

Supplementary Material B

Relative variable importance at agent, place, and simulation scale evaluated by randomForest algorithm

The complete set of agent parameters is reproduced in Table A2-1 below. In many cases, these parameters are drawn from normal distributions described at the place and simulation scale by both a mean and standard deviation; analysis at these scales includes these distribution parameters (mean and standard deviation) rather than individual agent parameters.

	Parameter	Description
<i>Determined on initialization</i>	id	Identifier for each agent
	incomeShareFraction	Fraction of income to the agent shared across social network in a given timestep
	shareCostThreshold	Fraction of the overall amount of a remittance lost to transaction costs, above which the agent will choose not to make that share
	knowledgeShareFrac	Fraction of their accumulated knowledge (of opportunities in other places) shared with agents during social interaction
	pInteract	Likelihood of current agent to interact with other agents to exchange information in a given timestep
	pChoose	Likelihood of current agent to make a decision about income portfolio in a given timestep
	pRandomLearn	Likelihood of current agent to learn new information about income opportunities randomly in a given timestep
	countRandomLearn	Number of new pieces of information learned randomly, if agent learns randomly during a timestep
	numBestLocation	Number of good node/locations agent will retain in memory from previous decision making
	numBestPortfolio	Number of good portfolios from a given location agent will retain in memory from previous decision making
	numRandomLocation	Number of node/locations agent will draw randomly in decision making
	numRandomPortfolio	Number of portfolios in a given location agent will draw randomly in decision making
	numPeriodsEvaluate	Number of time periods over which agent will evaluate and compare different portfolios when making a decision
	numPeriodsMemory	Number of time periods of past experience agent will hold in memory to inform decisions
	discountRate	Agent's individual discount rate on future time periods
	rValue	Agent's individual constant relative risk aversion coefficient
	network	List of other agents to which current agent has a social connection

Determined endogenously	location	Identifier for the specific node/location where the agent is located
	wealth	Cumulated wealth of the agent
	incomeLayersHistory	Agent's cumulated knowledge of past income opportunities (through experience, random learning, and social interaction)
	bestPortfolios	Retained list of income portfolios in various locations considered during previous decisions
	accessCodesPaid	List of costs already accrued by the agent to access particular layers (e.g., teaching licenses, necessary equipment, etc.)
	currentPortfolio	Agent's current portfolio of income layers accessed

The following figures show measured relative variable importance at agent, simulation, and place scales using horizontal bar charts. Variable importance is measured by the randomForest error as the increase in prediction error when a variable is withheld from inclusion in regression trees, relative to the baseline case of including the variable. A longer bar indicates greater variable importance (i.e., greater increase in predictive error when the variable is excluded). Most variables refer either to the parameters cited directly in Table A2-1, or the distributions from which those parameters are drawn. One exception is that in analysis at the place scale, we have included dummy variables for the specific experimental condition present at that place, in that simulation (BaseLayer, BaseLayerSP, ShockLayers, ShockCountry).

