Online Supplement for "Slavery and the British Industrial Revolution" (Not for Publication)

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S.2 Online Supplement

This *Online Supplement* develops the theoretical model from Section 6 of the paper in further detail. Section S.2.1 reports the derivation of all results including the proof of Proposition 1 in the paper and Section S.2.2 develops an extension of our theoretical model to incorporate investments in all locations and a gravity equation for investment flows. Finally, Section S.2.3 provides further details about the data sources and definitions.

S.2.1 Theoretical Framework

In this section of the Online Supplement, we provide further details on our theoretical model of economic development and structural transformation. We consider a conventional specific-factors model, in which agriculture is land-intensive and manufacturing is capital-intensive. We extend this framework to incorporate population mobility across locations within Britain and investment in colonial slave plantations.

We compare the actual world in which Britain has access to these colonial slavery investments to a counterfactual world in which it does not. We show that access to these colonial slavery investments expands the set of investment opportunities, and raises the rate of return to capital accumulation. This increase in the rate of return to capital accumulation leads to a higher steady-state *domestic* capital stock in the actual world with investments in colonial slave plantations than in the counterfactual world without. This domestic capital accumulation causes an expansion of the capital-intensive manufacturing sector, and a contraction of the land-intensive agricultural sector.

We allow the financial frictions to investing in colonial slave plantations to vary geographically within Britain, with distance from slave ports and family connections to the slave trade. To match our empirical findings that domestic investments satisfy a gravity equation, we also assume domestic financial frictions such that investments are concentrated locally. Under these assumptions, the higher steady-state domestic capital stock in locations with better access to colonial slavery investments leads to an expansion in the local manufacturing sector, a contraction in the local agricultural sector, and an increase in local population density.

Although we focus on colonial investments in slave plantations, because we observe them in our data, our mechanism applies more generally to other colonial investments. This mechanism is nevertheless especially powerful for colonial investments in slave plantations for two main reasons. First, labor costs for these investments were determined by the price of slaves rather than the wage of free workers, implying lower labor costs and higher profitability (otherwise free workers would have been used by revealed preference). Second, these investments were especially collateralizable, because enslaved people were treated as property.

S.2.1.1 Model Setup

We consider a set of small open economies: many domestic locations indexed by $i, n \in \{1, \ldots, N\}$ and a colonial plantation $\mathbb{N}$. Time is discrete and indexed by t.

The world economy includes four types of agents: workers, capitalists, landlords and enslaved persons. Workers, capitalists and landlords are located in the domestic economy. Enslaved persons work in the colonial plantation. There are three sectors of economic activity: agriculture and manufacturing (produced in the domestic economy) and plantation products (produced in the colony). Agriculture is produced with labor and land. Manufacturing is produced with labor and capital. Workers are mobile between the two domestic sectors. But land and capital are specific factors that only can be used in agriculture and manufacturing respectively. Enslaved persons and capital produce plantation goods.[1]

Workers are endowed with one unit of labor that is supplied inelastically. They are geographically mobile across locations within the domestic economy, but geographically immobile between the domestic economy and the colonial slave plantation. Landlords in each domestic location are geographically immobile and own local land (m_n).

Capitalists are geographically immobile and own local capital (k_{nt}). Each period, they allocate capital to either local manufacturing or to plantation production. They also make a dynamic consumption-investment decision. They can either invest their assets (a_{nt}) in capital (k_{nt}) or a consumption bond that pays a constant rate of return ρ. Investments in capital are subject to collateral constraints, such that capitalists can only invest a multiple of their current assets: $k_{nt} \leq \lambda_n a_{nt}$. If they invest in capital, they observe idiosyncratic draws for the productivity of each unit of capital if invested in each location. These idiosyncratic productivity draws give rise to a downward-sloping Keynesian marginal efficiency of capital schedule for each location, and imply that investments are imperfect substitutes across locations, as in the recent research on asset demand systems.

Capitalists face financial frictions, such that $\phi_{nit} \geq 1$ units of capital must be invested from location n in order for one unit to be available for production in location i. We allow domestic locations n to differ in their financial frictions of investing in the colonial slave plantation ($i = \mathbb{N}$), consistent with the observed variation in slaveholding across domestic locations in the data. We also assume that domestic locations n face financial frictions investing in other domestic locations $i \neq n$, consistent with the observed decline in domestic investments with distance in the data. In our baseline specification, we assume for simplicity that these financial frictions to other domestic locations are prohibitive, such that all domestic investments occur

[1] For simplicity, we abstract from land use in plantation products and capital use in agriculture, although both can be introduced. What matters is that plantation products and domestic manufacturing both use capital, and domestic manufacturing is more capital-intensive than domestic agriculture.

locally. In Online Supplement S.2.2, we develop an extension, in which capitalists can invest in any domestic location subject to financial frictions that increase with distance.

S.2.1.2 Preferences

The flow of utility for worker ϑ in location n at time t ($u_{nt}(\vartheta)$) depends on a consumption index (c_{nt}), amenities that are common across workers (B_{nt}), and an idiosyncratic amenity draw ($b_{nt}(\vartheta)$) that is specific to individual workers and captures all the idiosyncratic reasons why an individual worker can choose to locate in a particular region:

$$u_{nt}(\vartheta) = \ln B_{nt} + \ln c_{nt} + \kappa b_{nt}(\vartheta), \tag{S.2.1}$$

where the parameter κ regulates the heterogeneity in idiosyncratic amenities. The consumption index (c_{nt}) is defined over consumption of the output of the agricultural, manufacturing and plantation sectors and is assumed to take the constant elasticity of substitution (CES) form:

$$c_{nt} = \left[\left(\beta_t^A c_{nt}^A\right)^{\frac{\sigma-1}{\sigma}} + \left(\beta_t^M c_{nt}^M\right)^{\frac{\sigma-1}{\sigma}} + \left(\beta_t^S c_{nt}^S\right)^{\frac{\sigma-1}{\sigma}}\right]^{\frac{\sigma}{\sigma-1}}, \qquad 0 < \sigma < 1, \tag{S.2.2}$$

where σ is the elasticity of substitution across sectors and (β_t^A, β_t^M, β_t^S) control the relative weight of the agricultural, manufacturing and plantation sectors in utility. The corresponding indirect utility function takes the following form:

$$u_{nt}(\vartheta) = \ln B_{nt} + \ln w_{nt}^L - \ln p_{nt} + \kappa b_{nt}(\vartheta), \tag{S.2.3}$$

where w_{nt}^L is wage and p_{nt} is the dual consumption price index. This dual price index is defined over agricultural, manufacturing and plantation prices (p_{nt}^A, p_{nt}^M, p_{nt}^S):

$$p_{nt} = \left[\left(p_{nt}^A/\beta_t^A\right)^{1-\sigma} + \left(p_{nt}^M/\beta_t^M\right)^{1-\sigma} + \left(p_{nt}^S/\beta_t^S\right)^{1-\sigma}\right]^{\frac{1}{1-\sigma}}. \tag{S.2.4}$$

S.2.1.3 Production

Agriculture, manufacturing and plantation products are produced under conditions of perfect competition and constant returns to scale. For simplicity, we assume that the production technologies take the following Cobb-Douglas form. Outputs of agriculture (y_{nt}^A), manufacturing (y_{nt}^M) and plantation products (y_{nt}^S) are therefore:

$$y_{nt}^A = z_{nt}^A \left(\frac{m_n}{\alpha^A}\right)^{\alpha^A} \left(\frac{\ell_{nt}^A}{1-\alpha^A}\right)^{1-\alpha^A}, \qquad 0 < \alpha^A < 1, \qquad n \in \{1, \ldots, N\}, \tag{S.2.5}$$

$$y_{nt}^M = z_{nt}^M \left(\frac{k_{nt}^M}{\alpha^M}\right)^{\alpha^M} \left(\frac{\ell_{nt}^M}{1-\alpha^M}\right)^{1-\alpha^M}, \qquad 0 < \alpha^M < 1, \qquad n \in \{1, \ldots, N\}, \tag{S.2.6}$$

$$y_{\mathbb{N}t}^S = z_{\mathbb{N}t}^S \left(\frac{k_{\mathbb{N}t}^S}{\alpha^S}\right)^{\alpha^S} \left(\frac{h_{\mathbb{N}t}^S}{1-\alpha^S}\right)^{1-\alpha^S}, \qquad 0 < \alpha^S < 1, \tag{S.2.7}$$

where (z_{nt}^A, z_{nt}^M, $z_{\mathbb{N}t}^S$) denote productivity in the agriculture, manufacturing and plantation sectors respectively; recall that m_n is the supply of land; ℓ_{nt}^A and ℓ_{nt}^M labor input in agriculture and manufacturing respectively; $h_{\mathbb{N}t}^S$ is the input of enslaved labor for plantation products; and k_{nt}^M and $k_{\mathbb{N}t}^S$ are capital used in manufacturing and plantation products, respectively.

As the production technologies (S.2.5) and (S.2.6) satisfy the Inada conditions, it follows that each domestic location will produce both the agricultural and manufacturing goods for positive land endowments (m_n) and positive domestic capital allocations (k_{nt}^M), and the colonial location will produce plantation products for positive inputs of enslaved labor (h_{nt}^S) and capital (k_{nt}^S).

Each location is connected to world markets through iceberg trade costs ($\tau_{it}^A \geq 1$, $\tau_{it}^M \geq 1$, $\tau_{it}^S \geq 1$) and faces exogenous prices for each good on world markets (p_t^{AW}, p_t^{MW}, p_t^{SW}).[2] Therefore, no-arbitrage with international prices determines the domestic price of agricultural and manufacturing goods, depending on whether a location is an exporter or importer of manufacturing:

$$p_{nt}^A = \tau_{nt}^A p_t^{AW}, \qquad p_{nt}^M = p_t^{MW}/\tau_{nt}^M, \qquad \text{if } c_{nt}^A > y_{nt}^A \text{ and } y_{nt}^M > c_{nt}^M, \tag{S.2.8}$$

$$p_{nt}^A = p_t^{AW}/\tau_{nt}^A, \qquad p_{nt}^M = \tau_{nt}^M p_t^{MW}, \qquad \text{if } y_{nt}^A > c_{nt}^A > \text{ and } c_{nt}^M > y_{nt}^M, \tag{S.2.9}$$

$$\text{for} \qquad n \in \{1, \ldots, N\}.$$

All domestic locations are importers of plantation products, and hence the domestic price of these products is again determined by no-arbitrage as:

$$p_{nt}^S = \tau_{nt}^S p_t^{SW}, \qquad n \in \{1, \ldots, N\}. \tag{S.2.10}$$

Using these domestic prices for agriculture (p_{nt}^A), manufacturing (p_{nt}^M) and services (p_{nt}^S) from price arbitrage, we can solve for the overall domestic consumption price index (p_{nt}) in equation (S.2.4) above.

S.2.1.4 Agricultural Production

Landlords choose inputs of labor (ℓ_{nt}^A) and land (m_{nt}^A) in the agricultural sector to maximize profits. In equilibrium, all land is employed in the agricultural sector ($m_{nt}^A = m_n$), and landlords' profit maximization problem reduces to:

$$\max_{l_{nt}^A} \left\{ p_{nt}^A z_{nt}^A \left(\frac{m_n}{\alpha^A}\right)^{\alpha^A} \left(\frac{\ell_{nt}^A}{1-\alpha^A}\right)^{1-\alpha^A} - w_{nt}^L \ell_{nt}^A - q_{nt} m_{nt} \right\}, \tag{S.2.11}$$

[2] While our baseline specification assumes for simplicity that locations are small open economies that face exogenous world market prices, we can also allow for an endogenous terms of trade.

where q_{nt} is the price of land. From the first-order condition for employment, we have:

$$\left(1-\alpha^{A}\right) p_{nt}^{A} z_{nt}^{A}\left(\frac{m_{n}}{\alpha^{A}}\right)^{\alpha^{A}}\left(\frac{1}{1-\alpha^{A}}\right)^{1-\alpha^{A}}\left(\ell_{nt}^{A}\right)^{-\alpha^{A}}-w_{nt}^{L}=0,$$

$$\left(1-\alpha^{A}\right) p_{nt}^{A} z_{nt}^{A}\left(\frac{m_{n}}{\alpha^{A}}\right)^{\alpha^{A}}\left(\frac{1}{1-\alpha^{A}}\right)^{1-\alpha^{A}}\left(\ell_{nt}^{A}\right)^{-\alpha^{A}}=w_{nt}^{L},$$

$$\frac{p_{nt}^{A} z_{nt}^{A}}{w_{nt}^{L}}\left(\frac{m_{n}^{A}}{\alpha^{A}}\right)^{\alpha^{A}}\left(\frac{1}{1-\alpha^{A}}\right)^{-\alpha^{A}}=\left(\ell_{nt}^{A}\right)^{\alpha^{A}},$$

$$\ell_{nt}^{A}=\left(\frac{p_{nt}^{A} z_{nt}^{A}}{w_{nt}^{L}}\right)^{\frac{1}{\alpha^{A}}}\left(\frac{1-\alpha^{A}}{\alpha^{A}}\right) m_{n}. \tag{S.2.12}$$

Profit maximization and zero profits imply that the price of land can be expressed as:

$$q_{nt}=\left(p_{nt}^{A} z_{nt}^{A}\right)^{\frac{1}{\alpha^{A}}}\left(w_{nt}^{L}\right)^{-\frac{1-\alpha^{A}}{\alpha^{A}}}. \tag{S.2.13}$$

S.2.1.5 Manufacturing Production

Each capitalist chooses their inputs of labor (ℓ_{nt}^{M}) and effective units of capital ($\widetilde{k}_{nt}^{M}$) in the manufacturing sector to maximize their profits:

$$\max_{l_{nt}^{M}, k_{nt}^{M}}\left\{p_{nt}^{M} z_{nt}^{M}\left(\frac{\widetilde{k}_{nt}^{M}}{\alpha^{M}}\right)^{\alpha_{M}}\left(\frac{\ell_{nt}^{M}}{1-\alpha^{M}}\right)^{1-\alpha^{M}}-w_{nt}^{L} \ell_{nt}^{M}-r_{nt} \widetilde{k}_{nt}^{M}\right\}, \tag{S.2.14}$$

where we use the tilde to distinguish effective units of capital after taking into account idiosyncratic productivity draws ($\widetilde{k}_{nt}^{M}$) from actual units of capital without taking into account these idiosyncratic productivity draws (k_{nt}^{M}); and r_{nt} denotes the rental rate per effective unit of capital in domestic manufacturing. From the first-order condition for employment, equilibrium labor input satisfies:

$$\ell_{nt}^{M}=\left(\frac{p_{nt}^{M} z_{nt}^{M}}{w_{nt}^{L}}\right)^{\frac{1}{\alpha^{M}}}\left(\frac{1-\alpha^{M}}{\alpha^{M}}\right) \widetilde{k}_{nt}^{M}. \tag{S.2.15}$$

From the first-order condition for effective units of capital, equilibrium effective units of capital satisfy:

$$\widetilde{k}_{nt}^{M}=\left(\frac{p_{nt}^{M} z_{nt}^{M}}{r_{nt}}\right)^{\frac{1}{1-\alpha^{M}}} \frac{\alpha^{M}}{1-\alpha^{M}} \ell_{nt}^{M}. \tag{S.2.16}$$

Combining profit maximization and zero profits, we obtain:

$$p_{nt}^{M}=\frac{1}{z_{nt}^{M}} r_{nt}^{\alpha^{M}}\left(w_{nt}^{L}\right)^{1-\alpha^{M}},$$

which highlights that capitalists perceive a constant rate of return to effective capital determined by goods prices, productivity and wages:

$$r_{nt}=\left(p_{nt}^{M} z_{nt}^{M}\right)^{\frac{1}{\alpha^{M}}}\left(w_{nt}^{L}\right)^{-\frac{1-\alpha^{M}}{\alpha^{M}}}. \tag{S.2.17}$$

S.2.1.6 Plantation Production

Each capitalist chooses their inputs of enslaved labor ($h^S_{\mathbb{N}t}$) and effective units of capital ($\widetilde{k}^S_{\mathbb{N}t}$) in plantation production to maximize their profits:

$$\max_{h^S_{\mathbb{N}t}, k^S_{\mathbb{N}t}} \left\{ p^{SW}_t z^S_{\mathbb{N}t} \left(\frac{\widetilde{k}^S_{\mathbb{N}t}}{\alpha^S} \right)^{\alpha_S} \left(\frac{h^S_{\mathbb{N}t}}{1-\alpha^S} \right)^{1-\alpha^S} - w^S_{\mathbb{N}t} h^S_{\mathbb{N}t} - r_{\mathbb{N}t} \widetilde{k}^S_{\mathbb{N}t} \right\}, \tag{S.2.18}$$

where recall that p^{SW}_t is the price of plantation products on world markets; again we use the tilde to distinguish effective units of slavery capital after taking into account the idiosyncratic productivity draws ($\widetilde{k}^S_{\mathbb{N}t}$) from actual units of slavery capital without taking into account these idiosyncratic productivity draws ($k^S_{\mathbb{N}t}$); $w^S_{\mathbb{N}t}$ is the shadow wage of enslaved labor, which is exogenously determined by the costs of obtaining enslaved labor through the slave trade; and $r_{\mathbb{N}t}$ denotes the rental rate per effective unit of capital in the colonial plantation. From the first-order condition for enslaved labor, equilibrium employment of enslaved labor satisfies:

$$h^S_{\mathbb{N}t} = \left(\frac{p^{SW}_t z^S_{\mathbb{N}t}}{w^S_{\mathbb{N}t}} \right)^{\frac{1}{\alpha^S}} \left(\frac{1-\alpha^S}{\alpha^S} \right) \widetilde{k}^S_{\mathbb{N}t}. \tag{S.2.19}$$

From the first-order condition for effective units of capital, equilibrium effective units of capital satisfy:

$$\widetilde{k}^S_{\mathbb{N}t} = \left(\frac{p^{SW}_t z^S_{\mathbb{N}t}}{r_{\mathbb{N}t}} \right)^{\frac{1}{1-\alpha^S}} \frac{\alpha^S}{1-\alpha^S} \ell^S_{\mathbb{N}t}. \tag{S.2.20}$$

Combining profit maximization and zero profits, we obtain:

$$p^{SW}_t = \frac{1}{z^S_{\mathbb{N}t}} r^{\alpha^S}_{\mathbb{N}t} \left(w^S_{\mathbb{N}t} \right)^{1-\alpha^S},$$

which highlights that capitalists perceive a constant rate of return to effective capital determined by goods prices, productivity and wages:

$$r_{\mathbb{N}t} = \left(p^{SW}_t z^S_{\mathbb{N}t} \right)^{\frac{1}{\alpha^S}} \left(w^S_{\mathbb{N}t} \right)^{-\frac{1-\alpha^S}{\alpha^S}}. \tag{S.2.21}$$

S.2.1.7 Labor Market Clearing

After observing her idiosyncratic draws ($b_n(\vartheta)$), each worker chooses her preferred domestic location. We make the conventional assumption that idiosyncratic amenities are drawn from an extreme value distribution: $F(b) = \exp(-\exp(-b-\overline{\gamma}))$, where $\overline{\gamma}$ is the Euler-Mascheroni constant. After observing her idiosyncratic amenity draws for all locations, each worker chooses her preferred location.[3] Under our extreme value functional form assumption,

[3] Although we use idiosyncratic amenity draws as a dispersion force across locations, it is straightforward to consider alternative dispersion forces, such as an inelastic supply of housing.

the share of workers that choose to live in location n at time t (μ_{nt}) takes the familiar logit form:

$$\mu_{nt} = \frac{\ell_{nt}}{\overline{\ell}_t} = \frac{\left(B_{nt} w^L_{nt} / p_{nt}\right)^{1/\kappa}}{\sum_{k=1}^{N} \left(B_{kt} w^L_{kt} / p_{kt}\right)^{1/\kappa}}, \tag{S.2.22}$$

as shown in Section S.2.1.15 of this Online Supplement, where ℓ_{nt} is the measure of workers that choose to live in location n at time t and $\overline{\ell}_t$ is the total measure of workers in the economy. Worker expected utility across locations also takes the familiar logit form:

$$\mathbb{U}_t = \kappa \log \left[\sum_{k=1}^{N} \left(B_{kt} w^L_{kt} / p_{kt}\right)^{1/\kappa} \right], \tag{S.2.23}$$

as shown in Section S.2.1.15 of this Online Supplement.

