental perspective. This is similar to the results in Gatti, 2005, and Lindbeck and Weibull, 1988, who in turn build upon Becker, 1974, 1981. It is essential for these results that the parents are unable to make their bequests fully contingent of children efforts; and that the scope for intergenerational bargaining on these issues is limited.

These results suggest some of the motivations parents have when molding children attitudes. A stricter work norm would increase the child's work effort, potentially bringing it

closer to parental bliss point. A counter-balancing factor is the smaller utility from child's leisure that is also valued by the parents. And a final consideration is parental desire to have children with work norms similar to themselves.

To optimally select the work norm for their children, the parents maximize utility while taking into account the anticipated choices, implicitly given by (5) and (6). Employing the envelope theorem leads then to the following first order conditions:

$$-C'(\delta_{it+1} - \delta_{it}) + u'(c_{it})[a(1-F')dn_{it+1}/d\delta_{it+1}] - w(2-n_{it+1}) = 0 \quad (7)$$

To get additional insights, it will now be helpful to assume more specific functional forms, in particular, that all sub-utilities  $u$ ,  $v$ , and  $w$  are logarithmic,  $\log(z)$ .

Direct calculations reveal then that

$$y_{it+1} = c_{it} = (y_{it} + an_{it+1})/2, \quad c_{it} = (y_{it} + an_{it+1}), \quad b_{it+1} = (y_{it} - an_{it+1})/2 \quad (5')$$

and  $n_{it+1}$  satisfies the first order condition:

$$a/(y_{it} + an_{it+1}) - (1 - \delta_{it+1})/(2 - n_{it+1}) = 0 \quad (6')$$

so equals

$$n_{it+1} = [2 - (1 - \delta_{it+1}) y_{it}/a] / (2 - \delta_{it+1}) \quad (8)$$

It will be useful to observe that a corner solution,  $n_{it+1} = 1$ , is obtained whenever  $\delta_{it+1} > (1 - \delta_{it+1})y_{it}/a$  and, in particular, when  $\delta_{it+1}$  is close to one, or when the family income level is small enough. Likewise,  $n_{it+1} = 0$ , is obtained whenever  $(1 - \delta_{it+1}) y_{it}/a > 2$  and, in particular, when  $\delta_{it+1}$  is small enough, or when family income is large enough.

Also note that

$$1 - n_{it+1} = [-\delta_{it+1} + (1 - \delta_{it+1})y_{it}/a] / (2 - \delta_{it+1}) \quad (9)$$

and

$$2 - n_{it+1} = (1 - \delta_{it+1})(2 + y_{it}/a) / (2 - \delta_{it+1}) \quad (10)$$

Differentiations of (8) yield the following results:

$$\begin{aligned} dn_{it+1} / dy_{it} &= -(1 - \delta_{it+1})/a(2 - \delta_{it+1}) < 0; \quad dn_{it+1} / d\delta_{it+1} = (y_{it}/a + 2)/(2 - \delta_{it+1})^2 > 0; \\ d^2 n_{it+1} / dy_{it} d\delta_{it+1} &> 0 \end{aligned} \quad (11)$$

We now turn to study the determination of work norms by the parents. In contemplating so doing, the parents maximize their utility while anticipating the decisions above. Employing the envelope theorem, the resulting first order conditions are as follows:

$$-C'(\delta_{it+1} - \delta_{it}) + (a/(y_{it} + an_{it+1})) dn_{it+1} / d\delta_{it+1} - \log(2 - n_{it+1}) =$$

$$\begin{aligned}
& -C'(\delta_{it+1} - \delta_{it}) + [(1 - \delta_{it+1}) / (2 - n_{it+1})] [(y_{it} / a + 2) / (2 - \delta_{it+1})^2] - \log(2 - n_{it+1}) = \\
& -C'(\delta_{it+1} - \delta_{it}) + 1 / (2 - \delta_{it+1}) - \log(2 - n_{it+1}) = 0
\end{aligned} \tag{12}$$