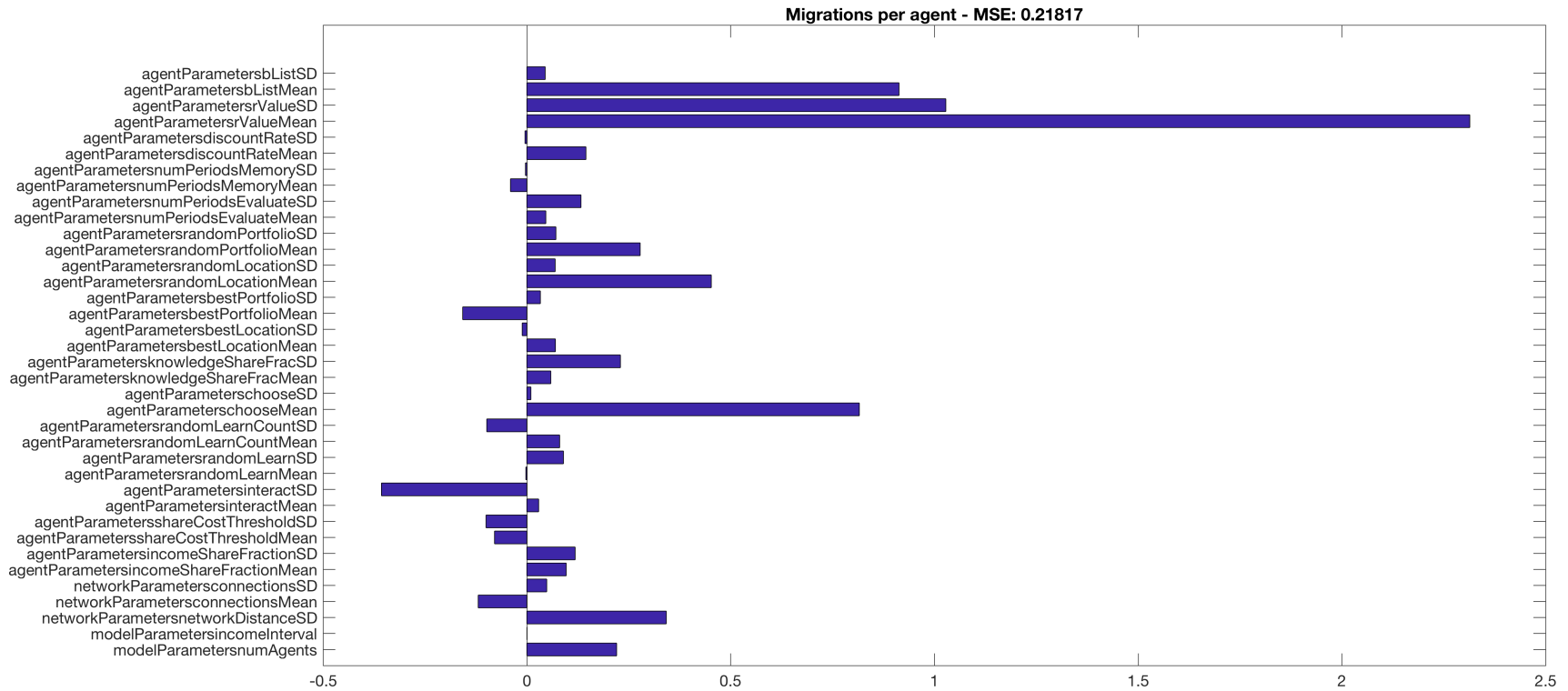


Figure A2-1: Relative variable importance measured by randomForest algorithm in predicting number of migrations per agent at simulation scale

