In the third step of our analysis we used the approximation to calculate model outcomes for a range of parameter values. We identified the link density and efficiency of administration as the main drivers of survival time and total energy production of the studied society models. Figure \ref{fig:parameters} show the model outcomes as functions of link density and administrator efficiency. As noted in section \ref{sec:trajectories}, the exploration model produces societies with infinite survival times, which could be confirmed in this analysis (Fig. \ref{fig:parameters-B}). However, in the original model, Figure \ref{fig:parameters}-A shows minimum requirements of a successful administration. The most important requirement being a sufficiently large mean degree of neighboring nodes of the social network. Also, the extreme case of $\rho = 0.0$ must be noted, in this case nodes cannot be converted to \textit{A}, because their are no neighbors. Thus the model remains frozen in its initial state.

Total energy production oft he original model is naturally low for low survival times, as it is calculated as the integral of energy production over time (Fig 4-D light blue area). However, energy production spikes as soon as a critical threshold is passed but does not increase past that point (dark blue). This can be explained that the model society in this case is satisfied by the conditions (i.e. epsilon >= 1) and the network remains static, as long as this epsilon – (1 – R) remains above 1. Hence, after rapid convergence to energy levels well above 1 (add mean value here), the probability of resource availability (R) low enough to drive epsilon below one, becomes slim. Thus the energy production above a certain threshold remains relatively stable for the original tainter model, only altered by the time interval until this stable state is reached, which is affected by the parameters efficiency and link density, but on long time scales they don’t shift the overall outcome by a large degree.

In contrast to this, the energy output of the social mobility model increases constantly with increasing efficiency (Fig. 4-E). This can be explained by fluctuations in the amount of coordinated workers due to the introduced social mobility mechanism. Increases of coordinated workers will affect the energy production more at higher efficiency of the administration, thus contributing to a higher energy output compared to low efficiency values, where energy output is considerably lower. Furthermore, increasing link density of the network increases the energy output, as with fluctuating nodes in administration, the effect of nodes entering the administration elevates the productivity of a higher number of nodes.

The differences in energy output between the reactive and proactive society are depicted in Fig 4-F. Here it becomes evident, that within a parameter region, model 1 performs better than model 2. Because of the static nature of the reactive society after it passed the parameter space where it enters the energy complexity spiral it is quasi instantly as productive as possible. Whereas the proactive society pays opportunity costs for being also longlived at lower efficiency and link density by producing energy also sometimes below the threshold (before optimum – stagnation point of reactive society). As efficiency rises, explorations of the proactive society into ranges of higher energy production (near optimum distribution of A, C, W nodes) overwhelm the productivity of the reactive society.