We assume that the left-hand side in (12) is positive at  $\delta_{it+1} = 0$  and is negative at  $\delta_{it+1} = 1$ ; both are likely to hold when  $\delta_{it}$  is small enough. These assumptions imply that (12) characterizes a utility maximizing work norm whenever the second order conditions hold, that is, when

$$\text{S.o.c.} = -C''(\delta_{it+1} - \delta_{it}) + 1 / (2 - \delta_{it+1})^2 + 1 / [(1 - \delta_{it+1}) (2 - \delta_{it+1})] < 0 \tag{13}$$

Totally differentiating (12) we first obtain  $d\delta_{it+1} / d\delta_{it} > 0$ , implying intergenerational transmission of work norms. This result is well consistent with recent empirical work that testifies to the importance of the origin country in determining the earnings of second generation immigrants, see Borjas, 1993, 1995, and Fernandez and Fogli, 2007. The latter paper specifically focuses on culture as a crucial determinant of work attitudes, concluding that cultural factors are transmitted from the first to the second immigrant generations.

Further, employing (10), it can be shown by differentiation that the left-hand side in (12) is a concave function of the child ability  $a$ . Suppose now that ability is unknown and is distributed according to a known distribution function in the beginning of the decision making process, when work norms are determined, and becomes only known afterwards. Thus, first the parents determine the work norms under the veil of ability uncertainty; then ability is

revealed; then children decide on their work efforts, and the parents finally make bequests. The last two stages proceed analytically in exactly same way as above, and the only difference is with the first stage where the work norms are determined. Note that the concavity of the left-hand side in (12) with respect to ability implies that it decreases with ability uncertainty which, totally differentiating (12), in turn, implies that the instilled work norm is a decreasing function of ability uncertainty. Associating ability with wage prospects, this then means that uncertain wage prospects lead to lower work norms in equilibrium.

Even more interestingly, differentiation with respect to income reveals that

$$d\delta_{it+1}/dy_{it} = (\text{S.o.c}) (y_{it}+2a) < 0 \quad (14)$$

so that the preferred work attitude for one's child is a decreasing function of family income. The intuition for this result is as follows. To constrain the child's moral hazard, all parents consider strengthening work norms. Because of the standard income effect, the adverse implications of moral hazard for the parents are more detrimental in poorer families, who are then more willing to instill strict work norms in their children.

Summarizing the main results,

**Proposition 2.** Parental work attitudes have a positive effect and uncertainty about future wages has a negative effect on instilled norms; and the richer a household the more lax will be the work norms its children receive.

The World Values Surveys provide an opportunity to get a sense to which the inverse relationship between material background and work attitudes holds in a large sample of countries and respondents. Several questions in the survey deal with work attitudes, one of them being "Work should come first even if it means less spare time", where the respondents were given five possibilities ranging from "strongly agree" to "strongly disagree". There are clearly negative relationships between the propensity to agree with the statement and the respondents' income or education level. For example, in the most recently available fourth wave of the surveys (1999-2004), about 66 percent of the respondents with lower education level strongly agree with the statement, whereas 17 percent strongly disagree (the rest being indifferent); the figures for the middle level of education are 59 percent and 28 percent respectively; and for upper education level they are 45 percent and 37 percent.

While this is indicative, the relationship could be driven by the differences in production functions across the countries, with various degrees of labor intensity, which results in corresponding attitudes to work. Taking account of countries' fixed effects, however, alleviates to some extent this concern and exhibits the same pattern; further, it holds for almost all sampled countries. For example, Figure 1 illustrates the pattern for the United States.

**INSERT FIGURE 1 HERE**

It can be clearly seen that the proportion of US respondents agreeing or strongly agreeing with the statement decreases and the proportion of those disagreeing or strongly disagreeing with it increases with education level.

Similarly, 45 percent of the respondents in the entire sample with lower education maintain that "Work is what makes life worth living, not leisure," as compared to 38 percent of individuals with middle education level, and 34 percent of individuals with upper education level.<sup>6</sup>

Jacob and Lefgren, 2007, provide yet another piece of supporting evidence. They find that low-income parents tend to place a larger weight of their children scholastic achievements relative to high-income parents, who value children general satisfaction with the attended school. Overall, these pieces of evidence provide reassurance that the differences in instilled norms across the income dimension are consistent with the above results.