S.2.1.8 Capital Market Clearing

Capital market clearing requires that the stock of capital in each domestic location (k_{nt}) equals the stock of capital used in domestic manufacturing ($k_{nnt} = k^M_{nt}$) plus the stock of capital used in colonial production ($k_{n\mathbb{N}t}$):

$$k_{nt} = k_{nnt} + k_{n\mathbb{N}t}, \tag{S.2.24}$$

where

$$k^M_{nt} = k_{nnt}, \tag{S.2.25}$$

$$k^S_{\mathbb{N}t} = \sum_{n \in N} k_{n\mathbb{N}t}. \tag{S.2.26}$$

Effective units of capital equal actual units of capital multiplied by average productivity: $\widetilde{k}^M_{nt} = \overline{\epsilon}_{nnt} k_{nnt}$ and $\widetilde{k}^S_{\mathbb{N}t} = \sum_{n \in N} \overline{\epsilon}_{n\mathbb{N}t} k_{n\mathbb{N}t}$, where we derive closed-form solutions for the average productivities of capital ($\overline{\epsilon}_{nnt}, \overline{\epsilon}_{n\mathbb{N}t}$) below.

S.2.1.9 Capital Allocation Within Periods

At the beginning of period t, the capitalists in location n inherit an existing stock of capital k_{nt}, and decide where to allocate this existing capital and how much to invest in accumulating additional capital. Once these decisions have been made, production and consumption occur. At the end of period t, new capital is created from the investment decisions made at the beginning of the period, and the depreciation of existing capital occurs. In the remainder of this subsection, we characterize capitalists' decisions at the beginning of period t of where to allocate the existing stock of capital. In the next subsection, we characterize capitalists' optimal consumption-investment decision.

We assume that the productivity of capital for domestic use (ϵ_{nnt}) and colonial use ($\epsilon_{n\mathbb{N}t}$) is subject to an idiosyncratic productivity draw for the number of effective units of capital, as in Kleinman et al. (2023). These idiosyncratic productivity draws can be interpreted as a Keynesian marginal efficiency of capital draw and give rise to a form of imperfect substitutability between domestic and slavery investments.[4] Therefore, the return to a capitalist from location n of investing a unit of capital in destination $i \in \{n, \mathbb{N}\}$ ($v_{nit}(\epsilon_{nit})$) depends on the rental rate per effective unit (r_{it}), the number of effective units (ϵ_{nit}) and financial frictions (ϕ_{nit}):

$$v_{nit}(\epsilon_{nit}) = \frac{\epsilon_{nit} r_{it}}{\phi_{nit}}, \qquad i \in \{n, \mathbb{N}\}. \tag{S.2.27}$$

We assume that these idiosyncratic shocks to the productivity of capital are drawn independently from the following Fréchet distribution:

$$F(\epsilon) = e^{-\epsilon^{-\theta}}, \qquad \theta > 1, \tag{S.2.28}$$

where we have normalized the Fréchet scale parameter to one, because it enters the model isomorphically to financial frictions, and the Fréchet shape parameter (θ) controls the responsiveness of capital investments to economic variables.

Using the properties of this Fréchet distribution, the shares of capital owned in location n that are invested in each domestic location i and in slavery in the colonial plantation $\mathbb{N}$ depend on relative returns to capital and financial frictions:

$$\xi_{nnt} = \frac{k_{nnt}}{k_{nt}} = \frac{\left(r_{nt}/\phi_{nnt}\right)^{\theta}}{\left(r_{\mathbb{N}t}/\phi_{n\mathbb{N}t}\right)^{\theta} + \left(r_{nt}/\phi_{nnt}\right)^{\theta}}, \tag{S.2.29}$$

$$\xi_{n\mathbb{N}t} = \frac{k_{n\mathbb{N}t}}{k_{nt}} = \frac{\left(r_{\mathbb{N}t}/\phi_{n\mathbb{N}t}\right)^{\theta}}{\left(r_{\mathbb{N}t}/\phi_{n\mathbb{N}t}\right)^{\theta} + \left(r_{nt}/\phi_{nnt}\right)^{\theta}}, \tag{S.2.30}$$

as shown in Section S.2.1.16 of this Online Supplement. We thus obtain the capital allocations to each sector and location:

$$k_{nt}^{M} = \xi_{nnt} k_{nt}, \tag{S.2.31}$$

$$k_{\mathbb{N}t}^{S} = \sum_{n=1}^{N} \xi_{n\mathbb{N}t} k_{nt}, \tag{S.2.32}$$

where $\xi_{nnt} + \xi_{n\mathbb{N}t} = 1$. Using the properties of the Fréchet distribution, the expected return to capital after taking into account the idiosyncratic productivity draws is equalized between the domestic and colonial slavery locations, and is given by:

$$v_{nt} = \overline{v}_{nnt} = \overline{v}_{n\mathbb{N}t} = \gamma \left[\left(r_{\mathbb{N}t}/\phi_{n\mathbb{N}t}\right)^{\theta} + \left(r_{nt}/\phi_{nnt}\right)^{\theta}\right]^{\frac{1}{\theta}}, \tag{S.2.33}$$

[4] This imperfect substitutability is consistent with slavery investments being concentrated in cane sugar, tobacco and cotton, none of which could be efficiently produced domestically at the time. It is also in line with the theoretical and empirical literature on asset demand systems following Koijen and Yogo (2019).

$$\gamma = \Gamma\left(\frac{\theta-1}{\theta}\right),$$

as also shown in Section S.2.1.16 of this Online Supplement; $\overline{v}_{nnt}$ and $\overline{v}_{n\mathbb{N}t}$ are the expected returns to allocating a unit of capital to the domestic location and colonial plantation, respectively; and $\Gamma(\cdot)$ is the Gamma function.

The productivity-adjusted stocks of capital allocated to domestic manufacturing ($\widetilde{k}_{nt}^{M}$) and the colonial slavery plantation ($\widetilde{k}_{nt}^{S}$) are:

$$\widetilde{k}_{nt}^{M} = \widetilde{k}_{nnt} = \overline{\epsilon}_{nnt}\xi_{nnt}k_{nt} = \gamma\xi_{nnt}^{\frac{\theta-1}{\theta}}k_{nt}, \tag{S.2.34}$$

$$\widetilde{k}_{\mathbb{N}t}^{S} = \sum_{n\in\mathbb{N}}\widetilde{k}_{n\mathbb{N}t} = \sum_{n\in\mathbb{N}}\overline{\epsilon}_{n\mathbb{N}t}\xi_{n\mathbb{N}t}k_{nt} = \sum_{n\in\mathbb{N}}\gamma\xi_{n\mathbb{N}t}^{\frac{\theta-1}{\theta}}k_{nt}, \tag{S.2.35}$$

where we have used $k_{nt}^{M} = \xi_{nnt}k_{nt}$; and recall that $\overline{\epsilon}_{nnt}$ and $\overline{\epsilon}_{nNt}$ denote the average productivity of capital for the domestic location and colonial plantation, respectively. The total gross income of each capitalist before depreciation is linear in the existing stock of capital and given by:

$$V_{nt} = v_{nt}k_{nt}, \tag{S.2.36}$$

where capitalist income can be expressed equivalently in terms of either actual or effective units of capital: $v_{nt}k_{nt} = v_{nt}\left[k_{nnt} + k_{n\mathbb{N}t}\right] = \left(r_{nt}/\phi_{nnt}\right)\widetilde{k}_{nnt} + \left(r_{\mathbb{N}t}/\phi_{n\mathbb{N}t}\right)\widetilde{k}_{n\mathbb{N}t}$, as again shown in Section S.2.1.16 of this Online Supplement.

We assume that capitalists' investment technology uses goods with the same functional form as consumption. In particular, capitalists in each location can produce one unit of capital using one unit of the consumption index in that location. Existing capital depreciates at the constant rate δ. Therefore, expected income net of depreciation from a unit of capital is given by $v_{nt} - \delta p_{nt}$. Given the linearity of capitalists' net income in the existing stock of capital ($\left(v_{nt} - \delta p_{nt}\right)k_{nt}$), the capitalists' decision of whether to invest assets in capital or the consumption bond is characterized by a corner equilibrium. If the rate of return on capital net of depreciation ($v_{nt} - \delta p_{nt}$) exceeds the rate of return on the consumption bond (ρ), capitalists invest all of their assets in capital up to the collateral constraint:

$$k_{nt}\left(a_{nt}\right) = \lambda_n a_{nt} \cdot 1_{\{(v_{nt}-\delta p_{nt})>\rho\}}. \tag{S.2.37}$$

If capitalists invest their assets in capital, they allocate positive shares of capital to domestic manufacturing (ξ_{nnt}) and the colonial plantation ($\xi_{n\mathbb{N}t}$) for non-prohibitive values of financial frictions (ϕ_{nnt}, $\phi_{n\mathbb{N}t}$) for each of these alternative uses.

S.2.1.10 Capital Allocation Across Periods

Capitalists in each location choose their consumption and investment to maximize their intertemporal utility subject to the investment technology. Capitalists' intertemporal utility equals the net present discounted value of their flow of utility each period:

$$U_{nt}^{k} = \sum_{t=0}^{\infty} \beta^{t} \ln c_{nt}^{k}, \tag{S.2.38}$$

where the superscript k denotes the value of a variable for capitalists; β denotes the discount rate; and we omit the term in amenities for capitalists without loss of generality, because they are geographically immobile, and hence this term plays no role for equilibrium allocations.

The intertemporal budget constraint for capitalists in each location requires that total income from the existing stock of assets ($R_{nt}a_{nt}$) equals the value of consumption ($p_{nt}c_{nt}^{k}$) plus the value of savings ($p_{nt}\left(a_{nt+1} - a_{nt}\right)$):

$$p_{nt}c_{nt}^{k} + p_{nt}\left(a_{nt+1} - a_{nt}\right) = R_{nt}a_{nt}, \tag{S.2.39}$$

where R_{nt} is the maximum of the return from investment in capital net of depreciation and the return from the consumption bond:

$$R_{nt} = \max\left\{v_{nt} - \delta p_{nt}, \rho\right\}.$$

Combining the intertemporal utility function (S.2.38) and budget constraint (S.2.39), capitalists' intertemporal optimization problem is:

$$\max_{\{c_{nt}, a_{nt+1}\}} \sum_{t=0}^{\infty} \beta^{t} \ln c_{nt}^{k}, \tag{S.2.40}$$

$$\text{subject to} \qquad p_{nt}c_{nt}^{k} + p_{nt}\left(a_{nt+1} - a_{nt}\right) = R_{nt}a_{nt},$$

We can write this problem as the following Lagrangian:

$$\mathcal{L} = \sum_{t=0}^{\infty} \beta^{t} \ln c_{nt}^{k} - \mu_{t}\left[p_{nt}c_{nt}^{k} + p_{nt}\left(a_{nt+1} - a_{nt}\right) - R_{nt}a_{nt}\right]. \tag{S.2.41}$$

The first-order conditions are:

$$\left\{c_{nt}^{k}\right\} \qquad \frac{\beta^{t}}{c_{nt}^{k}} - p_{nt}\mu_{t} = 0, \tag{S.2.42}$$

$$\left\{k_{nt+1}\right\} \qquad \left(R_{nt+1} + p_{nt+1}\right)\mu_{t+1} - p_{nt}\mu_{t} = 0, \tag{S.2.43}$$

Together these first-order conditions imply the following Euler equation:

$$\frac{c_{nt+1}^{k}}{c_{nt}^{k}} = \beta \frac{p_{nt}\mu_{t}}{p_{nt+1}\mu_{t+1}} = \beta\left(R_{nt+1}/p_{nt+1} + 1\right), \tag{S.2.44}$$

where the transversality condition implies:

$$\lim_{t \to \infty} \beta^{t} \frac{k_{nt+1}}{c_{nt}^{k}} = 0. \tag{S.2.45}$$

Our assumption of logarithmic utility and the property that the intertemporal budget constraint is linear in the stock of existing capital together imply that capitalists' optimal consumption-saving decision involves a constant saving rate, as in Moll (2014). In particular, we conjecture and verify that the following policy functions satisfy the above Euler equation:

$$p_{nt}c_{nt}^{k} = (1-\beta)\left(R_{nt} + p_{nt}\right)a_{nt}, \tag{S.2.46}$$

$$a_{nt+1} = \beta\left(R_{nt}/p_{nt} + 1\right)a_{nt}. \tag{S.2.47}$$

In steady-state equilibrium, we assume that collateral constraints do not bind, such that the steady-state rate of return to capital net of depreciation equals the rate of return on the consumption bond: $v_{nt} - \delta p_{nt} = \rho$ and hence $R_{nt} = \rho$. Therefore, capitalists are indifferent between investing their assets in capital and the consumption bond. In such a steady-state equilibrium, investment in capital exactly offsets depreciation ($\delta p_{nt}k_{nt}$), such that net investment in capital is zero ($p_{nt}\left(k_{nt+1} - k_{nt}\right) = 0$), and the capital stock is constant over time ($k_{nt+1} = k_{nt} = k_n^*$).

If collateral constraints bind along the transition path, capitalists invest all of their assets in capital accumulation ($k_{nt} = \lambda_n a_{nt}$), and receive a rate of return net of depreciation ($v_{nt} - \delta p_{nt}$) that exceeds the rate of return on the consumption bond ($R_{nt} > \rho$).

S.2.1.11 Steady-State Equilibrium

In this section of the Online Supplement, we characterize the steady-state equilibrium of the model. We consider a steady-state equilibrium with time-invariant exogenous fundamentals: amenities (B_n), productivities (z_n^A, z_n^M, z_n^S), world prices (p^{AW}, p^{MW}, p^{SW}), trade costs (τ_n^A, τ_n^M, τ_n^S), financial frictions (ϕ_{ni}), endowments ($\bar{\ell}$, m_n), the colonial rental rate ($r_{\mathbb{N}}$), and the shadow cost of enslaved labor ($w_{\mathbb{N}}^S$). We denote the steady-state values of variables with an asterisk. We focus on a steady-state equilibrium in which both the agricultural and manufacturing sectors are active in each location, as observed in our data. The solution to the model has a sequential structure, such that we can solve for steady-state in a sequence of steps.

Proposition S.2.1. ***(Existence and Uniqueness)*** *Given time-invariant fundamentals {B_n, z_n^A, z_n^M, z_n^S, p^{AW}, p^{MW}, p^{SW}, τ_n^A, τ_n^M, τ_n^S, ϕ_{ni}, $\bar{\ell}$, m_n, $r_{\mathbb{N}}$, $w_{\mathbb{N}}^{S*}$}, there exists a unique steady-state equilibrium of the model {ℓ_n^{A*}, ℓ_n^{M*}, ℓ_n^*, ξ_{ni}^*, k_n^{M*}, k_n^{S*}, w_n^{L*}, r_n^*, q_n^*}.*

Proof. **Goods prices:** Good prices are determined by no arbitrage given exogenous prices on world markets and transport costs:

$$\begin{aligned} p_n^A &= \tau_n^A p^{AW}, \qquad & p_n^M &= p^{MW}/\tau_n^M, \qquad & &\text{if } c_n^{A*} > y_n^{A*} \quad \text{and} \qquad y_n^{M*} > c_n^{M*}, \\ p_n^A &= p^{AW}/\tau_n^A, \qquad & p_n^M &= \tau_n^M p^{MW}, \qquad & &\text{if } y_n^{A*} > c_n^{A*} \quad \text{and} \qquad c_n^{M*} > y_n^{M*}, \end{aligned} \tag{S.2.48}$$

$$n \in \{1, \ldots, N\}.$$

$$p_n^S = \tau_n^S p^{SW}, \qquad n \in \{1, \ldots, N\},$$

$$p_n = \left[\left(p_n^A/\beta^A\right)^{1-\sigma} + \left(p_n^M/\beta^M\right)^{1-\sigma} + \left(p_n^S/\beta^S\right)^{1-\sigma} \right]^{\frac{1}{1-\sigma}},$$

such that we can treat goods prices as if they are exogenous.

Expected Return to Capital: In a steady-state equilibrium, no arbitrage with consumption bonds implies:

$$v_n^* = \rho + \delta p_n = \overline{\rho}_n, \tag{S.2.49}$$

where (ρ, p_n) and hence $\overline{\rho}_n$ are exogenous.

Domestic Rental Rate: Now note that we can re-write the expected return to capital (S.2.33) as follows:

$$\frac{v_n^*}{\gamma} = \left[\left(r_{\mathbb{N}}/\phi_{n\mathbb{N}}\right)^{\theta} + \left(r_n^*/\phi_{nn}\right)^{\theta} \right]^{1/\theta},$$

and the capital allocation probabilities (S.2.29) imply:

$$\left[\left(r_{\mathbb{N}}/\phi_{n\mathbb{N}}\right)^{\theta} + \left(r_n^*/\phi_{nn}\right)^{\theta} \right]^{1/\theta} = \frac{r_n^*/\phi_{nn}}{\left(\xi_{nn}^*\right)^{1/\theta}}.$$

Combining these two equations, we obtain the following relationship between the steady-state expected return to capital (v_n^*) and the steady-state domestic rental rate (r_n^*):

$$v_n^* = \frac{\gamma \left(r_n^*/\phi_{nn}\right)}{\left(\xi_{nn}^*\right)^{1/\theta}}.$$

Assuming no domestic capital frictions ($\phi_{nn} = 1$), we obtain:

$$r_n^* = \frac{1}{\gamma} \left(\xi_{nn}^*\right)^{1/\theta} v_n^* = \frac{\overline{\rho}_n}{\gamma} \left(\xi_{nn}^*\right)^{1/\theta}. \tag{S.2.50}$$

Capital Allocation: Assuming no domestic capital frictions ($\phi_{nn} = 1$), we also have the following expression for capital allocation:

$$\xi_{nn}^* = \frac{\left(r_n^*\right)^{\theta}}{\left(r_{\mathbb{N}}/\phi_{n\mathbb{N}}\right)^{\theta} + \left(r_n^*\right)^{\theta}}.$$

Combining these two relationships, we can solve for the equilibrium capital allocation from the following implicit function:

$$\xi_{nn}^* = \frac{\left(\frac{\overline{\rho}_n}{\gamma}\right)^{\theta} \xi_{nn}^*}{\left(r_{\mathbb{N}}/\phi_{n\mathbb{N}}\right)^{\theta} + \left(\frac{\overline{\rho}_n}{\gamma}\right)^{\theta} \xi_{nn}^*}. \tag{S.2.51}$$

Having thus determined the steady-state capital allocation (ξ_{nn}^*) in equation (S.2.51) as a function of the exogenous fundamentals ($\overline{\rho}_n$, $r_{\mathbb{N}}$, $\phi_{n\mathbb{N}}$), we have determined the steady-state rental rate (r_n^*) in equation (S.2.50) as a function of these same exogenous fundamentals.

Wage: Given the steady-state rental rate (r_n^*), manufacturing productivity (z_i^M) and manufacturing prices (p_i^M) as determined as a function of exogenous variables by price arbitrage, we can solve for the steady-state wage (w_n^{L*}) from the zero-profit condition in manufacturing:

$$p_n^M z_n^M = \left(r_n^*\right)^{\alpha^M} \left(w_n^{L*}\right)^{1-\alpha^M}.$$

Re-arranging this zero-profit condition, we obtain the following closed-form solution for the wage:

$$w_n^{L*} = \left[\frac{p_n^M z_n^M}{\left(r_n^*\right)^{\alpha^M}}\right]^{\frac{1}{1-\alpha^M}}, \tag{S.2.52}$$

where p_n^M and z_n^M are exogenous and we determined r_n^* as a function of exogenous variables above.

