

Born free[☆]

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ABSTRACT

This paper studies coercive labor institutions in a Malthusian framework, where class is hereditary: children born by free workers are free, while children of slaves are the property of their parents' masters. When productivity increases in an urban and slave-free sector, and more free workers migrate there, slave owners respond by feeding slaves better to increase their reproduction, and thus replace migrating free workers with the slaves' offspring. As a result, slaves are made better off in the short run, while their long-run representation in the rural workforce—and possibly even the overall population—increases.

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1. Introduction

"[I]n all societies where the institution [of slavery] acquired more than marginal significance and persisted for more than a couple of generations, birth became the single most important source of slaves. Of the great majority of slaveholding societies the stronger claim may be made that birth during *most* periods was the source of *most* slaves."

Patterson (1982, p. 132, italics in the original).

Human societies vary greatly in how much they rely on coerced labor. No current legal system recognizes property rights in humans, certainly not as explicitly as some did in the past, and the importance of slavery has varied greatly also among preindustrial societies.

This has inspired an extensive body of theoretical research, discussed further below, where a common implicit assumption is a homogeneous workforce, i.e., that all workers are equally easy to coerce, or enslave. The models tend to be static.

Here we study slavery in a dynamic two-sector model with urban–rural migration. Malthusian forces govern reproductive success, and workers are either slaves, or free, from birth. This offers several interesting insights about the effects of urban development on both the fraction slaves in the population, and their well-being.

According to the theory, when the slave-free urban sector grows and attracts more free workers, slave owners respond by improving the material well-being of slaves, to increase their reproductive success, and thus replace migrating free workers with the slaves' offspring. Slave owners are not compelled by any market forces to pay slaves more, since slaves have no rights, and cannot be employed in the urban sector. However, owners want to raise slaves' reproduction to substitute slave labor for that of migrating free workers.

The upshot is that urbanization improves the short-run well-being of slaves, and thereby also increases their long-run representation in the rural workforce. More surprisingly, we show that slaves' steady-state representation in the *overall* population, spanning both sectors, may increase. We pin down parametric conditions under which this is the case.

The model builds on a few, arguably plausible, assumptions:

- Slavery is hereditary (i.e., offspring of slaves are the property of the parent's owner).
- Reproductive success is an increasing function of parental resources.
- Only free workers can work in the urban sector.
- The cost of child rearing is higher in the urban sector than the rural.
- Free labor and slaves are substitutes in the rural sector.

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These all seem empirically valid, at least for most slave societies. Slavery being hereditary can be motivated by the quote from Orlando Patterson above. There have been other sources of slave labor, in particular war captives, but the long-run survival of any slave system seems to depend on internal regeneration. For example, according to Scheidel (2011, p. 308), in the Roman Empire natural regeneration was a more important source of slave supply than war and all other sources combined. Also, most slave societies, including the Roman Empire, had codes regulating the status of slaves' offspring (Patterson, 1982, Ch. 5).

Slaves' reproduction being an increasing function of resources allocated to them is consistent with an often documented interest in slaves' reproduction on part of their owners. For example, in the US South slave owners promoted early slave marriage, and spent resources on the medical treatment of slaves.¹

The assumption that the urban sector uses only free labor could be motivated by coercion being less effective when production is more care- than effort-intensive, as argued by Fenoaltea (1984), or by different laws and institutions in cities.²

Child rearing being costlier in the urban sector captures the historically higher mortality rates in cities, and generates an often-documented urban wage premium, similar to e.g. Cruz and Taylor (2012).

Free workers and slaves being relatively close, if not perfect, substitutes seems reasonable, at least for small-scale farming, probably common throughout most of human history since the Neolithic transition. In the antebellum US South, slaves and free workers were substitutes on small farms, although not on big plantations (Field, 1988). Moreover, when production modes are flexible some slave-free substitution should be feasible also in large-scale production. Temin (2004) suggests that slaves and free workers in the Roman Empire competed on the same labor markets.

While these assumptions all seem plausible, the long-run prediction they lead up to is arguably somewhat unexpected: increased urban productivity may lead to a more enslaved population in steady state.

The rest of this paper is organized as follows. Section 2 provides a brief overview of some existing theoretical work. Then Section 3 sets up the model and solves for the optimal choices of all agents. Section 4 studies the outcomes in steady state: first Section 4.1 treats out-migration of rural-born free workers as exogenous; then Section 4.2 endogenizes the migration decision and studies the free-slave composition of the population across both sectors. Section 5 discusses some extensions and possible applications. Section 6 ends with a concluding discussion.