We now examine the implication of these results for the next-period income. Employing (8), the latter can be written as follows:

$$y_{it+1} = (y_{it} + an_{it+1})/2 = (y_{it} + 2a)/2(2-\delta_{it+1}) \quad (15)$$

Differentiation of (15) reveals that  $dy_{it+1} / d\delta_{it} = [(y_{it} + 2a)/2(2-\delta_{it+1})^2] d\delta_{it+1} / d\delta_{it} > 0$ , so that a stricter parental work attitude generates – through the instilling of stricter work norms in the

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<sup>6</sup> In the US, 23 percent of low educated individuals believe that "work is what makes life worth living"; but only 12 percent among highly educated individuals.

children – a higher level of next-period income. Differentiation of (15) with respect to parental income yields:

$$\begin{aligned}
\text{Sign}(dy_{it+1} / dy_{it}) &= \text{Sign} \{2-\delta_{it+1} + (2a+y_{it}) d\delta_{it+1}/dy_{it}\} = \\
&\text{Sign} \{2-\delta_{it+1} + 1 /[-C'' + (1/(2-\delta_{it+1}))^2 + 1/(1-\delta_{it+1})(2-\delta_{it+1})]\} = \\
&\text{Sign} \{1 + 1 /[-(2-\delta_{it+1})C'' + 1/(2-\delta_{it+1}) + 1/(1-\delta_{it+1})]\} \tag{16}
\end{aligned}$$

In (16), the first term is positive to reflect the income effect that generates higher bequests, and the second term is negative because of the adverse income effect on work norms. (16) can be negative when, for example,  $C''$  is large enough. This illustrates the possibility of a reversal of fortune, whereby next-period income ranking of some households is inversely related to the current ranking. In particular, currently poor households may become in the next generation better off relatively to the currently rich households.

To sum up,

**Proposition 3.** There is a possibility of an endogenous reversal in income ranking across some households from one period to the next.

In particular, note that a poor household with a strict work attitude is especially likely to be upward mobile, whereas a rich household with a lax work attitude may well end up being poor in the next generation. To further illustrate the intertemporal income evolution, consider two

dynasties, with different income but initially identical work attitudes,  $y_{r0} > y_{p0}$ ,  $\delta_{r0} = \delta_{p0}$ . The above analysis then implies that in period 1, the work norm in the poor family will be higher than in the rich family,  $\delta_{p1} > \delta_{r1}$ , whereas income overtaking may or may not take place. In particular, assuming that the income ranking of the two families is still preserved,  $y_{r1} > y_{p1}$ , it follows that the stricter work norm in the poor family will prevail – both because of the income effect and also because of the stricter parental norm. This indicates that the change in income ranking of the two families may take several generations.

While this model assumes individual responsibility for children upbringing, it could be argued that the public school system often plays an important role in molding children values. In the appendix, an implication of this alternative assumption is briefly examined in the context of politically determined work attitudes. In particular, it is shown that an oligarchic political system, by instilling lax work norms, leads to slower economic growth than a democratic system.

#### **4. Income redistribution and work norms**

We now consider how income redistribution policies affect the above analysis. Redistribution is modeled by assuming that a proportional income tax, say  $0 \leq T \leq 1$ , is levied on period  $t$ 's income to finance a lump sum next period transfer to every household. With such budget balanced redistribution scheme, the budget constraint each parent faces becomes:

$$y_{it} (1-T) = c_{it} + b_{it+1} \quad (1')$$

whereas future income of a household is given by:

$$y_{it+1} = TY_t + an_{it+1} + b_{it+1} \quad (17)$$

where  $Y_t$  is the average period  $t$  income. The higher the tax rate the more intensive income redistribution.<sup>7</sup> The sequence of events is as previously.

Simple calculations reveal that the analysis of the last two stages of the period decision making is as above, with  $z_{it} = y_{it} (1-T) + TY_t$  replacing  $y_{it}$  everywhere.<sup>8</sup> We focus, therefore, on the third stage. The first order conditions determining the work attitudes are then as in (12), with  $2 - n_{it+1} = (1 - \delta_{it+1})(2 + z_{it}/a) / (2 - \delta_{it+1})$ ,

$$C'(\delta_{it+1} - \delta_{it}) + 1/(2 - \delta_{it+1}) - \log [(1 - \delta_{it+1})(2 + z_{it}/a) / (2 - \delta_{it+1})] = 0 \quad (18)$$

Totally differentiating (18) and recalling the second order conditions, we obtain that the equilibrium work attitude increases in  $T$  when  $y_{it} > Y_t$  and decreases in  $T$  otherwise. Comparing

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<sup>7</sup> A constant tax rate across time is assumed for simplicity.