Land Price: Given the steady-state wage (w_n^{L*}), agricultural productivity (z_i^A) and agricultural prices (p_i^A) as determined as a function of exogenous variables by price arbitrage, we can solve for the steady-state land price (q_n^*) from the zero-profit condition in manufacturing:

$$p_n^A z_n^A = \left(q_n^*\right)^{\alpha^A} \left(w_n^{L*}\right)^{1-\alpha^A}.$$

Substituting for the steady-state wage (w_n^{L*}) using equation (S.2.52), we obtain the following closed-form solution for the land price:

$$q_n^* = \left[\frac{p_n^A z_n^A}{\left(w_n^{L*}\right)^{1-\alpha^A}}\right]^{\frac{1}{\alpha^A}} = \left[\frac{p_n^A z_n^A \left(r_n^*\right)^{\alpha^M \frac{1-\alpha^A}{1-\alpha^M}}}{\left(p_n^M z_n^M\right)^{\frac{1-\alpha^A}{1-\alpha^M}}}\right]^{\frac{1}{\alpha^A}}, \tag{S.2.53}$$

where (p_n^A, z_n^A, p_n^M, z_n^M) are exogenous and we determined r_n^* as a function of exogenous variables above.

Total Population: From equation (S.2.22), steady-state total population (ℓ_n^*) is given by:

$$\ell_n^* = \frac{\left(B_n w_n^{L*}/p_n\right)^{1/\kappa}}{\sum_{k=1}^N \left(B_k w_k^{L*}/p_k\right)^{1/\kappa}}\bar{\ell}.$$

Substituting for the steady-state wage (w_n^{L*}) using equation (S.2.52), we obtain the following closed-form solution for steady-state total population:

$$\ell_n^* = \frac{\left(B_n/p_n\right)^{1/\kappa}\left(\left(p_n^M z_n^M\right)^{\frac{1}{1-\alpha^M}} \left(r_n^*\right)^{-\frac{\alpha^M}{1-\alpha^M}}\right)^{1/\kappa}}{\sum_{k=1}^N \left(B_k/p_k\right)^{1/\kappa}\left(\left(p_k^M z_k^M\right)^{\frac{1}{1-\alpha^M}} \left(r_k^*\right)^{-\frac{\alpha^M}{1-\alpha^M}}\right)^{1/\kappa}}\bar{\ell}. \tag{S.2.54}$$

where (p_n^M, z_n^M, B_n, p_n) are exogenous and we determined (r_n^*) as a function of exogenous variables above.

Productivity-Adjusted Manufacturing Capital-Labor Ratio: From equation (S.2.16), we have the following expression for the steady-state productivity-adjusted capital-labor ratio:

$$\frac{\widetilde{k}_n^{M*}}{\ell_n^{M*}} = \left(\frac{p_n^M z_n^M}{r_n^*}\right)^{\frac{1}{1-\alpha^M}} \frac{\alpha^M}{1-\alpha^M}. \tag{S.2.55}$$

where (p_n^M, z_n^M) are exogenous and we determined (r_n^*) as a function of exogenous variables above.

Unadjusted Manufacturing Capital-Labor Ratio: Recall the following relationship between the capital stocks with and without the productivity-adjustment: $\widetilde{k}_n^{M*} = \gamma \left(\xi_{nn}^*\right)^{-1/\theta} k_n^{M*}$. Using this relationship in equation (S.2.55), we obtain:

$$\frac{k_n^{M*}}{\ell_n^{M*}} = \frac{\left(\xi_{nn}^*\right)^{\frac{1}{\theta}}}{\gamma} \left(\frac{p_n^M z_n^M}{r_n^*}\right)^{\frac{1}{1-\alpha^M}} \frac{\alpha^M}{1-\alpha^M}, \tag{S.2.56}$$

where (p_n^M, z_n^M) are exogenous and we determined (r_n^*, ξ_{nn}^*) as a function of exogenous variables above.

Agricultural Employment: From the equality of marginal products in the two sectors, we have:

$$\left(1-\alpha^A\right) p_n^A z_n^A \left(\frac{m_n}{\alpha^A}\right)^{\alpha^A} \left(\frac{1}{1-\alpha^A}\right)^{1-\alpha^A} \left(\ell_n^{A*}\right)^{-\alpha^A} = \left(1-\alpha^M\right) p_n^M z_n^M \left(\frac{\widetilde{k}_n^M}{\alpha^M}\right)^{\alpha^M} \left(\frac{1}{1-\alpha^M}\right)^{1-\alpha^M} \left(\ell_n^{M*}\right)^{-\alpha^M},$$

$$p_n^A z_n^A \left(\frac{m_n}{\ell_n^{A*}}\right)^{\alpha^A} \left(\frac{1-\alpha^A}{\alpha^A}\right)^{\alpha^A} = p_n^M z_n^M \left(\frac{\widetilde{k}_n^{M*}}{\ell_n^{M*}}\right)^{\alpha^M} \left(\frac{1-\alpha^M}{\alpha^M}\right)^{\alpha^M}.$$

Re-arranging this relationship, we have:

$$\ell_n^{A*} = \left[\frac{p_n^A z_n^A \left(\frac{1-\alpha^A}{\alpha^A}\right)^{\alpha^A}}{p_n^M z_n^M \left(\frac{1-\alpha^M}{\alpha^M}\right)^{\alpha^M}}\right]^{\frac{1}{\alpha^A}} \frac{m_n}{\left(\widetilde{k}_n^{M*}/\ell_n^{M*}\right)^{\alpha^M/\alpha^A}}.$$

Substituting for the steady-state capital-labor ratio using equation (S.2.55), we have:

$$\ell_n^{A*} = \left[\frac{p_n^A z_n^A \left(\frac{1-\alpha^A}{\alpha^A}\right)^{\alpha^A}}{p_n^M z_n^M \left(\frac{1-\alpha^M}{\alpha^M}\right)^{\alpha^M}}\right]^{\frac{1}{\alpha^A}} \frac{m_n}{\left(\left(\frac{p_n^M z_n^M}{r_n^*}\right)^{\frac{1}{1-\alpha^M}} \frac{\alpha^M}{1-\alpha^M}\right)^{\alpha^M/\alpha^A}}, \tag{S.2.57}$$

where (p_n^A, z_n^A, p_n^M, z_n^M, m_n) are exogenous and we determined r_n^* as a function of exogenous variables above.

Manufacturing Employment: We can recover steady-state manufacturing employment (ℓ_n^{M*}) from labor market equilibrium within each location:

$$\ell_n^{M*} = \ell_n^* - \ell_n^{*A}, \tag{S.2.58}$$

where we determined ℓ_n^* and ℓ_n^{*A} as a function of exogenous variables above.
Productivity-adjusted Manufacturing Capital Stock: We can recover the productivity-adjusted manufacturing capital stock ($\widetilde{k}_n^{M*}$) from the productivity-adjusted capital-labor ratio ($\widetilde{k}_n^{M*}/\ell_n^{*M}$) and manufacturing employment (ℓ_n^{*M}):

$$\widetilde{k}_n^{M*} = \frac{\widetilde{k}_n^{M*}}{\ell_n^{*M}} \ell_n^{*M}, \tag{S.2.59}$$

where we determined $\widetilde{k}_n^{M*}/\ell_n^{*M}$ and ℓ_n^{*M} as a function of exogenous variables above.
Unadjusted Manufacturing Capital Stock: We can recover the unadjusted manufacturing capital stock (k_n^{M*}) from the unadjusted capital-labor ratio (k_n^{M*}/ℓ_n^{*M}) and manufacturing employment (ℓ_n^{*M}):

$$k_n^{M*} = \frac{k_n^{M*}}{\ell_n^{*M}} \ell_n^{*M}, \tag{S.2.60}$$

where we determined k_n^{M*}/ℓ_n^{*M} and ℓ_n^{*M} as a function of exogenous variables above.
Unadjusted Capital Stock: The overall capital stock is given by:

$$k_n^* = \frac{k_n^{M*}}{\xi_{nn}^*}, \tag{S.2.61}$$

where we determined k_n^{M*} and ξ_{nn}^* as a function of exogenous variables above.
Capital Stock in Colonial Plantation: The capital stock in the colonial plantation is given by:

$$k_n^{S*} = (1 - \xi_{nn}^*)\, k_n^*, \tag{S.2.62}$$

where we determined k_n^* and ξ_{nn}^* as a function of exogenous variables above.
Productivity-Adjusted Capital Stock in Colonial Plantation: Recall the following relationship between the capital stocks with and without the productivity-adjustment: $\widetilde{k}_n^{S*} = \gamma\,(1-\xi_{nn}^*)^{-1/\theta}\, k_n^{S*}$. Using this relationship in equation (S.2.62), we obtain:

$$\widetilde{k}_n^{S*} = \gamma\,(1-\xi_{nn}^*)^{\frac{\theta-1}{\theta}}\, k_n^*,$$

where we determined k_n^* and ξ_{nn}^* as a function of exogenous variables above. □

S.2.1.12 Sufficient Statistic for Slavery Investments

In this section of the Online Supplement, we use the model to evaluate the impact of access to slavery investment on levels and patterns of economic activity, and provide a proof of Proposition 1 in the paper. In particular, we undertake a comparative static in which we reduce colonial financial frictions ($\phi_{n\mathbb{N}}$) from prohibitive values for all locations (such that $\xi_{nn} = 1$ for all n) to finite values for some locations n (such that $\xi_{nn} < 1$ for some n as in our data). We hold constant world prices (p^{AW}, p^{MW}, p^{SW}) and other exogenous fundamentals. Therefore, this comparative static captures the pure impact of greater access to slavery investments through capital accumulation. We show that the domestic investment share (ξ_{nn}) is a sufficient statistic for the impact of colonial financial frictions ($\phi_{n\mathbb{N}}$) on steady-state economic activity, as summarized in the following proposition.

Proposition. ***(Slavery and Industrialization, Proposition 1 in the paper)*** *Other things equal, in steady-state equilibrium, locations with better access to slavery investments (lower $\phi_{n\mathbb{N}}$ and hence lower ξ^*_{nn}) have (i) lower agricultural employment (ℓ^{A*}_n); (ii) higher manufacturing employment (ℓ^{M*}_n); (iii) higher total population (ℓ^*_n); (iv) a lower rental rate for capital (r^*_n); (v) higher wages (w^{L*}_n) and worker real income (w^{L*}_n/p_n); (vi) lower price of agricultural land (q^*_n); (vii) higher productivity-adjusted and unadjusted stocks of capital ($\widetilde{k}^*_n$, k^*_n); (viii) higher productivity-adjusted and unadjusted stocks of capital in domestic manufacturing ($\widetilde{k}^{M*}_n$, k^{M*}_n); (ix) higher capitalist real income ($v^*_n k^*_n/p_n$); (x) lower landlord real income ($q^*_n m_n/p_n$).*

Proof. **Goods prices:** Recall from equation (S.2.48) that goods prices are determined by no arbitrage given exogenous prices on world markets and transport costs and are invariant with respect to ξ^*_{nn}:

$$\begin{aligned} p^A_n &= \tau^A_n p^{AW}, & p^M_n &= p^{MW}/\tau^M_n, & &\text{if } c^{A*}_n > y^{A*}_n \quad \text{and} & y^{M*}_n &> c^{M*}_n, \\ p^A_n &= p^{AW}/\tau^A_n, & p^M_n &= \tau^M_n p^{MW}, & &\text{if } y^{A*}_n > c^{A*}_n \quad \text{and} & c^{M*}_n &> y^{M*}_n, \end{aligned} \tag{S.2.63}$$

$$n \in \{1, \ldots, N\}.$$

$$p^S_n = \tau^S_n p^{SW}, \qquad n \in \{1, \ldots, N\},$$

$$p_n = \left[\left(p^A_n/\beta^A\right)^{1-\sigma} + \left(p^M_n/\beta^M\right)^{1-\sigma} + \left(p^S_n/\beta^S\right)^{1-\sigma} \right]^{\frac{1}{1-\sigma}},$$

such that we can treat goods prices as if they are exogenous.

Expected Return to Capital: Recall from equation (S.2.49) that no arbitrage implies that the steady-state expected return to capital (v^*_n) is pinned down by the exogenous value of the return to consumption bonds (ρ) and depreciation (δp_n) and invariant with respect to ξ^*_{nn}:

$$v^*_n = \rho + \delta p_n = \overline{\rho}_n, \tag{S.2.64}$$

where (ρ, δ) and hence $\overline{\rho}_n$ are exogenous.

Domestic Rental Rate: Recall from equation (S.2.50) that with no domestic capital frictions ($\phi_{nn} = 1$), the steady-state domestic rental rate (r^*_n) can be expressed as:

$$r^*_n = \frac{\overline{\rho}_n}{\gamma} \left(\xi^*_{nn}\right)^{1/\theta}, \tag{S.2.65}$$

where $\overline{\rho}_n$ is exogenous and γ is a parameter. Therefore, locations with better access to slavery investments (lower ξ^*_{nn}) have lower domestic rental rates (r^*_n).

Wage: Using equation (S.2.50) to substitute for the steady-state rental rate (r_n^*) in the steady-state wage equation (S.2.52), we can write the steady-state wage (w_n^{L*}) as:

$$w_n^{L*} = w_n^{L*} = \left[\frac{p_n^M z_n^M}{\left(\frac{\bar{\rho}_n}{\gamma} \left(\xi_{nn}^* \right)^{1/\theta} \right)^{\alpha^M}} \right]^{\frac{1}{1-\alpha^M}}, \tag{S.2.66}$$

where (p_n^M, z_n^M, $\bar{\rho}_n$) are exogenous. Therefore, other things equal, locations with better access to slavery investments (lower ξ_{nn}^*) have higher wages (w_n^{L*}), and hence higher real worker income (w_n^{L*}/p_n), since p_n is also exogenous.

Land Price: Using equation (S.2.50) to substitute for the steady-state rental rate (r_n^*) in the steady-state land price equation (S.2.53), we can also write the steady-state land price (q_n^*) as:

$$q_n^* = \left[\frac{p_n^A z_n^A \left(\frac{\bar{\rho}_n}{\gamma} \left(\xi_{nn}^* \right)^{1/\theta} \right)^{\alpha^M \frac{1-\alpha^A}{1-\alpha^M}}}{\left(p_n^M z_n^M \right)^{\frac{1-\alpha^A}{1-\alpha^M}}} \right]^{\frac{1}{\alpha^A}}. \tag{S.2.67}$$

where (p_n^A, p_n^M, z_n^A, z_n^M, $\bar{\rho}_n$) are exogenous. Therefore, other things equal, locations with better access to slavery investments (lower ξ_{nn}^*) have lower land prices (q_n^*), because their higher wages (w_n^{L*}) imply that less revenue is left over per unit of output to pay land.

Total Population: Using equation (S.2.65) to substitute for the steady-state rental rate (r_n^*) in the steady-state total population equation (S.2.54), we can also write steady-state total population (ℓ_n^*) as:

$$\ell_n^* = \frac{\left(B_n/p_n \right)^{1/\kappa} \left(\left(p_n^M z_n^M \right)^{\frac{1}{1-\alpha^M}} \left(\frac{\bar{\rho}_n}{\gamma} \left(\xi_{nn}^* \right)^{1/\theta} \right)^{-\frac{\alpha^M}{1-\alpha^M}} \right)^{1/\kappa}}{\sum_{k=1}^N \left(B_k/p_k \right)^{1/\kappa} \left(\left(p_k^M z_k^M \right)^{\frac{1}{1-\alpha^M}} \left(\frac{\bar{\rho}_k}{\gamma} \left(\xi_{kk}^* \right)^{1/\theta} \right)^{-\frac{\alpha^M}{1-\alpha^M}} \right)^{1/\kappa}} \bar{\ell}, \tag{S.2.68}$$

where (B_n, p_n, p_n^M, z_n^M, $\bar{\rho}_n$) are exogenous. Therefore, other things equal, locations with better access to slavery investments (lower ξ_{nn}^*) have higher total population (ℓ_n^*).

Productivity-adjusted Manufacturing Capital-labor Ratio: Using equation (S.2.50) to substitute for the steady-state rental rate (r_n^*) in the equation for the steady-state productivity-adjusted manufacturing capital-labor ratio (S.2.55), we can also write the steady-state productivity-adjusted manufacturing capital-labor ratio ($\widetilde{k}_n^{M*}/\ell_n^{M*}$) as:

$$\frac{\widetilde{k}_n^{M*}}{\ell_n^{M*}} = \left(\frac{p_n^M z_n^M}{\frac{\bar{\rho}_n}{\gamma} \left(\xi_{nn}^* \right)^{1/\theta}} \right)^{\frac{1}{1-\alpha^M}} \frac{\alpha^M}{1-\alpha^M}. \tag{S.2.69}$$

where $(p_n^M, z_n^M, \overline{\rho}_n)$ are exogenous. Therefore, other things equal, locations with better access to slavery investments (lower ξ_{nn}^*) have higher steady-state productivity-adjusted capital-labor ratios $(\widetilde{k}_n^{M*}/\ell_n^{M*})$.

Unadjusted Capital-labor Ratio: Using equation (S.2.50) to substitute for the steady-state rental rate (r_n^*) in the equation for the steady-state unadjusted manufacturing capital-labor ratio (S.2.56), we can also write the steady-state unadjusted manufacturing capital-labor ratio (k_n^{M*}/ℓ_n^{M*}) as:

$$\frac{k_n^{M*}}{\ell_n^{M*}} = \frac{(\xi_{nn}^*)^{\frac{1}{\theta}}}{\gamma} \left(\frac{p_n^M z_n^M}{\frac{\overline{\rho}_n}{\gamma} (\xi_{nn}^*)^{1/\theta}} \right)^{\frac{1}{1-\alpha^M}} \frac{\alpha^M}{1-\alpha^M},$$

which can be re-written as:

$$\frac{k_n^{M*}}{\ell_n^{M*}} = \gamma^{-1+\frac{1}{1-\alpha^M}} (\overline{\rho}_n)^{-\frac{1}{1-\alpha^M}} (\xi_{nn}^*)^{\frac{1}{\theta}-\frac{1}{\theta}\frac{1}{1-\alpha^M}} \left(p_n^M z_n^M\right)^{\frac{1}{1-\alpha^M}} \frac{\alpha^M}{1-\alpha^M}$$

$$\frac{k_n^{M*}}{\ell_n^{M*}} = \gamma^{\frac{\alpha^M}{1-\alpha^M}} (\overline{\rho}_n)^{-\frac{1}{1-\alpha^M}} (\xi_{nn}^*)^{-\frac{\alpha^M}{\theta(1-\alpha^M)}} \left(p_n^M z_n^M\right)^{\frac{1}{1-\alpha^M}} \frac{\alpha^M}{1-\alpha^M}, \tag{S.2.70}$$

where $(p_n^M, z_n^M, \overline{\rho}_n)$ are exogenous. Therefore, other things equal, locations with better access to slavery investments (lower ξ_{nn}^*) have higher steady-state capital-labor ratios (k_n^{M*}/ℓ_n^{M*}).

Agricultural Employment: Using equation (S.2.50) to substitute for the steady-state rental rate (r_n^*) in the equation for steady-state agricultural employment (S.2.57), we can write steady-state agricultural employment (ℓ_n^{A*}) as:

$$\ell_n^{A*} = \left[\frac{p_n^A z_n^A \left(\frac{1-\alpha^A}{\alpha^A}\right)^{\alpha^A}}{p_n^M z_n^M \left(\frac{1-\alpha^M}{\alpha^M}\right)^{\alpha^M}} \right]^{\frac{1}{\alpha^A}} \frac{m_n (\xi_{nn}^*)^{\frac{\alpha^M}{\theta\alpha^A(1-\alpha^M)}}}{\left(\left(\frac{p_n^M z_n^M}{\overline{\rho}_n/\gamma}\right)^{\frac{1}{1-\alpha^M}} \frac{\alpha^M}{1-\alpha^M} \right)^{\alpha^M/\alpha^A}}, \tag{S.2.71}$$

where $(p_n^A, z_n^A, p_n^M, z_n^M, m_n, \overline{\rho}_n)$ are exogenous. Therefore, other things equal, locations with better access to slavery investments (lower ξ_{nn}^*) have lower steady-state agricultural employment (ℓ_n^{A*}).