2. Previous literature

Much has been written on coercive labor arrangements (e.g., Domar, 1970; Bergstrom, 1971; Chwe, 1990; Genicot, 2002; Conning, 2004; Lagerlöf, 2009; Acemoglu and Wolitzky, 2011; Fenske, 2013). This contribution can be compared to two of these.

Lagerlöf (2009) models an environment where an elite can, at a cost, claim property rights over (land and/or) people, i.e., enslave them. Following Domar (1970) and Conning (2004), the incentives to enslave people are stronger when labor is scarce relative to land. In a very literal interpretation, a transition from a free-labor environment to slavery there amounts to a previously free population being

completely enslaved from one generation to the next. Here the elite always own *some* slaves (as well as all land), but the size of the slave population is endogenous. Thus, there are no institutional “transitions” in the sense of Lagerlöf (2009), but given an institutional environment that permits slavery, the model allows us to study the determinants of the composition of the population.

Acemoglu and Wolitzky (2011) take a different approach, using a principle-agent model where the agent (a worker) controls effort, and coercion amounts to the principal (a landowner) spending resources on lowering the agent's outside options. An exogenous improvement in the agent's outside options can then induce the principal to use less coercion.³ The key mechanism is that effort and coercion are complementary: when the agent's participation constraint becomes harder to satisfy, the principal responds by extracting less effort, thus using less coercion.

An implicit assumption in Acemoglu and Wolitzky (2011) is that all workers are equally coercible, at a cost. Here we assume that some workers (slaves) can be coerced without cost, but must be fed to produce offspring (i.e., future slaves), while others (free workers) cannot be coerced at all, but are hired on a competitive labor market, and reproduce themselves. This generates quite different mechanics. As in the Acemoglu–Wolitzky model, better outside options for free workers here induce the elite to treat slaves better in the short run, but the long-run effect is a more coerced agricultural labor force.⁴

While this paper seems to be the first to explicitly model the slave population as a capital stock, Canaday and Tamura (2009) model investment in slaves' (plantation-specific) human capital.

The link from fertility differentials between population groups to the composition of the population has been modeled in many other contexts (e.g., Galor and Moav, 2001, 2002; Kremer and Chen, 2002; Lucas, 2002; de la Croix and Doepke, 2003, 2009). Ours is perhaps closest to that of Lucas (2002, Ch. 5). However, none of these studies the dynamics of classes with different institutional status, such as slaves and free workers.

3. The model

The basic framework is a standard Malthusian model, like that of, e.g., Ashraf and Galor (2011), but with different classes and a forward-looking elite, similar in spirit to Lucas (2002, Ch. 5).

There are three social classes—free workers, slaves, and a slave-owning elite—and two sectors—an urban sector, using only free labor, and a rural sector, using both slaves and free labor.

Free workers and slaves, collectively referred to as just workers, live in overlapping generations for two periods: as passive children in the first, and working adults in the second, supplying one unit of labor each. The elite are infinitely lived and of constant (and small) size, which can be interpreted as each elite agent having one offspring who inherits her property (land and slaves).⁵

In period t there are S_t (adult) slaves, and L_t and F_t (adult) free workers in the rural and urban sectors, respectively. All these evolve endogenously over time, both through free workers' migration decisions, and because class status is inherited.

³ This can account for some specific historical events, such as the decline of serfdom in the wake of the Black Death, related to the so-called Brenner Debates; cf. Brenner (1976).

⁴ Acemoglu and Wolitzky (2011) also find that an increase in the price of the (agricultural) output which the principal produces leads to more coercion, which can be compared to the effects of rising rural productivity in our model; see Section 5.2.

⁵ This assumption is not important, but ensures that the elite does not expand in size, compressing their living standards to the level of workers.

¹ See, e.g., Fogel and Engerman (1974, pp. 78–86, 117–126), White (1999, Ch. 3), and Kolchin (2003, pp. 114–115, 123, 139). While Fogel and Engerman (1974) famously argue that “slave-breeding” was exceedingly rare in the antebellum South, they readily concede that slave owners rewarded reproduction.

² Yet another interpretation could be that slaves who do work in urban professions are better treated and therefore less exploited than in the rural sector, and in that sense closer to free on a slave-free continuum.

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