<sup>8</sup> Thus, the amount of bequests as determined from the first order conditions in the last stage is  $b_{it+1} = (y_{it}(1-T) + TY_t - an_{it+1})/2$ , so that  $y_{it+1} = (y_{it}(1-T) + TY_t + an_{it+1})/2$ ; and  $n_{it+1} = [2 - (1 - \delta_{it+1})(y_{it}(1-T) + TY_t)] / (2 - \delta_{it+1})$  and  $2 - n_{it+1} = (1 - \delta_{it+1})(2 + (y_{it}(1-T) + TY_t)/a) / (2 - \delta_{it+1})$ .

high-redistribution with low-redistribution societies, this then implies that that work ethic is expected to be stricter among the rich and weaker among the poor in the former relative to the latter.

Totally differentiating with respect to  $y_{it}$  as in the above analysis yields

$$d\delta_{it+1}/dy_{it} = (\text{S.o.c}) (z_{it}+2a)/(1-T) < 0 \quad (19)$$

and further differentiation reveals that  $d^2 \delta_{it+1}/dy_{it} dT < 0$ , implying that the inverse relationship between family income and work norms is steeper in redistributive societies.

To sum up,

**Proposition 4.** Extending the analysis to take redistribution into account, we obtain that the main result, that work attitudes are inversely related to income, is even strengthened. Moreover, work norms are expected to be stricter among the rich but weaker among the poor in high-redistribution societies relative to low-redistribution ones.

## 5. Concluding remarks

This paper endogenizes the determination of work attitudes in a dynamic macroeconomic context. Its building block is intergenerational conflict of interests between parents and children that results in disincentives to generate adequate work effort in anticipation of parental

transfer. Parental instilling of work norms is then an instrument to mitigate their moral hazard consequences, and the motive to use it decreases with income. Survey data strongly indicates support for this inverse relationship, both across and within countries. This, further, generates the possibility of dynastic reversals of fortune, whereby descendants of poor families overtake the descendants of rich families. We conclude by discussing some relevant evidence for this scenario.

One piece of historical evidence is reviewed in detail in the related work Doepke and Zilibotti, 2007 (see also Bertocchi, 2006).<sup>9</sup> It is argued there that landowner classes in European countries did not reap at all the opportunities offered by the Industrial Revolution – which is surprising given their economic wealth and political clout. This is interpreted as the unwillingness on their part to forgo immediate life comfort in order to pursue for the young children demanding occupational careers. In contrast, middle classes were prepared to undertake long term human capital investments required to pursue prospective promising occupations. Further, it is argued that the consumption of leisure by the landed aristocracy was measurable higher, whereas industrious and financial investment activity was lower, that in the case of the middle case. These historical facts are consistent with this paper’s framework.

Evidence on the economic assimilation of immigrants is in some sense even more relevant. Semi-anecdotal stories about immigrants' hard working attitudes and economic successes are abundant, see Sowell, 1996, for these in the context of several ethnic immigrant groups. A more carefully compiled piece of evidence comes from the analysis of second

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<sup>9</sup> The reader is referred to that paper for additional discussion and references on this issue.

generation immigrants.<sup>10</sup> This literature has followed the lead of Chiswick, 1977, 1978, who finds income convergence across the first two immigration cohorts in the US. Lending further support, Borjas, 1993, in the US context and Hammarstedt and Palme, 2006, in the context of Sweden, using detailed datasets find strong evidence of income convergence from the first to the second generation of immigrants. Further, both Borjas, 1995, and Hammarstedt and Palme, 2006, in their different contexts, also discern a large variation across the immigrants' countries of origin, which in itself is a significant contributing factor to the immigrants' earnings. Hansen and Kucera, 2004, discover convergence in educational attainment in Canada. Card, 2005, reviewing several recent studies, comes to the conclusion that second generation immigrants have higher education and wages than the natives in their cohort; and even children of the least educated immigrant origin groups have closed most of the education gaps.