Manufacturing Employment: We can recover steady-state manufacturing employment (ℓ_n^{M*}) from labor market equilibrium within each location:

$$\ell_n^{M*} = \ell_n^* - \ell_n^{*A}. \tag{S.2.72}$$

We showed above that locations with better access to slavery investments (lower ξ_{nn}^*) have higher total population (ℓ_n^*) and lower agricultural employment (ℓ_n^{*A}), which implies that they have higher manufacturing employment (ℓ_n^{*M}).

Productivity-adjusted Manufacturing Capital Stock: We can recover the productivity-adjusted manufacturing capital stock ($\widetilde{k}_n^{M*}$) from the productivity-adjusted manufacturing capital-labor ratio ($\widetilde{k}_n^{M*}/\ell_n^{*M}$) and manufacturing employment (ℓ_n^{*M}):

$$\widetilde{k}_n^{M*} = \frac{\widetilde{k}_n^{M*}}{\ell_n^{*M}} \ell_n^{*M}. \tag{S.2.73}$$

We showed above that locations with better access to slavery investments (lower ξ_{nn}^*) have higher productivity-adjusted manufacturing capital-labor ratios ($\widetilde{k}_n^{M*}/\ell_n^{*M}$) and higher manufacturing employment (ℓ_n^{*M}), which implies that they have higher productivity-adjusted capital stocks ($\widetilde{k}_n^{M*}$).

Unadjusted Manufacturing Capital Stock: We can recover the unadjusted manufacturing capital stock (k_n^{M*}) from the unadjusted capital-labor ratio (k_n^{M*}/ℓ_n^{*M}) and manufacturing employment (ℓ_n^{*M}):

$$k_n^{M*} = \frac{k_n^{M*}}{\ell_n^{*M}} \ell_n^{*M}. \tag{S.2.74}$$

We showed above that locations with better access to slavery investments (lower ξ_{nn}^*) have higher unadjusted manufacturing capital-labor ratios (k_n^{M*}/ℓ_n^{*M}) and higher manufacturing employment (ℓ_n^{*M}), which implies that they have higher unadjusted capital stocks (k_n^{M*}).

Capital Stock: The overall capital stock is given by:

$$k_n^* = \frac{k_n^{M*}}{\xi_{nn}^*} = \gamma^{\frac{\alpha^M}{1-\alpha^M}} \left(\overline{\rho}_n\right)^{-\frac{1}{1-\alpha^M}} \left(\xi_{nn}^*\right)^{-\left(\frac{\alpha^M}{\theta(1-\alpha^M)}+1\right)} \left(p_n^M z_n^M\right)^{\frac{1}{1-\alpha^M}} \frac{\alpha^M}{1-\alpha^M} \ell_n^{M*}. \tag{S.2.75}$$

where (p_n^M, z_n^M, $\overline{\rho}_n$) are exogenous. We showed above that locations with better access to slavery investments (lower ξ_{nn}^*) have higher steady-state manufacturing employment (ℓ_n^{M*}). Therefore, other things equal, locations with better access to slavery investments (lower ξ_{nn}^*) have higher steady-state capital stocks (k_n^*).

Expected Worker Welfare: Using equation (S.2.52) to substitute for the steady-state wage (w_n^{L*}) in expected worker welfare ($\mathbb{U}^*$) in equation (7), we obtain the following closed-form solution for steady-state expected worker welfare:

$$\mathbb{U}^* = \kappa \log \left[\sum_{k=1}^{N} \left(B_k \left(p_k^M z_k^M\right)^{1-\alpha^M} / \left(\left(r_k^*\right)^{\frac{\alpha^M}{1-\alpha^M}} p_k \right) \right)^{1/\kappa} \right]$$

where (p_k^M, z_k^M, B_k, p_k) are exogenous and we determined (r_n^*) as a function of exogenous variables above. Using equation (S.2.50) to substitute for the steady-state rental rate (r_n^*), we can write steady-state expected worker welfare as:

$$\mathbb{U}^* = \kappa \log \left[\sum_{k=1}^{N} \left(B_k/p_k\right)^{1/\kappa} \left(\left(p_k^M z_k^M\right)^{1-\alpha^M} \left(\xi_{kk}^*\right)^{-\frac{\alpha^M}{\theta(1-\alpha^M)}} \left(\overline{\rho}_k/\gamma\right)^{-\frac{\alpha^M}{1-\alpha^M}} \right)^{1/\kappa} \right]. \tag{S.2.76}$$

where (p_k^M, z_k^M, B_k, p_k, $\overline{\rho}_n$) are exogenous. Therefore, other things equal, greater access locations to slavery investments (lower ξ_{kk}^* across locations k) raises expected worker welfare ($\mathbb{U}^*$).

Capitalist Real Income: Steady-state capitalist real income is given by:

$$\frac{v_n^* k_n^*}{p_n},$$

where p_n is exogenous. We showed above that the steady-state expected return to capital (v_n^*) is invariant with respect to access to slavery investments (ξ_{nn}^*) and the steady-state capital stock (k_n^*) is increasing in access to slavery investments. Therefore, other things equal, capitalists in locations with better access to slavery investments (lower ξ_{nn}^*) have higher capitalist real income ($v_n^* k_n^* / p_n$).

Landowner Real Income: Steady-state landowner real income is given by:

$$\frac{q_n^* m_n}{p_n},$$

where (p_n, m_n) are exogenous. We showed above that the steady-state price of land (q_n^*) is decreasing in access to slavery investments (ξ_{nn}^*). Therefore, other things equal, landowners in locations with better access to slavery investments (lower ξ_{nn}^*) have lower real income ($q_n^* m_n / p_n$). $\square$

S.2.1.13 Steady-State Model Inversion

In this section of the Online Supplement, we show how the observed data and the equilibrium conditions of the model can be used to solve for unobserved endogenous variables and unobserved location characteristics. We use the values of some of these unobserved endogenous variables in our counterfactuals for the removal of access to slavery investments, as discussed further in the next section of this Online Supplement.

Given the observed data $\{\mathbb{R}_n^*, \mathbb{R}_n^{S*}, \ell_n^{A*}, \ell_n^{M*}, m_n, \overline{\rho}_n\}$, and assuming that these observed data are a steady-state equilibrium of the model, we now show that we can invert the model to recover unobserved endogenous variables $\{w_n^{L*}, \mathbb{R}_n^{A*}, \mathbb{R}_n^{M*}, \xi_{nn}^*, q_n^*, r_n^*, \widetilde{k}_n^{M*}, k_n^{M*}, k_n^*\}$, and solve for unobserved composite fundamentals $\{r_{Nn}^*/\phi_{nN}, p_n^A z_n^A, p_n^M z_n^M, B_n/p_n\}$ that rationalize the observed data as a steady-state equilibrium. The model inversion has a sequential structure, such that we can solve for the unobserved endogenous variables and unobserved composite fundamentals in a sequence of steps.

Proposition S.2.2. ***(Model Inversion)*** *Suppose that we observe data on rateable values ($\mathbb{R}_n^*$), slavery compensation ($\mathbb{R}_n^{S*}$), agricultural employment (ℓ_n^{A*}), manufacturing employment (ℓ_n^{M*}), land area (m_n) and the rate of return on consumption bonds (ρ). Assuming that the observed data* *correspond to a steady-state equilibrium, the model can be inverted to recover unique values of other unobserved endogenous variables* $\{w_n^{L*}, \mathbb{R}_n^{A*}, \mathbb{R}_n^{M*}, \xi_{nn}^*, q_n^*, r_n^*, \widetilde{k}_n^{M*}, k_n^{M*}, k_n^*\}$ *and unique values of unobserved composite fundamentals* $\{r_{Nn}^*/\phi_{nN}, p_n^A z_n^A, p_n^M z_n^M, B_n/p_n\}$ *that rationalize the observed data as a steady-state equilibrium.*

Proof. **Wages (w_n^{L*}):** The equality between observed rateable values ($\mathbb{R}_n^*$) and payments for the use of land and capital implies:

$$\mathbb{R}_n^* = q_n^* m_n + v_n^* k_n^{M*} = q_n^* m_n + \frac{r_n^*}{\phi_{nn}} \widetilde{k}_n^{M*} = w_n^{L*} \left[\ell_n^{A*} \left(\frac{1-\alpha^A}{\alpha^A} \right) + \ell_n^{M*} \left(\frac{1-\alpha^M}{\alpha^M} \right) \right].$$

Re-arranging this relationship, we can solve for wages (w_n^{L*}) from observed rateable values ($\mathbb{R}_n^*$) and employments (ℓ_n^{A*}, ℓ_n^{M*}):

$$w_n^{L*} = \frac{\mathbb{R}_n^*}{\left[\ell_n^{A*} \left(\frac{1-\alpha^A}{\alpha^A} \right) + \ell_n^{M*} \left(\frac{1-\alpha^M}{\alpha^M} \right) \right]}, \tag{S.2.77}$$

where ($\mathbb{R}_n^*$, ℓ_n^{A*}, ℓ_n^{M*}) are observed.

Land Payments ($\mathbb{R}_n^{A*}$): Using the solution for wages (w_n^{L*}) from Step 1, land payments ($\mathbb{R}_n^{A*}$) satisfy:

$$\mathbb{R}_n^{A*} = q_n m_n = w_n^{L*} \ell_n^{A*} \left(\frac{1-\alpha^A}{\alpha^A} \right), \tag{S.2.78}$$

where ℓ_n^{A*} is observed and we solved for w_n^{L*} above.

Domestic Manufacturing Capital Payments ($\mathbb{R}_n^{M*}$): Using the solution for wages (w_n^*) from Step 1, total payments for manufacturing capital ($\mathbb{R}_n^{M*}$) satisfy:

$$\mathbb{R}_n^{M*} = v_n^* k_n^{M*} = \frac{r_n^*}{\phi_{nn}} \widetilde{k}_n^{M*} = w_n^{L*} \ell_n^{M*} \left(\frac{1-\alpha^M}{\alpha^M} \right). \tag{S.2.79}$$

where ℓ_n^{M*} is observed and we solved for w_n^{L*} above. Note that equations (S.2.77), (S.2.78) and (S.2.79) ensure $\mathbb{R}_n^* = \mathbb{R}_n^{A*} + \mathbb{R}_n^{M*}$.

Slavery Capital Payments ($\mathbb{R}_n^{S*}$): We directly observe slavery capital payments from the Legacies of British Slavery Database: $\mathbb{R}_n^{S*}$.

Capital Allocation (ξ_{nn}^*, $\xi_{n\mathbb{N}}^*$): Using our solution for manufacturing rateable values ($\mathbb{R}_n^{M*}$) from Step 4 and observed slavery wealth ($\mathbb{R}_n^{S*}$), together with the property that the expected return to capital conditional to allocating it to a given use is the same between domestic manufacturing and colonial production ($v_{ni}^* = v_{n\mathbb{N}}^* = v_n^*$), we can solve for the shares of manufacturing capital (ξ_{nn}^*) and slavery capital ($\xi_{n\mathbb{N}}^*$) in total capital:

$$\xi_{nn}^* = \frac{\mathbb{R}_n^{M*}}{\mathbb{R}_n^{M*} + \mathbb{R}_n^{S*}} = \frac{v_n^* k_n^{M*}}{v_n^* k_n^{M*} + v_n^* k_{n\mathbb{N}}^{S*}} = \frac{k_n^{M*}}{k_n^{M*} + k_{n\mathbb{N}}^{S*}}, \tag{S.2.80}$$

$$\xi_{n\mathbb{N}}^{*} = \frac{\mathbb{R}_{n}^{S*}}{\mathbb{R}_{n}^{M*} + \mathbb{R}_{n}^{S*}} = \frac{v_{n}^{*} k_{n\mathbb{N}}^{S*}}{v_{n}^{*} k_{n}^{M*} + v_{n}^{*} k_{n\mathbb{N}}^{S*}} = \frac{k_{n\mathbb{N}}^{S*}}{k_{n}^{M*} + k_{n\mathbb{N}}^{S*}}, \tag{S.2.81}$$

where we observe $\mathbb{R}_{n}^{S*}$ and solved for $\mathbb{R}_{n}^{M*}$ above.

Expected Return to Capital (v_{n}^{*}): No-arbitrage with consumption bonds implies that the expected return to capital (v_{n}^{*}) satisfies:

$$v_{n}^{*} = \rho + \delta p_{nt} = \overline{\rho}_{n}.$$

Rental Rates (r_{n}^{*}, $r_{\mathbb{N}}/\phi_{n\mathbb{N}}$): The steady-state rental rate (r_{n}^{*}) satisfies:

$$r_{n}^{*} = \frac{\overline{\rho}_{n}}{\gamma} \left(\xi_{nn}^{*}\right)^{1/\theta},$$

where we solved for ξ_{nn}^{*} above. Under the assumption of no domestic financial frictions ($\phi_{nn} = 1$), we can recover the steady-state slavery rental rate net of financial frictions ($r_{\mathbb{N}}/\phi_{n\mathbb{N}}$) for those locations with positive slavery investments ($\xi_{nn}^{*} < 1$):

$$\xi_{nnt} = \frac{\left(r_{nt}^{*}\right)^{\theta}}{\left(r_{\mathbb{N}t}/\phi_{n\mathbb{N}t}\right)^{\theta} + \left(r_{nt}^{*}\right)^{\theta}} = \frac{\left(\frac{\overline{\rho}_{n}}{\gamma}\right)^{\theta} \xi_{nn}^{*}}{\left(r_{\mathbb{N}t}/\phi_{n\mathbb{N}t}\right)^{\theta} + \left(\frac{\overline{\rho}_{n}}{\gamma}\right)^{\theta} \xi_{nn}^{*}} = \frac{\left(\frac{\overline{\rho}_{n}}{\gamma}\right)^{\theta}}{\frac{1}{\xi_{nn}^{*}} \left(r_{\mathbb{N}t}/\phi_{n\mathbb{N}t}\right)^{\theta} + \left(\frac{\overline{\rho}_{n}}{\gamma}\right)^{\theta}},$$

which implies:

$$\left(r_{\mathbb{N}t}/\phi_{n\mathbb{N}t}\right)^{\theta} + \xi_{nn}^{*} \left(\frac{\overline{\rho}_{n}}{\gamma}\right)^{\theta} = \left(\frac{\overline{\rho}_{n}}{\gamma}\right)^{\theta},$$

$$\left(r_{\mathbb{N}t}/\phi_{n\mathbb{N}t}\right) = \left(1 - \xi_{nn}^{*}\right)^{\frac{1}{\theta}} \left(\frac{\overline{\rho}_{n}}{\gamma}\right).$$

Agricultural Land (q_{n}^{*}): The steady-state price of agricultural land (q_{n}^{*}) satisfies:

$$q_{nt}^{*} = \frac{\alpha^{A}}{1 - \alpha^{A}} \frac{w_{nt}^{L*} \ell_{nt}^{A*}}{m_{n}},$$

where (ℓ_{nt}^{A*}, m_{n}) are observed and we solved for w_{n}^{L*} above.

Productivity-adjusted Manufacturing Capital ($\widetilde{k}_{n}^{M*}$): Productivity-adjusted manufacturing capital ($\widetilde{k}_{n}^{M*}$) satisfies:

$$\widetilde{k}_{n}^{M*} = \frac{\alpha^{M}}{1 - \alpha^{M}} \frac{w_{n}^{L*} \ell_{n}^{M*}}{r_{n}^{*}} = \frac{\alpha^{M}}{1 - \alpha^{M}} \frac{w_{n}^{L*} \ell_{n}^{M*}}{\frac{\overline{\rho}_{n}}{\gamma} \left(\xi_{nn}^{*}\right)^{1/\theta}},$$

where we observe ℓ_{n}^{M*} and solved for (w_{n}^{L*}, ξ_{nn}^{*}) above.

Unadjusted Manufacturing Capital (k_{n}^{M*}): Using the relationship between productivity-adjusted and unadjusted capital, we have:

$$\widetilde{k}_{n}^{M*} = \gamma \left(\xi_{nn}^{*}\right)^{-\frac{1}{\theta}} k_{n}^{M*},$$

which implies that unadjusted manufacturing capital (k_n^M) is:

$$k_n^{M*} = \frac{1}{\gamma} \left(\xi_{nn}^*\right)^{\frac{1}{\theta}} \widetilde{k}_n^{M*} = \frac{1}{\gamma} \left(\xi_{nnt}^*\right)^{\frac{1}{\theta}} \frac{\alpha^M}{1-\alpha^M} \frac{w_n^{L*}\ell_n^{M*}}{r_n^*} = \frac{\alpha^M}{1-\alpha^M} \frac{w_n^{L*}\ell_n^{M*}}{\overline{\rho}_n},$$

where we observe ℓ_n^{M*} and solved for w_n^* above.

Unadjusted Capital (k_n^*): Using the capital allocation rule, we have:

$$k_n^{M*} = \xi_{nn}^* k_n^*,$$

which implies that unadjusted total capital (k_n^*) is:

$$k_n^* = \frac{k_n^{M*}}{\xi_{nn}^*} = \frac{1}{\xi_{nn}^*} \frac{\alpha^M}{1-\alpha^M} \frac{w_n^{L*}\ell_n^{M*}}{r_n^*} = \frac{1}{\xi_{nn}^*} \frac{\alpha^M}{1-\alpha^M} \frac{w_n^{L*}\ell_n^{M*}}{\overline{\rho}_n},$$

where we observe ℓ_n^{M*} and solved for (w_n^{L*}, ξ_{nn}^*) above.

Manufacturing Price-adjusted Productivity ($p_n^M z_n^M$): From zero profits, manufacturing price-adjusted productivity ($p_n^M z_n^M$) is:

$$p_n^M z_n^M = \left(r_n^*\right)^{\alpha^M} \left(w_n^{L*}\right)^{1-\alpha^M} = \left(\frac{\overline{\rho}_n}{\gamma} \left(\xi_{nn}^*\right)^{1/\theta}\right)^{\alpha^M} \left(w_n^{L*}\right)^{1-\alpha^M},$$

where we solved for ξ_{nn}^* and w_n^{L*} above.

Agricultural Price-adjusted Productivity ($p_n^A z_n^A$): From zero profits, agricultural price-adjusted productivity ($p_n^A z_n^A$) is:

$$p_n^A z_n^A = \left(q_n^*\right)^{\alpha^A} \left(w_n^{L*}\right)^{1-\alpha^A} = \left(\frac{\alpha^A}{1-\alpha^A} \frac{w_n^{L*}\ell_n^{A*}}{m_n}\right)^{\alpha^A} \left(w_n^{L*}\right)^{1-\alpha^A},$$

where we observe ℓ_n^{A*} and solved for w_n^{L*} above.

Price-adjusted Amenities (B_{nt}/p_{nt}): From population mobility, we can recover price-adjusted amenities (up to a normalization or choice of units) as follows:

$$\frac{\ell_n^*}{\widetilde{\ell}} = \left(\frac{B_n/p_n}{\widetilde{B}/\widetilde{p}}\right)^{1/\kappa} \left(\frac{w_n^{L*}}{\widetilde{w}^{L*}}\right)^{1/\kappa},$$

where a tilde above a variable denotes a geometric mean. We thus obtain:

$$\frac{B_n/p_n}{\widetilde{B}/\widetilde{p}} = \left(\frac{\ell_n^*}{\widetilde{\ell}}\right)^{\kappa} \left(\frac{w_n^{L*}}{\widetilde{w}^{L*}}\right)^{-1},$$

where we observe $(\ell_n^*, \widetilde{\ell})$ and solved for $(w_n^{L*}, \widetilde{w}^{L*})$ above and choose units to measure amenities such that $\widetilde{B}/\widetilde{p} = 1$.