Both the findings on convergence, in education and in earnings, between second generation immigrants and the natives, and also the differences across countries of origin are consistent with the model's framework. Moreover, these pieces of evidence about reversals of fortunes pertaining to population groups also help to distinguish our model from the standard models of intertemporal mobility that rely on exogenous ability variations. Since ability is perceived in these models to be an individual specific characteristic, they do not seem to be consistent with the rise and fall of groups of individuals. In contrast, this paper's model generates predictions that may explain the emergence of group-specific norms relevant for these groups' economic success or failure.

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<sup>10</sup> Generally defined as local born individuals to foreign born parents.

## Appendix

### A. Proof of Proposition 1.

Omitting subscripts for notational simplicity and using asterisks to denote the equilibrium values, we write the first order equilibrium conditions for parental bequests and the young individual's effort choice as follows:

$$-u'(y-b^*) + v'(b^*+an^*) = 0 \quad (\text{A1})$$

$$v'(b^*+an^*)[db^*/dn^* + a] - (1-\delta)w'(2-n^*) = 0 \quad (\text{A2})$$

where  $db/dn < 0$  as follows from differentiating (A1); the envelope theorem was employed in deriving (A2).

In contrast, if the parent had full control over the child's effort as well as over bequests, her optimal choices would have to satisfy:

$$-u'(y-b) + v'(b+an) = 0 \quad (\text{A3})$$

$$v'(b+an)a - (1-\delta)w'(2-n) = 0 \quad (\text{A4})$$

The concavity properties of sub-utilities then imply, comparing (A1) and (A2) with (A3) and (A4), that  $b^* < b$  and  $n^* > n$ .

It can also be shown that the period equilibrium choices are socially sub-optimal for given work norms. Indeed the optimal values maximize the sum of utilities of the family members, yielding the first order conditions:

$$-u'(y-b^o) + v'(b^o+an^o) + \lambda v'(b^o+an^o) = 0 \quad (\text{A5})$$

$$v'(b^o+an^o) - (1-\delta)w'(2-n^o) = 0 \quad (\text{A6})$$

Comparing (A1) and (A2) with (A5) and (A6) respectively, we observe that  $b^* < b^o$ , and  $n^* < n^o$ , so that the equilibrium levels of bequests and effort are smaller than the optimal ones.

### *B. Political determination of work attitudes through public schools*

To see the implications of the main results in the context of politically determined work attitudes such as through public education, suppose that all parents initially share the same work attitude, determined by the parameter  $\delta_0$ . Further, the work attitude in each subsequent period is determined collectively, through voting.<sup>11</sup> Thus, in each period the collective decision on  $\delta_t$  is made; then the parents allocate family income; finally, the children allocate their time unit between effort and leisure.

The analysis of the last two stages in the decision making sequence is analogous to the above. And an equation similar to (12) determines parental preferences in regard to children values:

$$C'(\delta_{t+1} - \delta_t) + 1/(2-\delta_{t+1}) - \log(2-n_{it+1}) = 0$$

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<sup>11</sup> Thus, in each period all individuals share the same attitudes. While this is an extreme assumptions, it complements the other extreme case, considered above, whereby the public had no influence on children values.

As implied by Proposition 2, these preferences are inversely related to family income. When the political process can be proxied by the one-man-one vote system, standard considerations imply that the median income voter is decisive. In contrast, in an oligarchic political system, which excludes low-income individuals from political participation, or, more generally, where there is political bias so that the richer a household the larger is its political weight, an individual with a higher than the median income is decisive. In any case, it should be clear that political bias implies that the decisive voter will choose a lower level of the work attitude than the one preferred by the median voter in a democracy. Letting  $Y_{t+1}$  denote the average next-period income, it follows from (5') that

$$Y_{t+1} = (Y_t + a \int n_{jt+1} dj) / 2$$

where each  $n_{jt+1}$  increases in the work norm. This implies that the larger is the political bias the lower is the economy's growth rate. To the extent that slow growth endangers the prevailing political system, it could be argued, therefore, that under oligarchic political system, the ruling elite sows the seeds of its own decline by neglecting the cultivation of hard work attitudes.

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Figure 1. Importance of work across education levels, US, 1999 (Source: World Values Surveys)