Expected Utility ($\mathbb{U}_t$): From expected utility, we have:

$$\exp\left(\mathbb{U}_t\right) = \left[\sum_{k=1}^{N} \left(B_{kt} w_{kt}^L / p_{kt}\right)^{1/\kappa}\right]^{\kappa},$$

which implies that we can recover expected utility from:

$$\exp\left(\mathbb{U}_t\right) = \left[\sum_{k=1}^{N}\left(\left(\frac{\ell_n^*}{\widetilde{\ell}}\right)^{\kappa}\widetilde{w}^{L*}\right)^{1/\kappa}\right]^{\kappa}.$$

Income from Slavery Investments: Income in each location is given by:

$$x_{nt} = q_{nt}m_n + w_{nt}\left(\ell_{it}^A + \ell_{it}^M\right) + v_{nt}\left(k_{nt}^M + k_{nt}^S\right),$$

$$x_{nt} = w_{nt}\left(\ell_{it}^A + \ell_{it}^M\right) + \left(\mathbb{R}_{nt}^A + \mathbb{R}_{nt}^M + \mathbb{R}_{nt}^S\right).$$

The share of income from slavery is therefore:

$$\frac{\mathbb{R}_{nt}^S}{x_{nt}} = \frac{\mathbb{R}_{nt}^S}{w_{nt}\left(\ell_{it}^A + \ell_{it}^M\right) + \left(\mathbb{R}_{nt}^A + \mathbb{R}_{nt}^M + \mathbb{R}_{nt}^S\right)}.$$

□

S.2.1.14 Steady-state Counterfactuals

In this section of the Online Supplement, we show how the model can be used to undertake counterfactuals for the steady-state impact of removing access to slavery investments. We develop a method for computing these counterfactuals to implement the comparative static in Proposition 1 of the paper and Section S.2.1.12 of this Online Supplement.

We measure slavery investments at the time of the abolition of slavery using our slave-holder compensation data. We assume central values for the model's parameters from the existing empirical literature and our historical time period, as discussed further in Section A.2 of the Online Appendix. We start at the observed equilibrium in the data in 1833 and undertake a counterfactual for a prohibitive increase in financial frictions with the colonial plantation ($\phi_{n\mathbb{N}} \to \infty$ for all n). Comparing the resulting counterfactual equilibrium to the observed equilibrium, we evaluate the impact of access to slavery investments on levels and patterns of economic activity.

We use an exact-hat algebra approach, in which we re-write the counterfactual equilibrium conditions in terms of the observed variables in the data in 1833, and the relative changes of the endogenous variables between the counterfactual and observed equilibria. We denote the counterfactual equilibrium variables with a prime, the observed equilibrium values with no prime, and the relative changes of variables between the two equilibrium with a hat (such that $\hat{x}_n = x_n'/x_n$). We assume that the observed equilibrium in 1833 is close to steady-state, in the absence of any further changes in technology or other exogenous variables of the model.[5] We

[5] To the extent that the full steady-state impact of British participation in slavery had not been realized by the 1830s, starting from the observed equilibrium in the 1830s will underestimate its steady-state impact.

solve for the new counterfactual steady-state equilibrium given prohibitive colonial financial frictions. We hold constant goods prices on world markets (p^{AW}, p^{MW}, p^{SW}) and the other exogenous variables of the model. Therefore, this counterfactual captures the pure impact of the abolition of slavery on economic development through the mechanism of capital accumulation.

We use the property of the model that the domestic investment share (ξ^*_{nn}) is a summary statistic for the impact of access to slavery investments on the spatial distribution of economic activity. As colonial financial frictions become prohibitive ($\phi_{n\mathbb{N}} \to \infty$ for all n), the domestic investment share converges to one ($\xi^{*\prime}_{nn} \to 1$ for all n), such that the relative change in colonial financial frictions is given by $\widehat{\xi}_{nn} = 1/\xi_{nn}$. Given this counterfactual change in the domestic investment share ($\widehat{\xi}^*_{nn}$), we can solve for the counterfactual changes in all other endogenous variables from Proposition 1 in the paper.

Counterfactual Change in Domestic Investment Share ($\widehat{\xi}^*_{nn}$): The counterfactual change in the domestic investment share is:

$$\widehat{\xi}^*_{nn} = \frac{1}{\xi^*_{nn}}.$$

Counterfactual Change in Expected Return to Capital ($\widehat{v}^*_n$): The steady-state expected return to capital (v^*_n) is determined by no-arbitrage with the consumption bond ($\overline{\rho}_n$), and hence is invariant respect to the removal of access to slavery investments:

$$\widehat{v}^*_n = 1. \tag{S.2.82}$$

Counterfactual Change in Rental Rate (r^*_n): The counterfactual change in the steady-state rental rate (r^*_n) is given by:

$$\widehat{r}^*_n = \left(\widehat{\xi}^*_{nn}\right)^{\frac{1}{\theta}}. \tag{S.2.83}$$

Therefore, the removal of access to slavery investments increases the steady-state rental rate in locations that participated in slavery (through a rise in ξ^*_{nn}).

Counterfactual Wage ($\widehat{w}^{L*}_n$): Recall from equation (S.2.66) that the zero-profit condition in the manufacturing sector implies:

$$p^M_n z^M_n = \left(r^*_n\right)^{\alpha^M} \left(w^{L*}_n\right)^{1-\alpha^M}.$$

Therefore, the counterfactual change in the steady-state wage is:

$$\widehat{w}^{L*}_n = \left(\widehat{r}^*_n\right)^{-\frac{\alpha^M}{1-\alpha^M}}. \tag{S.2.84}$$

Hence, the removal of access to slavery investments reduces the steady-state wage in locations that participated in slavery (because of the rise in the rental rate r^*_n).

Counterfactual Total Population Share ($\widehat{\mu}_n^*$): From the population choice probabilities, the counterfactual change in the steady-state population share is:

$$\widehat{\mu}_n^* \mu_n^* = \frac{\mu_n^* \left(\widehat{w}_n^*\right)^{1/\kappa}}{\sum_{k=1}^N \mu_k^* \left(\widehat{w}_k^*\right)^{1/\kappa}}. \tag{S.2.85}$$

Hence, the removal of access to slavery investments reduces the steady-state population share in locations that participated in slavery (because of the fall in the wage w_n^*).

Counterfactual Land Price ($\widehat{q}_n^*$): Recall from equation (S.2.67) that the zero-profit condition in agriculture implies:

$$p_n^A z_n^A = \left(q_n^*\right)^{\alpha^A} \left(w_n^{L*}\right)^{1-\alpha^A}.$$

Therefore, the counterfactual change in the steady-state land price is:

$$\widehat{q}_n^* = \left(\widehat{w}_n^{L*}\right)^{-\frac{\left(1-\alpha^A\right)}{\alpha^A}}. \tag{S.2.86}$$

Hence, the removal of access to slavery investments increases the steady-state land price in locations that participated in slavery (because of the fall in the wage w_n^*).

Counterfactual Productivity-Adjusted Manufacturing Capital-Labor Ratio ($\widehat{\frac{\widetilde{k}_n^{M*}}{\ell_n^{M*}}}$): Recall from equation (S.2.69) that the steady-state productivity-adjusted manufacturing capital-labor ratio can be written as:

$$\frac{\widetilde{k}_n^{M*}}{\ell_n^{M*}} = \frac{\alpha^M}{1-\alpha^M} \frac{w_n^{L*}}{r_n^*}.$$

Therefore, the counterfactual change in the steady-state productivity-adjusted manufacturing capital-labor ratio is:

$$\widehat{\frac{\widetilde{k}_n^{M*}}{\ell_n^{M*}}} = \frac{\widehat{w}_n^{L*}}{\widehat{r}_n^*}. \tag{S.2.87}$$

Hence, the removal of access to slavery investments reduces the steady-state productivity-adjusted manufacturing capital-labor ratio in locations that participated in slavery (through the fall in the wage (w_n^{L*}) and the rise in the rental rate r_n^*).

Counterfactual Unadjusted Manufacturing Capital-Labor Ratio ($\widehat{\frac{k_n^{M*}}{\ell_n^{M*}}}$): Recall from equilibrium capital portfolio allocations, productivity and un-adjusted capital are related according to:

$$\widetilde{k}_{nt}^M = \gamma \xi_{nnt}^{\frac{\theta-1}{\theta}} k_{nt}.$$

Therefore the counterfactual change in the unadjusted manufacturing capital-labor ratio is given by:

$$\widehat{\frac{k_n^{M*}}{\ell_n^{M*}}} = \widehat{\xi}_{nnt}^{-\frac{\theta-1}{\theta}} \frac{\widehat{w}_n^{L*}}{\widehat{r}_n^*}. \tag{S.2.88}$$

Hence, the removal of access to slavery investments reduces the steady-state unadjusted manufacturing capital-labor ratio in locations that participated in slavery (through the rise in ξ^*_{nn}, the fall in the wage w^*_n and the rise in the rental rate r^*_n).

Counterfactual Agricultural Employment ($\widehat{\ell}^A_{nt}$): Recall from equation (S.2.71) that steady-state agricultural employment can be written as:

$$\ell^A_{nt} = \left(\frac{p^A_{nt} z^A_{nt}}{w^L_{nt}}\right)^{\frac{1}{\alpha^A}} \left(\frac{1-\alpha^A}{\alpha^A}\right) m_n.$$

Therefore the counterfactual change in agricultural employment is:

$$\widehat{\ell}^A_{nt} = \left(\widehat{w}^L_{nt}\right)^{-\frac{1}{\alpha^A}}$$

Hence, the removal of access to slavery investments increases steady-state agricultural employment in locations that participated in slavery (through the lower wage w^*_n).

Counterfactual Manufacturing Employment ($\widehat{\ell}^{M*}_n \ell^{M*}_n$): Recall from equation (S.2.58) that steady-state manufacturing employment can be written as:

$$\ell^{M*}_n = \ell^*_n - \ell^{*A}_n.$$

Therefore, the counterfactual change in steady-state manufacturing employment from the abolition of slavery can be recovered from:

$$\widehat{\ell}^{M*}_n \ell^{M*}_n = \widehat{\ell}^*_n \ell^*_n - \widehat{\ell}^{*A}_n \ell^{*A}_n, \tag{S.2.89}$$

where we determined $\widehat{\ell}^*_n$ and $\widehat{\ell}^{*A}_n$ above. Since the removal of access to slavery investments reduces total population and increases agricultural employment in the locations that participated in slavery the most, it also reduces manufacturing employment in the locations that participated in slavery the most.

Counterfactual Productivity-Adjusted Manufacturing Capital Stock ($\widehat{\widetilde{k}^{M*}_n}$): Recall from equation (S.2.59) that the steady-state productivity-adjusted manufacturing capital stock can be written as:

$$\widetilde{k}^{M*}_n = \frac{\widetilde{k}^{M*}_n}{\ell^{*M}_n} \ell^{*M}_n.$$

Therefore, the counterfactual change in the steady-state productivity-adjusted manufacturing capital stock can be recovered from:

$$\widehat{\widetilde{k}^{M*}_n} = \widehat{\frac{\widetilde{k}^{M*}_n}{\ell^{*M}_n}} \widehat{\ell^{*M}_n}, \tag{S.2.90}$$

where we determined $\widehat{\frac{\widetilde{k}^{M*}_n}{\ell^{*M}_n}}$ and $\widehat{\ell^{*M}_n}$ above. Since the removal of access to slavery investments reduces the steady-state productivity-adjusted manufacturing capital-labor ratio and reduces steady-state manufacturing employment, it also reduces the steady-state productivity-adjusted manufacturing capital stock.

Counterfactual Unadjusted Manufacturing Capital Stock ($\widehat{k_n^{M*}}$): Recall from equation (S.2.60) that the steady-state manufacturing capital stock can be written as:

$$k_n^{M*} = \frac{k_n^{M*}}{\ell_n^{*M}} \ell_n^{*M},$$

Therefore, the counterfactual change in the steady-state manufacturing capital stock can be recovered from:

$$\widehat{k_n^{M*}} = \widehat{\frac{k_n^{M*}}{\ell_n^{*M}}} \widehat{\ell_n^{*M}},$$

where we determined $\widehat{\frac{k_n^{M*}}{\ell_n^{*M}}}$ and $\widehat{\ell_n^{*M}}$ above. Since the removal of access to slavery investments reduces the steady-state unadjusted manufacturing capital-labor ratio and reduces steady-state manufacturing employment, it also reduces the steady-state unadjusted manufacturing capital stock.

Counterfactual Capital Stock ($\widehat{k_n^*}$): Recall from equation (S.2.61) that the steady-state capital stock can be written as:

$$k_n^* = \frac{k_n^{M*}}{\xi_{nn}^*}.$$

Therefore, the counterfactual change in the steady-state capital stock can be recovered from:

$$\widehat{k_n^*} = \frac{\widehat{k_n^{M*}}}{\widehat{\xi_{nn}^*}} = \frac{\widehat{k_n^{M*}}}{1/\xi_{nn}^*}. \tag{S.2.91}$$

where we determined $\widehat{k_n^{M*}}$ and $\widehat{\xi_{nn}^*}$ above. Since the removal of access to slavery investments reduces the steady-state unadjusted manufacturing capital stock, it also reduces the steady-state capital stock.

Counterfactual Expected Worker Welfare ($\widehat{\exp(\mathbb{U}^*)}$): Recall from equation (S.2.76) that steady-state expected worker welfare can be written as:

$$\exp(\mathbb{U}^*) = \left[\sum_{k=1}^{N} \left(B_k w_k^{L*}/p_k\right)^{1/\kappa}\right]^{\kappa}.$$

Therefore, the counterfactual change in steady-state expected worker welfare can be written as:

$$\widehat{\exp(\mathbb{U}^*)} = \left[\sum_{k=1}^{N} \mu_{kt} \left(\widehat{w_k^{L*}}\right)^{1/\kappa}\right]^{\kappa}. \tag{S.2.92}$$

Hence, the removal of access to slavery investments reduces steady-state expected worker welfare (through lower w_n^*).

Counterfactual Capitalist Real Income: Recall that capitalist real income is:

$$\frac{v_n^* k_n^*}{p_n}.$$

We show above that v_n^* is invariant to ξ_{nn}^* and p_n is exogenous. Therefore, the counterfactual change in capitalist real income is given by:

$$\widehat{k_n^*}.$$

We showed above that the removal of access to slavery investments reduces the steady-state capital stock ($\widehat{k_n^*} < 1$). Hence, it also reduces steady-state capitalist real income.

Counterfactual Landowner Real Income: Recall that landowner real income is:

$$\frac{q_n^* m_n}{p_n}.$$

Both m_n and p_n are exogenous. Therefore, the counterfactual change in landowner real income is given by:

$$\widehat{q_n^*}.$$

We showed above that the removal of access to slavery investments increases steady-state agricultural land prices ($\widehat{q_n^*} > 1$). Hence, it also increases landowner real income.

Counterfactual Income: Note that income in each location is given by:

$$x_{nt} = q_{nt} m_n + w_{nt} \left(\ell_{it}^A + \ell_{it}^M \right) + v_{nt} \left(k_{nt}^M + k_{nt}^S \right),$$

$$x_{nt} = w_{nt} \left(\ell_{it}^A + \ell_{it}^M \right) + \left(\mathbb{R}_{nt}^A + \mathbb{R}_{nt}^M + \mathbb{R}_{nt}^S \right).$$

$$x_{nt} = w_{nt} \ell_{it} + \left(\mathbb{R}_{nt}^A + \mathbb{R}_{nt}^M + \mathbb{R}_{nt}^S \right).$$

Therefore, the counterfactual change in income is given by:

$$\widehat{x}_{nt} x_{nt} = \widehat{w}_{nt} \widehat{\ell}_{it} w_{nt} \ell_{it} + \left(\widehat{\mathbb{R}}_{nt}^A \mathbb{R}_{nt}^A + \widehat{\mathbb{R}}_{nt}^M \mathbb{R}_{nt}^M + \widehat{\mathbb{R}}_{nt}^S \mathbb{R}_{nt}^S \right).$$

$$\widehat{x}_{nt} = \frac{w_{nt} \ell_{it}}{x_{nt}} \widehat{w}_{nt} \widehat{\ell}_{it} + \frac{\mathbb{R}_n^A}{x_{nt}} \widehat{\mathbb{R}}_n^A + \frac{\mathbb{R}_n^M}{x_{nt}} \widehat{\mathbb{R}}_n^M,$$

where we have used $\widehat{\mathbb{R}}_{nt}^S = 0$. We can re-write this counterfactual change in income as:

$$\widehat{x}_{nt} = \frac{w_{nt} \ell_{it}}{x_{nt}} \widehat{w}_{nt} \widehat{\ell}_{it} + \frac{\mathbb{R}_n^A}{x_{nt}} \widehat{q}_n^A + \frac{\mathbb{R}_n^M}{x_{nt}} \widehat{v}_n \widehat{k}_n.$$

We thus have a direct loss in income from the removal of access to slavery investments (as captured by the compensation payments $\mathbb{R}_{nt}^S$) and an indirect loss through changes in incomes in the agricultural and manufacturing sectors.

S.2.1.15 Worker Location Decisions

In this section of the Online Supplement, we provide the detailed derivations for workers' location decisions. In Subsection S.2.1.15, we characterize worker expected utility. In Subsection S.2.1.15, we derive workers' location choice probabilities.

Expected Utility We now derive expected utility in equation (S.2.23) of this Online Supplement. Recall that idiosyncratic amenities are drawn from an extreme value distribution with the following cumulative distribution function:

$$F\left(b\right) = e^{-e^{\left(-b-\bar{\gamma}\right)}},$$

and corresponding probability density function:

$$f\left(b\right) = e^{\left(-b-\bar{\gamma}\right)}e^{-e^{\left(-b-\bar{\gamma}\right)}}.$$

Using this extreme value distribution, note that:

$$\text{Prob}\left[u_{nt} + \kappa b_{nt} \geq u_{mt} + \kappa b_{mt}\right], \qquad \forall\, m \neq n,$$

$$\text{Prob}\left[u_{nt} - u_{mt} + \kappa b_{nt} \geq \kappa b_{mt}\right],$$

$$\text{Prob}\left[\kappa b_{mt} \leq u_{nt} - u_{mt} + \kappa b_{nt}\right],$$

$$\text{Prob}\left[\kappa b_{mt} \leq \kappa \bar{b}_{nmt} + \kappa b_{nt}\right],$$

$$\bar{b}_{nmt} \equiv \frac{u_{nt} - u_{mt}}{\kappa},$$

$$\text{Prob}\left[b_{mt} \leq \bar{b}_{nmt} + b_{nt}\right].$$

Now define expected utility as:

$$\mathbb{U}_t = \max_{\{n\}_1^N}\left\{\mathbb{E}_b\left[u_{nt}\right] + \kappa b_{nt}\right\}$$

$$\mathbb{U}_t = \sum_{n=1}^{N}\int_{-\infty}^{\infty}\left(u_{nt} + \kappa b_{nt}\right) f\left(b_{nt}\right)\prod_{m \neq n} F\left(\bar{b}_{nmt} + b_{nt}\right) \mathrm{d}b_{nt}.$$

Using our assumed functional form, we have:

$$\mathbb{U}_t = \sum_{n=1}^{N}\int_{-\infty}^{\infty}\left(u_{nt} + \kappa b_{nt}\right) e^{\left(-b_{nt}-\bar{\gamma}\right)}e^{-e^{\left(-b_{nt}-\bar{\gamma}\right)}}e^{-\sum_{m\neq n} e^{\left(-\bar{b}_{nmt}-b_{nt}-\bar{\gamma}\right)}}\mathrm{d}b_{nt},$$

$$\mathbb{U}_t = \sum_{n=1}^{N}\int_{-\infty}^{\infty}\left(u_{nt} + \kappa b_{nt}\right) e^{\left(-b_{nt}-\bar{\gamma}\right)}e^{-\sum_{m=1}^{N} e^{\left(-\bar{b}_{nmt}-b_{nt}-\bar{\gamma}\right)}}\mathrm{d}b_{nt},$$

since $\bar{b}_{nnt} = 0$.

$$\mathbb{U}_t = \sum_{n=1}^{N} \int_{-\infty}^{\infty} \left(u_{nt} + \kappa b_{nt}\right) e^{\left(-b_{nt} - \bar{\gamma}\right)} e^{-e^{\left(-b_{nt}-\bar{\gamma}\right)} \sum_{m=1}^{N} e^{\left(-\bar{b}_{nmt}\right)}} \mathrm{d}b_{nt}.$$

Define:

$$\eta_{nt} \equiv \log \sum_{m=1}^{N} e^{-\bar{b}_{nmt}},$$

$$e^{\eta_{nt}} = \sum_{m=1}^{N} e^{-\bar{b}_{nmt}},$$

$$\zeta_{nt} \equiv b_{nt} + \bar{\gamma},$$

Using these definitions:

$$\mathbb{U}_t = \sum_{n=1}^{N} \int_{-\infty}^{\infty} \left(u_{nt} + \kappa \left(\zeta_{nt} - \bar{\gamma}\right)\right) e^{\left(-\zeta_{nt}\right)} e^{-e^{\left(-\zeta_{nt}\right)} \sum_{m=1}^{N} e^{\left(-\bar{b}_{nmt}\right)}} \mathrm{d}\zeta_{nt},$$

$$\mathbb{U}_t = \sum_{n=1}^{N} \int_{-\infty}^{\infty} \left(u_{nt} + \kappa \left(\zeta_{nt} - \bar{\gamma}\right)\right) e^{\left(-\zeta_{nt}\right)} e^{-e^{\left(-\zeta_{nt}\right)} e^{\eta_{nt}}} \mathrm{d}\zeta_{nt},$$

$$\mathbb{U}_t = \sum_{n=1}^{N} \int_{-\infty}^{\infty} \left(u_{nt} + \kappa \left(\zeta_{nt} - \bar{\gamma}\right)\right) e^{\left(-\zeta_{nt}\right)} e^{-e^{\left(-\left(\zeta_{nt} - \eta_{nt}\right)\right)}} \mathrm{d}\zeta_{nt}.$$

Now define another change of variables:

$$\tilde{y}_{nt} \equiv \zeta_{nt} - \eta_{nt}.$$

Using this definition:

$$\mathbb{U}_t = \sum_{n=1}^{N} \int_{-\infty}^{\infty} \left(u_{nt} + \kappa \left(\tilde{y}_{nt} + \eta_{nt} - \bar{\gamma}\right)\right) e^{\left(-\left(\tilde{y}_{nt} + \eta_{nt}\right) - e^{\left(-\tilde{y}_{nt}\right)}\right)} \mathrm{d}\tilde{y}_{nt}.$$

$$\mathbb{U}_t = \sum_{n=1}^{N} \left(\begin{array}{c} \int_{-\infty}^{\infty} \left(u_{nt} + \kappa \left(\eta_{nt} - \bar{\gamma}\right)\right) e^{\left(-\left(\tilde{y}_{nt} + \eta_{nt}\right) - e^{\left(-\tilde{y}_{nt}\right)}\right)} \mathrm{d}\tilde{y}_{nt} \\ + \kappa \int_{-\infty}^{\infty} \tilde{y}_{nt} e^{\left(-\left(\tilde{y}_{nt} + \eta_{nt}\right) - e^{\left(-\tilde{y}_{nt}\right)}\right)} \mathrm{d}\tilde{y}_{nt} \end{array} \right).$$

$$\mathbb{U}_t = \sum_{n=1}^{N} e^{-\eta_{nt}} \left(\begin{array}{c} \left(u_{nt} + \kappa \left(\eta_{nt} - \bar{\gamma}\right)\right) \int_{-\infty}^{\infty} e^{\left(-\tilde{y}_{nt} - e^{\left(-\tilde{y}_{nt}\right)}\right)} \mathrm{d}\tilde{y}_{nt} \\ + \kappa \int_{-\infty}^{\infty} \tilde{y}_{nt} e^{\left(-\left(\tilde{y}_{nt} + \eta_{nt}\right) - e^{\left(-\tilde{y}_{nt}\right)}\right)} \mathrm{d}\tilde{y}_{nt} \end{array} \right).$$

Now note that:

$$\frac{\mathrm{d}}{\mathrm{d}y} \left[e^{-e^{-y}} \right] = e^{-y - e^{-y}},$$

$$\int_{-\infty}^{\infty} e^{\left(-\tilde{y}_{nt} - e^{\left(-\tilde{y}_{nt}\right)}\right)} \mathrm{d}\tilde{y}_{nt} = \left[e^{-e^{-\tilde{y}_{nt}}} \right]_{-\infty}^{\infty} = \left[1 - 0\right],$$

which implies:

$$\mathbb{U}_{it} = \sum_{n=1}^{N} e^{-\eta_{nt}} \left(\begin{array}{c} (u_{nt} + \kappa (\eta_{nt} - \bar{\gamma})) \\ +\kappa \int_{-\infty}^{\infty} \tilde{y}_{nt} e^{\left(-(\tilde{y}_{nt}+\eta_{nt}) - e^{(-\tilde{y}_{nt})}\right)} \mathrm{d}\tilde{y}_{nt} \end{array} \right).$$

Now note also that:

$$\kappa\bar{\gamma} = \kappa \int_{-\infty}^{\infty} \tilde{y}_{nt} e^{\left(-(\tilde{y}_{nt}+\eta_{nt}) - e^{(-\tilde{y}_{nt})}\right)} \mathrm{d}\tilde{y}_{nt},$$

Therefore:

$$\mathbb{U}_{t} = \sum_{n=1}^{N} e^{-\eta_{nt}} \left(u_{nt} + \kappa\eta_{nt} \right).$$

Using the definition of η_{nt}, we have:

$$\mathbb{U}_{t} = \sum_{n=1}^{N} e^{-\log \sum_{m=1}^{N} e^{-\bar{b}_{nmt}}} \left(u_{nt} + \kappa \log \sum_{m=1}^{N} e^{-\bar{b}_{nmt}} \right).$$

Recall that

$$\bar{b}_{nmt} \equiv \frac{u_{nt} - u_{mt}}{\kappa}.$$

Therefore

$$\begin{aligned} \left(u_{nt} + \kappa \log \sum_{m=1}^{N} e^{-\bar{b}_{nmt}} \right) &= \left(u_{nt} + \kappa \log \sum_{m=1}^{N} e^{-\frac{(u_{nt}-u_{mt})}{\kappa}} \right) \\ &= \kappa \log \left(\sum_{m=1}^{N} e^{\frac{u_{mt}}{\kappa}} \right) \\ &= \kappa \log \left(\sum_{m=1}^{N} e^{u_{mt}^{1/\kappa}} \right), \end{aligned}$$

and

$$\begin{aligned} \sum_{n=1}^{N} e^{-\log \sum_{m=1}^{N} e^{-\bar{b}_{nmt}}} &= \sum_{n=1}^{N} e^{-\log \sum_{m=1}^{N} e^{-\frac{u_{nt}-u_{mt}}{\kappa}}}, \\ &= \sum_{n=1}^{N} e^{-\log\left[e^{-u_{nt}^{1/\kappa}} \sum_{m=1}^{N} e^{u_{mt}^{1/\kappa}} \right]} \\ &= \sum_{n=1}^{N} e^{u_{nt}^{1/\kappa}} \sum_{m=1}^{N} e^{-u_{mt}^{1/\kappa}} \\ &= 1. \end{aligned}$$

Thus we obtain the expression for expected utility in equation (S.2.23):

$$\mathbb{U}_{t} = \max_{\{n\}_{1}^{N}} \left\{ \mathbb{E}_{b} \left[u_{nt} \right] + \kappa b_{nt} \right\} = \kappa \log \left(\sum_{n=1}^{N} e^{u_{nt}^{1/\kappa}} \right).$$

Location Choice Probabilities We now derive the location choice probabilities (μ_{nt}) in equation (S.2.22) in this Online Supplement. The probability that a worker chooses location n is given by:

$$\mu_{nt} = \text{Prob}\left[\frac{\bar{u}_{nt}}{\kappa} + b_{nt} \geq \max_{m \neq n}\left\{\frac{\bar{u}_{mt}}{\kappa} + b_{mt}\right\}\right],$$

$$\mu_{nt} = \text{Prob}\left[\frac{\bar{u}_{nt} - \bar{u}_{mt}}{\kappa} + b_{nt} \geq \max_{m \neq n}\left\{b_{mt}\right\}\right],$$

where we use $\bar{u}_{nt}$ to denote the common component of utlity. Therefore this location choice probability can be written as:

$$\mu_{nt} = \int_{-\infty}^{\infty} f\left(b_{nt}\right) \prod_{m \neq n} F\left(\frac{\bar{u}_{nt} - \bar{u}_{mt}}{\kappa} + b_{nt}\right) \mathrm{d}b_{nt}.$$

Using our extreme value distributional assumption and the definition of $\bar{b}_{nmt}$ in the previous subsection, we can write this as:

$$\mu_{nt} = \int_{-\infty}^{\infty} e^{(-b_{nt}-\bar{\gamma})} e^{-e^{(-b_{nt}-\bar{\gamma})} \sum_{m=1}^{N} e^{-\bar{b}_{nmt}}} \mathrm{d}b_{nt},$$

Recall from the previous subsection the following definitions:

$$\eta_{nt} \equiv \log \sum_{m=1}^{N} e^{-\bar{b}_{nmt}},$$

$$e^{\eta_{nt}} = \sum_{m=1}^{N} e^{-\bar{b}_{nmt}},$$

$$\zeta_{nt} \equiv b_{nt} + \bar{\gamma}.$$

Using these definitions, our location choice probability can be written as follows:

$$\mu_{nt} = \int_{-\infty}^{\infty} e^{-\zeta_{nt}} e^{-e^{-\zeta_{nt}} e^{\eta_{nt}}} \mathrm{d}\zeta_{nt},$$

Now recall the following additional definition from the previous subsection:

$$\tilde{y}_{nt} \equiv \zeta_{nt} - \eta_{nt}.$$

$$\mu_{nt} = \int_{-\infty}^{\infty} e^{-(\tilde{y}_{nt}+\eta_{nt})} e^{-e^{-(\tilde{y}_{nt}+\eta_{nt})} e^{\eta_{nt}}} \mathrm{d}\tilde{y}_{nt},$$

$$\mu_{nt} = e^{-\eta_{nt}} \int_{-\infty}^{\infty} e^{-\tilde{y}_{nt}} e^{-e^{-(\tilde{y}_{nt})}} d\tilde{y}_{nt},$$

$$\mu_{nt} = e^{-\eta_{nt}} \int_{-\infty}^{\infty} e^{-\tilde{y}_{nt}-e^{-(\tilde{y}_{nt})}} \mathrm{d}\tilde{y}_{nt},$$

Recall that:

$$\int_{-\infty}^{\infty} e^{\left(-\tilde{y}_{nt}-e^{(-\tilde{y}_{nt})}\right)} \mathrm{d}\tilde{y}_{nt} = \left[e^{-e^{-\tilde{y}_{nt}}}\right]_{-\infty}^{\infty} = [1-0].$$

Therefore we have

$$\mu_{nt} = e^{-\eta_{nt}}.$$

Recall

$$\eta_{nt} \equiv \log \sum_{m=1}^{N} e^{-\bar{b}_{nmt}},$$

Therefore

$$\mu_{nt} = e^{-\left[\log \sum_{m=1}^{N} e^{-\bar{b}_{nmt}}\right]},$$

Recall

$$\bar{b}_{nmt} \equiv \frac{(\bar{u}_{nt}-\bar{u}_{mt})}{\kappa}.$$

Therefore

$$\mu_{nt} = e^{-\log\left[\sum_{m=1}^{N} e^{-\frac{(\bar{u}_{nt}-\bar{u}_{mt})}{\kappa}}\right]},$$

$$\mu_{nt} = e^{-\log\left[e^{-\bar{u}_{nt}^{1/\kappa}} \sum_{m=1}^{N} e^{\bar{u}_{mt}^{1/\kappa}}\right]},$$

$$\mu_{nt} = e^{\log\left[e^{\bar{u}_{nt}^{1/\kappa}} \sum_{m=1}^{N} e^{-\bar{u}_{mt}^{1/\kappa}}\right]},$$

$$\mu_{nt} = e^{\log\left[\frac{e^{\bar{u}_{nt}^{1/\kappa}}}{\sum_{m=1}^{N} e^{\bar{u}_{mt}^{1/\kappa}}}\right]},$$

$$\mu_{nt} = \frac{e^{\bar{u}_{nt}^{1/\kappa}}}{\sum_{m=1}^{N} e^{\bar{u}_{mt}^{1/\kappa}}},$$

which yields equation (S.2.22) in this Online Supplement:

$$\mu_{nt} = \frac{\exp\left(\bar{u}_{nt}\right)^{1/\kappa}}{\sum_{m=1}^{N} \exp\left(\bar{u}_{mt}\right)^{1/\kappa}}.$$

S.2.1.16 Capital Allocation Decisions Within Periods

In this section of the Online Supplement, we provide the detailed derivations for capitalists' capital allocation decisions within periods. In Subsection S.2.1.16, we characterize the bilateral distribution of capital returns. In Subsection S.2.1.16, we derive the capital allocation probabilities. In Subsection S.2.1.16, we analyze the multilateral distribution of capital returns. In Subsection S.2.1.16, we derive the expected return to capital. In Subsection S.2.1.17, we characterize the average productivity of capital for each bilateral investment allocation.

Bilateral Distribution of Capital Returns The returns to a unit of capital allocated from location n to location $i \in \{n, \mathbb{N}\}$ are:

$$v_{nit}(\epsilon_{nit}) = \frac{\epsilon_{nit} r_{it}}{\phi_{nit}}.$$

Effective units of capital are drawn from the following distribution:

$$F(\epsilon) = e^{-\epsilon^{-\theta}}, \qquad \theta > 1.$$

Using the monotonic relationship between income and effective units of capital, we have:

$$\epsilon = \frac{v}{r_{it}/\phi_{nit}}.$$

The distribution of capital returns from location n to location $i \in \{n, \mathbb{N}\}$ is therefore:

$$F_{ni}(v) = e^{-(r_{it}/\phi_{nit})^{\theta} v^{-\theta}}, \qquad \theta > 1.$$

Derivation of Capital Allocation Probabilities The probability that capital is allocated to location $i \in \{n, \mathbb{N}\}$ is:

$$\begin{aligned}
\xi_{nit} &= \text{Prob}\left[v_{nit} \geq \max\left\{v_{not}\right\}; o \in \{n, \mathbb{N}\}\right], \\
&= \int_0^{\infty} \prod_{o \neq i} F_{no}(v) f_{ni}(v) \, dv, \\
&= \int_0^{\infty} \left[\prod_{o \neq i} e^{-(r_{ot}/\phi_{not})^{\theta} v^{-\theta}}\right] \theta \left(r_{it}/\phi_{nit}\right)^{\theta} v^{-(\theta+1)} e^{-(r_{it}/\phi_{nit})^{\theta} v^{-\theta}} dv, \\
&= \int_0^{\infty} \left[\prod_{o \in \{n, \mathbb{N}\}} e^{-(r_{ot}/\phi_{not})^{\theta} v^{-\theta}}\right] \theta \left(r_{it}/\phi_{nit}\right)^{\theta} v^{-(\theta+1)} dv, \\
&= \int_0^{\infty} \left[e^{-\Psi_{nt} v^{-\theta}}\right] \theta \Psi_{nit} v^{-(\theta+1)} dv,
\end{aligned}$$

where:

$$\Psi_{nit} \equiv \left(r_{it}/\phi_{nit}\right)^{\theta}, \qquad \Psi_{nt} \equiv \sum_{o \in \{n, \mathbb{N}\}} \left(r_{ot}/\phi_{not}\right)^{\theta}.$$

Note that:

$$\frac{d}{dv}\left[\frac{1}{\Psi_{nt}} e^{-\Psi_{nt} v^{-\theta}}\right] = \theta v^{-(\theta+1)} e^{-\Psi_{nt} v^{-\theta}}.$$

Using this result:

$$\xi_{nit} = \frac{\Psi_{nit}}{\Psi_{nt}} = \frac{\left(r_{it}/\phi_{nit}\right)^{\theta}}{\sum_{o \in \{n, \mathbb{N}\}} \left(r_{ot}/\phi_{not}\right)^{\theta}}.$$

Multilateral Distribution of Capital Returns The distribution of capital returns in location n from all destinations $i \in \{n, \mathbb{N}\}$ is:

$$F_n(v) = \prod_{i \in \{n, \mathbb{N}\}} e^{-(r_{it}/\phi_{nit})^{\theta} v^{-\theta}} = e^{-\Psi_{nt} v^{-\theta}}.$$

Note that the distribution of capital returns in location n across all destinations $i \in \{n, \mathbb{N}\}$ is equal to the distribution of capital returns in location n from a given destination i conditional on allocating capital to that destination:

$$\begin{aligned}
&= \frac{1}{\xi_{nit}} \int_o^v \prod_{o \neq i} F_{no}(v) f_{ni}(v) \, dv, \\
&= \frac{1}{\xi_{nit}} \int_o^v \left[\prod_{o \neq i} e^{-(r_{ot}/\phi_{not})^{\theta} v^{-\theta}} \right] \theta \left(r_{it}/\phi_{nit} \right)^{\theta} v^{-(\theta+1)} e^{-(r_{it}/\phi_{nit})^{\theta} v^{-\theta}} dv, \\
&= \frac{1}{\xi_{nit}} \int_o^v \left[\prod_{o \in \{n, \mathbb{N}\}} e^{-(r_{ot}/\phi_{not})^{\theta} v^{-\theta}} \right] \theta \left(r_{it}/\phi_{nit} \right)^{\theta} v^{-(\theta+1)} dv, \\
&= \frac{\Psi_{nt}}{\Psi_{nit}} \int_o^v \left[e^{-\Psi_{nt} v^{-\theta}} \right] \theta \Psi_{nit} v^{-(\theta+1)} dv, \\
&= e^{-\Psi_{nt} v^{-\theta}}.
\end{aligned}$$

Derivation of Expected Return to Capital The expected return to capital in location n across all destinations $i \in \{n, \mathbb{N}\}$ at time t is:

$$\begin{aligned}
\mathbb{E}_{nt}[v] &= \int_0^{\infty} v f_n(v) \, dv, \\
&= \int_0^{\infty} \theta \Psi_{nt} v^{-\theta} e^{-\Psi_{nt} v^{-\theta}} dv.
\end{aligned}$$

Now define the following change of variables:

$$y_{nt} = \Psi_{nt} v^{-\theta}, \qquad dy_t = -\theta \Psi_{nt} v^{-(\theta+1)} dv,$$

$$v = \left(\frac{y_{nt}}{\Psi_{nt}} \right)^{-\frac{1}{\theta}}, \qquad dv = -\frac{dy_{nt}}{\theta \Psi_{nt} v^{-(\theta+1)}} = -\frac{dy_{nt}}{\theta \Psi_{nt} \left(\frac{y_{nt}}{\Psi_{nt}} \right)^{\frac{\theta+1}{\theta}}},$$

Using this change of variables, the expected return to capital in location n from all destinations $i \in \{n, \mathbb{N}\}$ at time t can be written as:

$$\begin{aligned}
\mathbb{E}_{nt}[v] &= \int_0^\infty \theta \Psi_{nt} v^{-\theta} e^{-\Psi_{nt} v^{-\theta}} dv, \\
&= \int_0^\infty \theta y_{nt} e^{-y_{nt}} \frac{dy_{nt}}{\theta \Psi_{nt} \left(\frac{y_{nt}}{\Psi_{nt}}\right)^{\frac{\theta+1}{\theta}}}, \\
&= \int_0^\infty y_{nt} e^{-y_{nt}} \frac{(y_{nt})^{-\frac{\theta+1}{\theta}} dy_{nt}}{\Psi_{nt} (\Psi_{nt})^{-\frac{\theta+1}{\theta}}}, \\
&= \int_0^\infty \Psi_{nt}^{1/\theta} y_{nt}^{-1/\theta} e^{-y_{tn}} dy_{nt},
\end{aligned}$$

which can be in turn written as:

$$\mathbb{E}_{nt}[v] = \gamma \Psi_{nt}^{1/\theta} = \gamma \left[\sum_{o \in \{n, \mathbb{N}\}} (r_{ot}/\phi_{not})^{\theta} \right]^{1/\theta},$$

$$\gamma \equiv \Gamma\left(\frac{\theta - 1}{\theta}\right).$$

S.2.1.17 Derivation of Average Capital Productivity

Recall that the distribution of capital returns in location n across all destinations $i \in \{n, \mathbb{N}\}$ is equal to the distribution of capital returns in location n from a given destination i conditional on allocating capital to that destination:

$$F_n(v) = e^{-\Psi_{nt} v^{-\theta}}.$$

Now recall the monotonic relationship between income and ability:

$$v = \frac{\epsilon\, r_{it}}{\phi_{nit}}.$$

Therefore the distribution of capital productivity for location n in a given destination i conditional on allocating capital to that destination:

$$\begin{aligned}
F_n(\epsilon) &= e^{-\Psi_{nt}(r_{it}/\phi_{nit})^{-\theta} \epsilon^{-\theta}}, \\
&= e^{-(\Psi_{nt}/\Psi_{nit})\epsilon^{-\theta}}.
\end{aligned}$$

Expected capital productivity for location n in a given destination i conditional on allocating capital to that destination at time t is:

$$\begin{aligned}
\mathbb{E}_n[\epsilon] &= \int_0^\infty \epsilon f_n(\epsilon)\, d\epsilon, \\
&= \int_0^\infty \theta (\Psi_{nt}/\Psi_{nit}) \epsilon^{-\theta} e^{-(\Psi_{nt}/\Psi_{nit})\epsilon^{-\theta}} d\epsilon.
\end{aligned}$$

Now define the following change of variables:

$$y_{nt} = \left(\Psi_{nt}/\Psi_{nit}\right)\epsilon^{-\theta}, \qquad dy_{nt} = -\theta\left(\Psi_{nt}/\Psi_{nit}\right)\epsilon^{-(\theta+1)}d\epsilon,$$

$$\epsilon = \left(\frac{y_{nt}}{\Psi_{nt}/\Psi_{nit}}\right)^{-\frac{1}{\theta}}, \qquad d\epsilon = -\frac{dy_{nt}}{\theta\left(\Psi_{nt}/\Psi_{nit}\right)\left(\frac{y_{nt}}{\Psi_{nt}/\Psi_{nit}}\right)^{\frac{\theta+1}{\theta}}}.$$

Using this change of variables, capital productivity for location n in a given destination i conditional on allocating capital to that destination can be written as:

$$\begin{aligned}
\overline{\epsilon}_{nit} = \mathbb{E}_{nt}\left[\epsilon\right] &= \int_0^\infty \theta\left(\Psi_{nt}/\Psi_{nit}\right)\epsilon^{-\theta}e^{-\left(\Psi_{nt}/\Psi_{nit}\right)\epsilon^{-\theta}}d\epsilon,\\
&= \int_0^\infty \theta y_{nt}e^{-y_{nt}}\frac{dy_{nt}}{\theta\left(\Psi_{nt}/\Psi_{nit}\right)\left(\frac{y_{nt}}{\Psi_{nt}/\Psi_{nit}}\right)^{\frac{\theta+1}{\theta}}},\\
&= \int_0^\infty y_{nt}e^{-y_{nt}}\frac{\left(y_{nt}\right)^{-\frac{\theta+1}{\theta}}dy_{nt}}{\left(\Psi_{nt}/\Psi_{nit}\right)\left(\Psi_{nt}/\Psi_{nit}\right)^{-\frac{\theta+1}{\theta}}},\\
&= \int_0^\infty y_{nt}^{-1/\theta}e^{-y_{nt}}\left(\Psi_{nt}/\Psi_{nit}\right)^{1/\theta}dy_{nt},\\
&= \gamma\left(\Psi_{nt}/\Psi_{nit}\right)^{1/\theta},\\
&= \gamma\xi_{nit}^{-1/\theta}.
\end{aligned}$$

Productivity-adjusted capital from location n in destination i at time t therefore:

$$\widetilde{k}_{nit} = \overline{\epsilon}_{nit}k_{nit} = \overline{\epsilon}_{nit}\xi_{nit}k_{nt}.$$

We thus have:

$$\widetilde{k}_{nt}^{M} = \overline{\epsilon}_{nnt}\xi_{nnt}k_{nt} = \gamma\xi_{nnt}^{\frac{\theta-1}{\theta}}k_{nt}.$$

Note that total capital income in location n from destination i can be written in the following two equivalent ways:

$$\begin{aligned}
v_{nt}\xi_{nit}k_{nt} &= \left(r_{it}/\phi_{nit}\right)\overline{\epsilon}_{nit}\xi_{nit}k_{nt},\\
\gamma\left(r_{it}/\phi_{nit}\right)\xi_{nit}^{\frac{\theta-1}{\theta}}k_{nt} &= \gamma\left(r_{it}/\phi_{nit}\right)\xi_{nit}^{\frac{\theta-1}{\theta}}k_{nt}.
\end{aligned}$$

We thus have the following expressions for productivity-adjusted capital for each domestic location and the colonial slavery plantation:

$$\widetilde{k}_{nt}^{M} = \overline{\epsilon}_{nnt}k_{nnt} = \overline{\epsilon}_{nnt}\xi_{nnt}k_{nt} = \gamma\xi_{nnt}^{\frac{\theta-1}{\theta}}k_{nt},$$

$$\widetilde{k}_{\mathbb{N}t}^{S} = \sum_{n\in\mathbb{N}}\overline{\epsilon}_{n\mathbb{N}t}k_{n\mathbb{N}t} = \sum_{n\in\mathbb{N}}\overline{\epsilon}_{n\mathbb{N}t}\xi_{n\mathbb{N}t}k_{nt} = \sum_{n\in\mathbb{N}}\gamma\xi_{n\mathbb{N}t}^{\frac{\theta-1}{\theta}}k_{nt}.$$

S.2.2 Theoretical Extensions

In this section of the Online Supplement, we present an extension of our baseline model to allow capitalists to invest in any domestic location subject to financial frictions that increase with distance. We show that this specification implies a gravity equation in bilateral investment flows, such that investment continues to be concentrated locally.

The specification of consumption, production and labor mobility remains the same as in our baseline specification in Section 6 of the paper and Section S.2.1 of this Online Supplement. The only change is to the specification of capital allocation decisions within periods from Section 6.5 of the paper and Section S.2.1.9 of this Online Supplement, as summarized in the next subsection. The characterization of capitalists optimal consumption-investment decisions remains the same as in Subsection 6.6 of the paper and Subsection S.2.1.10 of this Online Supplement, given the expected return to capital (v_{nt}) determined below.

S.2.2.1 Capital Allocation With Domestic Gravity

At the beginning of period t, the capitalists in location n inherit an existing stock of capital k_{nt}, and decide where to allocate this existing capital and how much to invest in accumulating additional capital. Once these decisions have been made, production and consumption occur. At the end of period t, new capital is created from the investment decisions made at the beginning of the period, and the depreciation of existing capital occurs. For this remainder of this subsection, we focus on capitalists' capital allocation decisions at the beginning of period t.

We assume that the productivity of capital for domestic use (ϵ_{nnt}) and colonial use ($\epsilon_{n\mathbb{N}t}$) is subject to an idiosyncratic productivity draw for the number of effective units of capital, as in Kleinman et al. (2023). These idiosyncratic productivity draws can be interpreted as a Keynesian marginal efficiency of capital draw and give rise to a form of imperfect substitutability between domestic and slavery investments.[6] The key difference from our baseline specification in the paper is that the capitalist in each domestic location n can invest in any domestic location $i \in N$ and in the colonial plantation $\mathbb{N}$. The return to a capitalist from location n of investing a unit of capital in destination $i \in \{N \cup \mathbb{N}\}$ ($v_{nit}(\epsilon_{nit})$) depends on the rental rate per effective unit (r_{it}), the number of effective units (ϵ_{nit}) and financial frictions (ϕ_{nit}):

$$v_{nit}(\epsilon_{nit}) = \frac{\epsilon_{nit} r_{it}}{\phi_{nit}}, \qquad i \in \{N \cup \mathbb{N}\}. \tag{S.2.93}$$

We assume that these idiosyncratic shocks to the productivity of capital are drawn indepen-

[6] This imperfect substitutability is consistent with slavery investments being concentrated in cane sugar, tobacco and cotton, none of which were available domestically at the time. It is also in line with the theoretical and empirical literature on asset demand systems following Koijen and Yogo (2019).

dently from the following Fréchet distribution:

$$F(\epsilon) = e^{-\epsilon^{-\theta}}, \qquad \theta > 1, \tag{S.2.94}$$

where we have normalized the Fréchet scale parameter to one, because it enters the model isomorphically to financial frictions, and the Fréchet shape parameter (θ) controls the responsiveness of capital investments to economic variables.

Using the properties of this Fréchet distribution, the shares of capital owned in location n that are invested in each domestic location i and in slavery in the colonial plantation $\mathbb{N}$ depend on relative returns to capital and financial frictions:

$$\xi_{nit} = \frac{k_{nit}}{k_{nt}} = \frac{\left(r_{it}/\phi_{nit}\right)^{\theta}}{\left(r_{\mathbb{N}t}/\phi_{n\mathbb{N}t}\right)^{\theta} + \sum_{k\in N}\left(r_{kt}/\phi_{nkt}\right)^{\theta}}, \qquad i \in N, \tag{S.2.95}$$

$$\xi_{n\mathbb{N}t} = \frac{k_{n\mathbb{N}t}}{k_{nt}} = \frac{\left(r_{\mathbb{N}t}/\phi_{n\mathbb{N}t}\right)^{\theta}}{\left(r_{\mathbb{N}t}/\phi_{n\mathbb{N}t}\right)^{\theta} + \sum_{k\in N}\left(r_{kt}/\phi_{nkt}\right)^{\theta}}. \tag{S.2.96}$$

A key prediction of this specification is that investment flows between locations are characterized by a gravity equation. The probability of investing from origin n in destination i depends on the characteristics of the origin n, the attributes of the destination i, and bilateral financial frictions (ϕ_{nit}), namely "bilateral resistance." Furthermore, this probability also depends on the characteristics of all destinations i and all bilateral financial frictions, namely "multilateral resistance." Therefore, if financial frictions are increasing in geographical distance, this specification provides microfoundations for a gravity equation, in which bilateral investment flows are declining in distance, and hence are concentrated locally, as observed empirically.

Capital market clearing implies that the capital used in domestic manufacturing in each destination i is the sum of the capital allocated there from all domestic origins n:

$$k_{it}^{M} = \sum_{n\in N} \xi_{nit} k_{nt}. \tag{S.2.97}$$

Similarly, the capital used in the colonial plantation equals the sum of the capital allocated there from all domestic origins n:

$$k_{\mathbb{N}t}^{S} = \sum_{n\in \mathbb{N}} \xi_{n\mathbb{N}t} k_{nt}, \tag{S.2.98}$$

where $\xi_{n\mathbb{N}t} + \sum_{i\in N}\xi_{nit} = 1$. The average productivity of capital allocated to each location depends on the share of capital allocated to that location (ξ_{nit}), such that the capital market clearing condition can be written in productivity-adjusted terms as:

$$\widetilde{k}_{nt}^{M} = \sum_{i\in N} \gamma \xi_{nit}^{-\frac{1}{\theta}} k_{nit} = \sum_{i\in N} \gamma \xi_{nit}^{\frac{\theta-1}{\theta}} k_{nt},$$

$$\widetilde{k}^{S}_{\mathbb{N}t} = \sum_{n \in \mathbb{N}} \gamma \xi_{n\mathbb{N}t}^{-\frac{1}{\theta}} k_{n\mathbb{N}t} = \sum_{n \in \mathbb{N}} \gamma \xi_{n\mathbb{N}t}^{\frac{\theta-1}{\theta}} k_{nt},$$

where we use the tilde above the capital stock to denote the productivity-adjustment. Intuitively, as location n allocates a larger share of capital to location i (higher ξ_{nit}), it moves further down the marginal efficiency of capital to investments of lower productivity, which reduces the average productivity of these investments (by $\xi_{nit}^{-\frac{1}{\theta}}$).

Again using the properties of the Fréchet distribution, the expected return to capital taking into account the idiosyncratic capital productivity draws is equalized between local manufacturing and the colonial plantation:

$$v_{nt} = \gamma \left[(r_{\mathbb{N}t}/\phi_{n\mathbb{N}t})^{\theta} + \sum_{k \in N} (r_{kt}/\phi_{nkt})^{\theta} \right]^{\frac{1}{\theta}}, \qquad \gamma \equiv \Gamma\left(\frac{\theta - 1}{\theta}\right), \tag{S.2.99}$$

where $\Gamma(\cdot)$ is the Gamma function.

Intuitively, if location i has a better investment characteristics in the form of a higher rental rate (r_{it}) or lower financial frictions (ϕ_{nit}), it attracts investments with lower idiosyncratic realizations for capital productivity, which reduces average capital productivity through a composition (batting average) effect. With a Fréchet distribution for capital productivity, this composition effect exactly offsets the impact of the better investment characteristics, such that the expected return to capital is equalized across locations. Therefore, the rental rate for capital can differ across domestic destinations and between domestic destinations and the colonial plantation, but the expected return to capital taking into account the idiosyncratic productivity draws is equalized. Total capitalist income is linear in the existing stock of capital and given by $V_{nt} = v_{nt} k_{nt}$.

The expected return to capital (v_{nt}) in equation (S.2.99) can be re-written in terms of the domestic investment share (ξ_{nnt}) using equation (S.2.95):

$$v_{nt} = \frac{\gamma\left(r_{nt}/\phi_{nnt}\right)}{\left(\xi_{nnt}\right)^{\frac{1}{\theta}}}. \tag{S.2.100}$$

Given domestic rental rates (r_{nt}) and financial frictions (ϕ_{nnt}), locations n with greater access to investments in other (lower ϕ_{nit}) for $i \neq n$ have lower domestic investment shares (lower ξ_{nnt}), which implies higher expected returns to capital accumulation (higher v_{nt}) from equation (S.2.100). Intuitively, there is a downward-sloping marginal efficiency of capital schedule for each destination, as determined by the distribution of idiosyncratic productivity draws. As in our baseline specification in the main paper, obtaining access to slavery investments acts like an improvement in the productivity of the investment technology, because capitalists obtain another set of draws for idiosyncratic productivity for the colonial plantation, which increases the average productivity of the investments that they undertake in equilibrium.

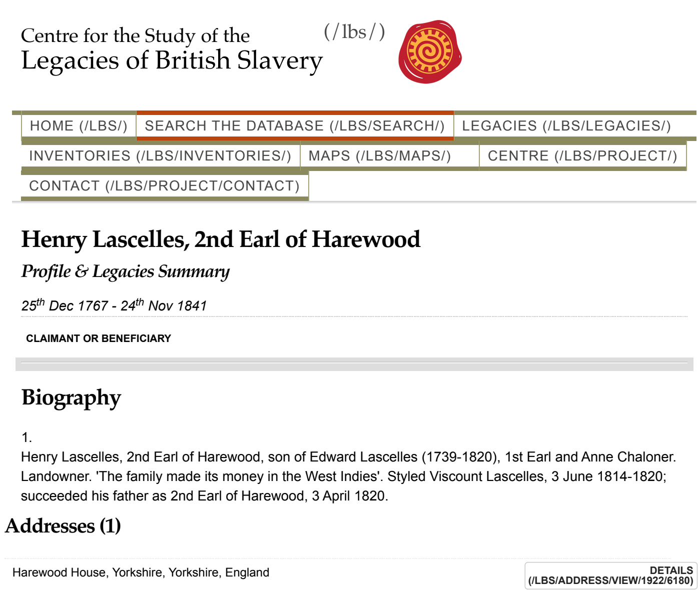
S.2.3 Data Appendix

In this section of the Online Supplement, we provide further information on the data sources and definitions.

S.2.3.1 Slavery Compensation

As discussed in Section 4 of the paper, we use data from the *Legacies of British Slavery Database* to measure the geographical distribution of slavery wealth within Britain at the time of the abolition of slavery in 1833. Starting with the records of the Slave Compensation Committee, this database was constructed over more than a decade by the *Centre for the Study of the Legacies of British Slavery* at University College London. The data include detailed information on compensation claims, the identity of the awardees, the legitimacy of their claims, and the ownership records of awardees. We use a digital version of these data, which includes information on 53,000 individuals connected to slavery, of whom 25,000 were awarded compensation for 425,000 enslaved persons. In Figures S.2.1-S.2.2 below, we provide an example of the entry from this database for the Second Earl of Harewood. We observe name, date of birth and death, biographical information including family history, address, the name and location of each colonial plantation, and the compensation awarded and number of enslaved persons for each plantation.

Figure S.2.1: Example Compensation Claim for Henry Lascelles from the Legacies of British Slavery Database



Note: Example compensation claim for Henry Lascelles from the Legacies of British Slavery Database, showing name, birth and death date, family history and address.

Figure S.2.2: Example Claim from the Legacies of British Slavery Database

Associated Claims (6)

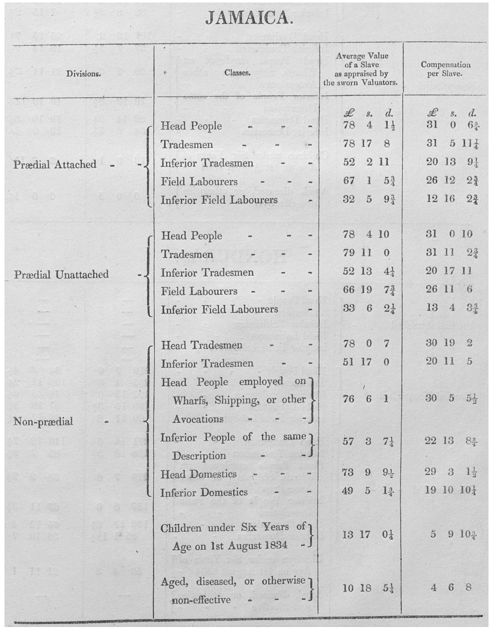
Barbados 211 (Belle) (/lbs/claim/view/5922)	£6,486 1s 6d	Awardee	DETAILS (/LBS/CLAIM/VIEW/5922)
Barbados 2769 (Fortescues) (/lbs/claim/view/3115)	£3,291 11s 4d	Awardee	DETAILS (/LBS/CLAIM/VIEW/3115)
Barbados 2770 (Thicket) (/lbs/claim/view/3116)	£5,810 5s 6d	Awardee	DETAILS (/LBS/CLAIM/VIEW/3116)
Barbados 3817 (Mount St George) (/lbs/claim/view/6143)	£3,835 6s 5d	Awardee	DETAILS (/LBS/CLAIM/VIEW/6143)
Jamaica St Dorothy 23 (Nightingale Grove Estate) (/lbs/claim/view/20581)	£2,599 0s 4d	Awardee	DETAILS (/LBS/CLAIM/VIEW/20581)
Jamaica St Thomas-in-the-Vale 147 (Williamsfield Estate) (/lbs/claim/view/19790)	£4,286 19s 3d	Awardee	DETAILS (/LBS/CLAIM/VIEW/19790)

Note: Further details for the compensation claim for Henry Lascelles from the Legacies of British Slavery Database, showing amounts awarded for individual estates.

As discussed in Section 3 of the paper, slavery compensation payments under the Abolition of Slavery Act of 1833 were divided up across the different colonies. Separate schedules were drawn up for each colony that specified a compensation rate per slave that depended on occupation and age. In Figure S.2.3, we provide an example of such a schedule for Jamaica. Compensation rates are higher for enslaved people working in more skilled occupations and lower for children and enslaved people whose ability to work was reduced by either age or illness. Despite this limited variation in compensation rates per slave, we find that the total compensation paid to each slaveholder has a strong, positive, statistically significant and approximately log linear relationship with the number of enslaved, as shown in Figure S.2.4 below. Therefore, we use the number of enslaved as our baseline measure of slaveholding in our regression specifications in Section 7 of the paper.

In our quantitative analysis of the model in Section 7.4 of the paper, we measure wealth from slavery investments using the slavery compensation payments. These payments were rationalized as a one-off payment for the net present value of enslaved labor. To convert this net present value to a flow value, we assume a rate of return of 10 percent, reflecting the high rates of slave mortality and the risk of slave rebellion. Additionally, slave compensation was set at 40 percent of market values, in part because of implicit compensation through the "apprenticeship" system. Therefore, we multiply the flow compensation values by 2.5 to obtain flow market values. Finally, the total value of slavery plantations was typically 3 times the value of the enslaved, according to the accounting studies in Sheridan (1965), Ward (1978) and Rosenthal (2018). Therefore, we multiply the flow market values of enslaved people by 3 to

Figure S.2.3: Slave Compensation Schedule for Jamaica from the 1833 Abolition of Slavery Act

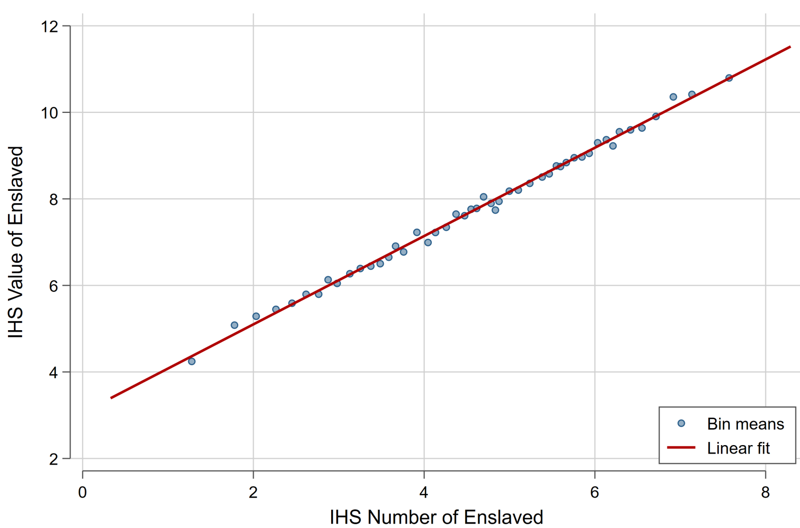


JAMAICA.

Divisions.	Classes.	Average Value of a Slave as appraised by the sworn Valuators. £	s.	d.	Compensation per Slave. £	s.	d.
Prædial Attached	Head People	78	4	1½	31	0	6¾
	Tradesmen	78	17	8	31	5	11¼
	Inferior Tradesmen	52	2	11	20	13	9¼
	Field Labourers	67	1	5¾	26	12	2¾
	Inferior Field Labourers	32	5	9¾	12	16	2¾
Prædial Unattached	Head People	78	4	10	31	0	10
	Tradesmen	79	11	0	31	11	2¾
	Inferior Tradesmen	52	13	4¼	20	17	11
	Field Labourers	66	19	7¾	26	11	6
	Inferior Field Labourers	33	6	2¼	13	4	3¾
Non-prædial	Head Tradesmen	78	0	7	30	19	2
	Inferior Tradesmen	51	17	0	20	11	5
	Head People employed on Wharfs, Shipping, or other Avocations	76	6	1	30	5	5½
	Inferior People of the same Description	57	3	7¼	22	13	8¾
	Head Domestics	73	9	9½	29	3	1½
	Inferior Domestics	49	5	1¾	19	10	10¼
	Children under Six Years of Age on 1st August 1834	13	17	0¼	5	9	10¾
	Aged, diseased, or otherwise non-effective	10	18	5¼	4	6	8

Note: Predial refers to enslaved people employed in agricultural occupations; Non-predial refers to enslaved people working in non-agricultural occupations (e.g., domestic service); Attached refers to enslaved people held on the estates of their enslavers; Unattached refers to enslaved people rented by their enslavers to other estates.

Figure S.2.4: Binscatter Across Slaveholders of Value of Slavery Compensation Paid Against Number of Enslaved Claimed Under the 1833 Abolition of Slavery Act



Note: Vertical axis shows inverse hyperbolic sine (IHS) of the value of slavery compensation; horizontal axis shows the inverse hyperbolic sine (IHS) of the number of enslaved; each dot corresponds to a ventile of the distribution across slaveholders in our data; red dotted line shows the linear fit between the two variables.

obtain the flow market value of slave plantations. For the aggregate economy as a whole, the resulting flow income from these slavery plantations equals 3.63 percent of the flow income from all capital and land (including slavery capital, domestic capital and land), which is in line with the estimates in Pebrer (1833).[7]

S.2.3.2 Hexagonal Regions

To overcome changes in the boundaries of administrative units such as parishes in England and Wales over time, we construct a hexagonal spatial grid consisting of 849 cells ("regions"). We choose hexagons (rather than squares or triangles) because of their advantages for partitions of geographical space, as discussed for example in Carr and Pickle (2010). Each grid cell covers an area of 200 square kilometers and the distance from the centroid to the vertex measures around 9 km. Since the dominant mode of commuting during our sample period was walking, 9 km is a reasonable distance over which it would be possible to walk to work. The average hexagon contains 15 parishes and the average historic county contains 15 hexagons. This section discusses the creation of the hexagons and the mapping of data into them.

Hexagon Construction We employ a GIS tessellation procedure to create a grid of regular hexagonal polygons, each at a fixed size of 200 square kilometres, that covers the full extent of England and Wales. We construct this hexagon grid starting from the intersection of the most northern and western coordinates of England and Wales. We then select the subset of hexagons that contain at least one of the $N = 12,659$ parish centroids. We drop the Isles of Scilly, as few of our data sources cover this remote archipelago. This leaves us with 849 units of observation.

Point-level Data To assign point-specific locations to the hexagonal grid, we use a simple spatial join of the latitude-longitude of the address to the hexagonal grid it falls inside. This procedure applies to all data where we translate an address to a point-specific location (e.g, slavery compensation recipients, cotton mills).

Distance Data We calculate distances from the latitude-longitude of a location (e.g, country banks, historic ports) to the centroid of the hexagonal region. For distance to the coast, we calculate the minimum distance to the coastline to the hexagon centroid.

[7] According to Pebrer (1833), the value of all capital and land in the West Indies was 3.44 percent of the value of all capital and land in both the United Kingdom and the West Indies in 1833.

Parish-level Data Census data is available to us at the level of parishes, which presents a choice as to how we aggregate the data into our hexagonal units. There are two main alternatives for mapping parishes to hexagons. First, one can aggregate using *centroid mapping*, in which parishes are assigned to hexagons based on the parish centroid. Second, one can use *area weights* to redistribute parish data across all hexagons that intersect the boundary of the parish, in proportion to the share of the total parish area that each intersection represents. We use centroid mapping in our baseline specification to avoid introducing the spatial autocorrelation between neighboring units that apportioning the data with weights necessitates. We also report a robustness test using area weights and show that in practice we find a similar pattern of results using both approaches.

S.2.3.3 Population Data

Population data from the population censuses of England and Wales from 1801-1891 was provided by the *Cambridge Group for the History of Population and Social Structure* (Cambridge Group), as documented in Wrigley (2011). The original sources for the population data are:

- 1801 Census Report, Abstract of answers and returns, PP 1801, VI
- 1811 Census Report, Abstract of answers and returns, PP 1812, XI
- 1821 Census Report, Abstract of answers and returns, PP 1822, XV
- 1831 Census Report, Abstract of the Population Returns of Great Britain, PP 1833, XXXVI to XXXVII
- 1841 Census Report, Enumeration Abstract, PP 1843, XXII
- 1851 Census Report: Population Tables, part II, vols. I to II, PP 1852-3, LXXXVIII, parts I to II
- 1861 Census Report: Population tables, vol. II, PP 1863, LIII, parts I to II
- 1871 Census Report: vol. III, Population abstracts: ages, civil condition, occupations and birthplaces of people, PP 1873, LXXI, part I
- 1891 Census Report: vol. II, Area, Houses and Population: registration areas and sanitary districts, PP 1893-4, CV [which also includes the 1881 data, as used in our analysis]

S.2.3.4 Property Valuation Data

Domesday Data Our property valuation data for 1086 are from *The Domesday Book* assessment of land holdings undertaken by William the Conqueror shortly after the Norman conquest of England and Wales in 1066.

The survey process and compilation of Domesday Book took about 20 months (January 1086 to September 1087), being facilitated by the availability of Anglo-Saxon hidage (or tax) lists. The counties of England were grouped into circuits. Each circuit was visited by a team of commissioners, bishops, lawyers and lay barons, who had no material interests in the area. The commissioners were responsible for circulating a list of questions to land holders, for subjecting the responses to a review in the county court by the hundred juries, and for supervising the compilation of county and circuit returns. The circuit returns were then sent to the Exchequer in Winchester where they were summarised, edited and compiled into Domesday Book, as discussed further in McDonald and Snooks (1986).

We use the digital edition of the *The Domesday Book* from the Prosopography of Anglo-Saxon England (Pase 2010). For each manor, the data report (i) the holder of the manor in 1066 prior to the Norman Conquest; (ii) the holder of the manor in 1086; (iii) the valuation of the manor in 1066 and 1086 (including land, buildings, equipment and people); (iii) the number of different categories of people: freemen and sokeman, villans, bordars, and slaves; (iv) location information, including county, hundred, vill and latitude and longitude coordinates. We assign manors to the parishes in which their latitude and longitude coordinates fall. We aggregate valuations across manors within parishes to obtain a property valuation for each parish in 1086.

Lay Subsidy Data Our property valuation data for 1344 are from the *Lay Subsidy* of that year, which corresponded to a tax on the personal property (excluding land and buildings) of the laity (the church and religious orders were exempt).

The origins of the lay subsidies of the early-14th century were the continuing conflict with France and Scotland, which placed extra demands upon the revenue of the Crown. With increasing frequency, these special needs were met by subsidies granted by Parliament to the Crown in the form of taxes on the personal property of the laity. Taxes were paid based on the value of movable goods, principally on crops and livestock, rather than on land and buildings. For the Lay Subsidy of 19th September 1334, the tax rate was a fifteenth from rural areas and a tenth from boroughs and ancient demesnes.[8] Based on these tax rates, a tax quota was specified for each community, which in rural areas correspond closely to the manors reported

[8]Ancient demesnes were, in general, rural manors, which had been listed under the heading *Terra Regis* in *The Domesday Book*, as discussed in Hoyt (1950).

in *The Domesday Book*.

We use a digital version of the 1334 Lay Subsidy compiled by Campbell and Bartley (2006) based on the tax quotas for each community reported in Glasscock (1975). For each community, we observe the value of tax quota and latitude and longitude coordinates. We assign communities to the parishes in which their latitude and longitude coordinates fall. We aggregate valuations across communities within parishes to obtain a property valuation for each parish in 1344.

Land Tax Data Our property valuation data for 1798 are from the Land Tax quotas for that year. The land tax was first imposed in 1693 in the form of a national poundage rate on both personal property and land and buildings. In the face of declining revenues from underreporting, this direct poundage rate was replaced with a system of county land tax quotas. These county quotas were further subdivided into hundred and parish quotas by the local commissioners of the tax. These land tax quotas were amended over time, although increases in land tax faced resistance, as discussed in Ginter (1992). In 1798, the Land Tax Perpetuation Act of Parliament made these land tax quotas unalterable by law, and they remained unchanged until the land tax was abolished in 1963. We use reported land tax quotas for each parish from the parliamentary return published under the 1798 Land Tax Perpetuation Act.

Rateable Values Our property valuation data for 1815 and 1843 are rateable values, which correspond to the annual flow of rent for the use of land and buildings, and equal the price times the quantity of floor space in the model. In particular, these rateable values correspond to "The annual rent which a tenant might reasonably be expected, taking one year with one another, to pay for a hereditament, if the tenant undertook to pay all usual tenant's rates and taxes ... after deducting the probable annual average cost of the repairs, insurance and other expenses" (see London County Council 1907).

These rateable values cover all categories of property, including public services (such as tramways, electricity works etc), government property (such as courts, parliaments etc), private property (including factories, warehouses, wharves, offices, shops, theaters, music halls, clubs, and all residential dwellings), and other property (including colleges and halls in universities, hospitals and other charity properties, public schools, and almshouses). As discussed in Stamp (1922), there are three categories of exemptions: (1) Crown property occupied by the Crown (Crown properties leased to other tenants are included); (2) Places for divine worship (church properties leased to other tenants are included); (3) Concerns listed under No. III Schedule A, namely: (i) Mines of coal, tin, lead, copper, mundic, iron, and other mines; (ii) Quarries of stone, slate, limestone, or chalk; ironworks, gasworks, salt springs or works, alum mines or works, waterworks, streams of water, canals, inland navigations, docks, drains and levels, fishings, rights of markets and fairs, tolls, railways and other ways, bridges, ferries, and cemeteries. Rateable values were assessed at the parish level approximately every five years during our sample period. All of the above categories of properties are included, regardless of whether or not their owners are liable for income tax.

These rateable values have a long history in England and Wales, dating back to the 1601 Poor Relief Act, and were originally used to raise revenue for local public goods. Different types of rateable values can be distinguished, depending on the use of the revenue raised: Schedule A Income Taxation, Local Authority Rates, and Poor Law Rates. Where available, we use the Schedule A rateable values, since Schedule A is the section of the national income tax concerned with income from property and land, and these rateable values are widely regarded as corresponding most closely to market valuations. For example, Stamp (1922) argues that "It is generally acknowledged that the income tax, Schedule A, assessments are the best approach to the true values" (page 25). Where these Schedule A rateable values are not available, we use the Local Authority rateable values, Poor Law rateable values, or property valuations for income tax. For years for which more than one of these measures is available, we find that they are highly correlated with one another across parishes.

- **1815**: Property valuations for income tax. Return to an address of the Honourable the House of Commons, dated 21 February 1854; House of Commons Papers, vol. LVI.1, paper no: 509.

- **1843**: Property valuations for income tax. Return to an address of the Honourable the House of Commons, dated 21 February 1854; House of Commons Papers, vol. LVI.1, paper no: 509.

Rateable values are reported at the parish level. However, parish geographies change over time which means that the raw data cannot be readily linked to our preferred hexagon geography. To accommodate this, we introduce the following procedure.[9]

1. We manually match the rateable value information at the parish level with the *CGKO* (Cambridge Group, Kain Oliver 2018) shapefile using both, parish and place names, as well as the corresponding poor law union and county the parish (or place) is nested in. The CGKO shapefile was developed by the *Cambridge Group for the History of Population and Social Structure* and consists of roughly 23,000 spatial units and it is derived from Kain and Oliver's digital maps of parish and township boundaries. It can map data at the level of parishes, townships, or places from censuses collected between 1801–1891.

[9]For more details, we refer the reader to Heblich et al. (2022).

2. In some cases, the parish units used to report rateable values do not match census parishes, for instance because evaluators chose to aggregate information. In these cases, we look up the location manually and geolocate it. This leaves us with coordinates for the specific rateable value payment.

3. Since parish boundaries change over time, we cannot be sure that the rateable value reported for a given parish applies to the matched census parish. Therefore, we refrain from using the rateable value per parish and focus instead on the *rateable value per acre* assigned to the parish centroid or the coordinates of a manually located entry, respectively. Conveniently, rateable values were reported along with the corresponding acreage of the parish they apply to. This procedure leaves us with 10,238 observation points for the years 1815 and 1843 across England and Wales. Note that CGKO units are very accurate and in some cases, a rateable value reported for one parish my be linked to one census parish which is, however, subdivided into multiple places and thus spatial units. In this case, we would assign the same rateable value per acre to each subdivision.

4. In a last step, we log-transform the data to ensure that they are approximately normally distributed and use *kriging*, a spatial interpolation method, to estimate a smooth surface using the rateable value per acre information from all matched locations in England and Wales. From this estimated surface, we can calculate every hexagon's rateable value by multiplying the average rateable value per acre with the hexagon's acreage.

S.2.3.5 Family Trees Instrument

Our baseline instrument exploits the spatial distribution of the ancestors of slave traders to predict the regions which transitioned into slave holding by 1833. We identify these ancestors by collecting data on the family trees of slave traders as reported on `Ancestry.com`. This section outlines how we use this data to construct the mapping of slave trader ancestors.

Ancestors We start with the sample of slave traders identified as the owners of British-flagged slave voyages in the Slave Voyages database. For each of these 3,995 individuals, we attempt to collect the most detailed family tree on `Ancestry.com`. We identify ancestors as members of the family tree born before the slave trader. We geolocate the birth and death locations of each ancestor, and prefer the birth location if both are available. Next, we choose to exclude ancestors that we locate within 10km of their slave trader's location. This helps us to identify the ancestral homeland of the family, rather than the current or recent location of the family, which is unsurprisingly skewed towards slave ports. This procedure yields 20,840 ancestors a of 1,474 slave traders v that cover around 40% of our regions i. We consider only the subset of these trees which connect to a slave trader with available mortality data (around 25% of those in the Slave Voyages database). This leaves a sample of 2,485 ancestors from 286 slave traders. One potential concern is that the family trees available on Ancestry.com could be a selected sample, which motivates our use of the surname instrument as a robustness test. Balance tests for family tree availability do not unambiguously suggest selection. The 286 traders whose ancestors form our instrument have, on average, completed more voyages than the rest of the slave traders. They also slightly over-represent Liverpool-based traders. However, the groups are statistically indistinguishable in terms of the years when they operated and the average duration of their middle-passage crossings.

Instrument Construction We assign to each ancestor their associated slave traders' voyage success. In particular, we construct our voyage success measure as follows. First, we regression-adjust the mortality rate of slave voyage j in year t for decade fixed effects to account for the fact that overall mortality rates were decreasing over time, and then normalize the rates between zero and one. Second, we invert the voyage-specific mortality rate: $1/mortality_j$. Note that this voyage success measure ranges from a lower bound of one for voyages where all of the enslaved die, and approaches infinity as the number of deaths among the enslaved approaches zero. Therefore a higher value of our voyage success measure corresponds to fewer deaths among the enslaved and a more profitable voyage for the slave trader. Note that we treat $mortality_j = 0$ as $0 + \epsilon = 0.005$ to avoid an undefined measure for the small number of voyages with zero mortality among the enslaved. Third, we calculate voyager v's average *voyage success* as $VS_v = \frac{1}{n_v}\sum_{j=1}^{n_v} 1/mortality_{vj}$, where n_v is the number of slave trading voyages for voyager v. Finally, we assign equally this average voyage success for each slave-trading descendent to their ancestors from their family trees, as defined above. For each location i, we compute our first average voyage success instrument (VSI_i^{tree}) as an average of the voyager successes across all slave-trading ancestors in that location:

$$VSI_i^{tree} = \frac{1}{A}\sum_{a=1}^{A_i} VS_{v(a)},$$

where A_i is the number of ancestors of slave-traders in location i; A is the total number of ancestors of slave-traders in England and Wales; the scaling by $1/A$ rather than $1/A_i$ before the summation ensures that locations with more slave-trading ancestors have higher values of the instrument; $VS_{v(a)}$ is the average voyage success for voyager v who is the descendant of ancestor a, as defined above and in equation (13) in the paper, where the notation $v(a)$ makes explicit that voyager v is matched to ancestor a.

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