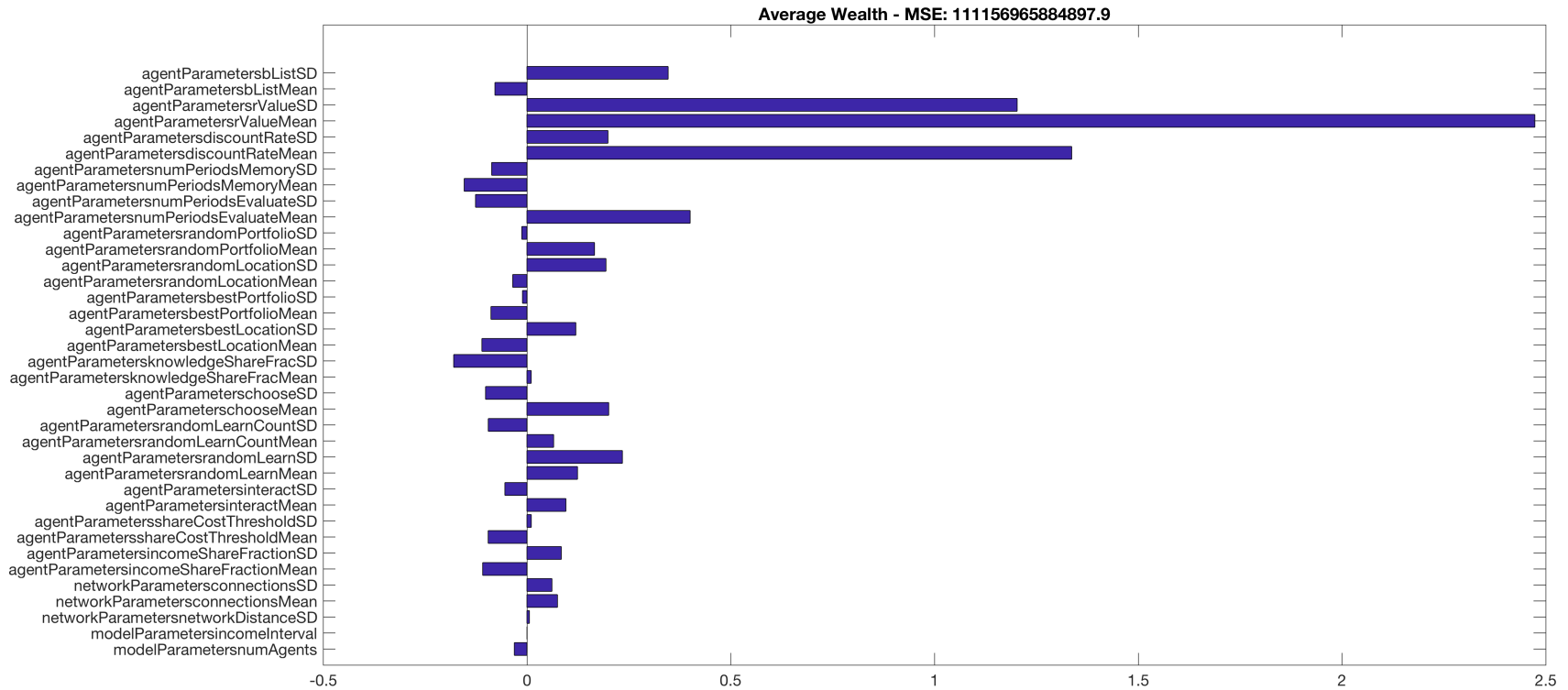


Figure A2-2: Relative variable importance measured by randomForest algorithm in predicting average wealth per agent at simulation scale

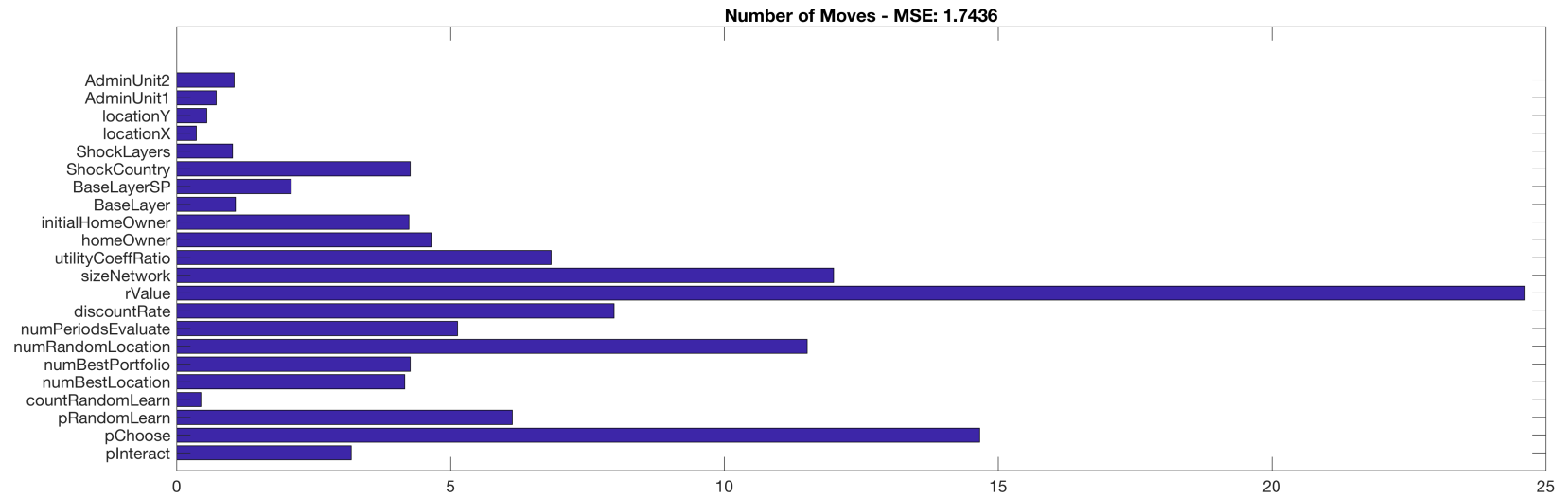


Figure A2-3: Relative variable importance measured by randomForest algorithm in predicting number of migrations per agent at agent scale



Figure A2-4: Relative variable importance measured by randomForest algorithm in predicting average wealth per agent at agent scale

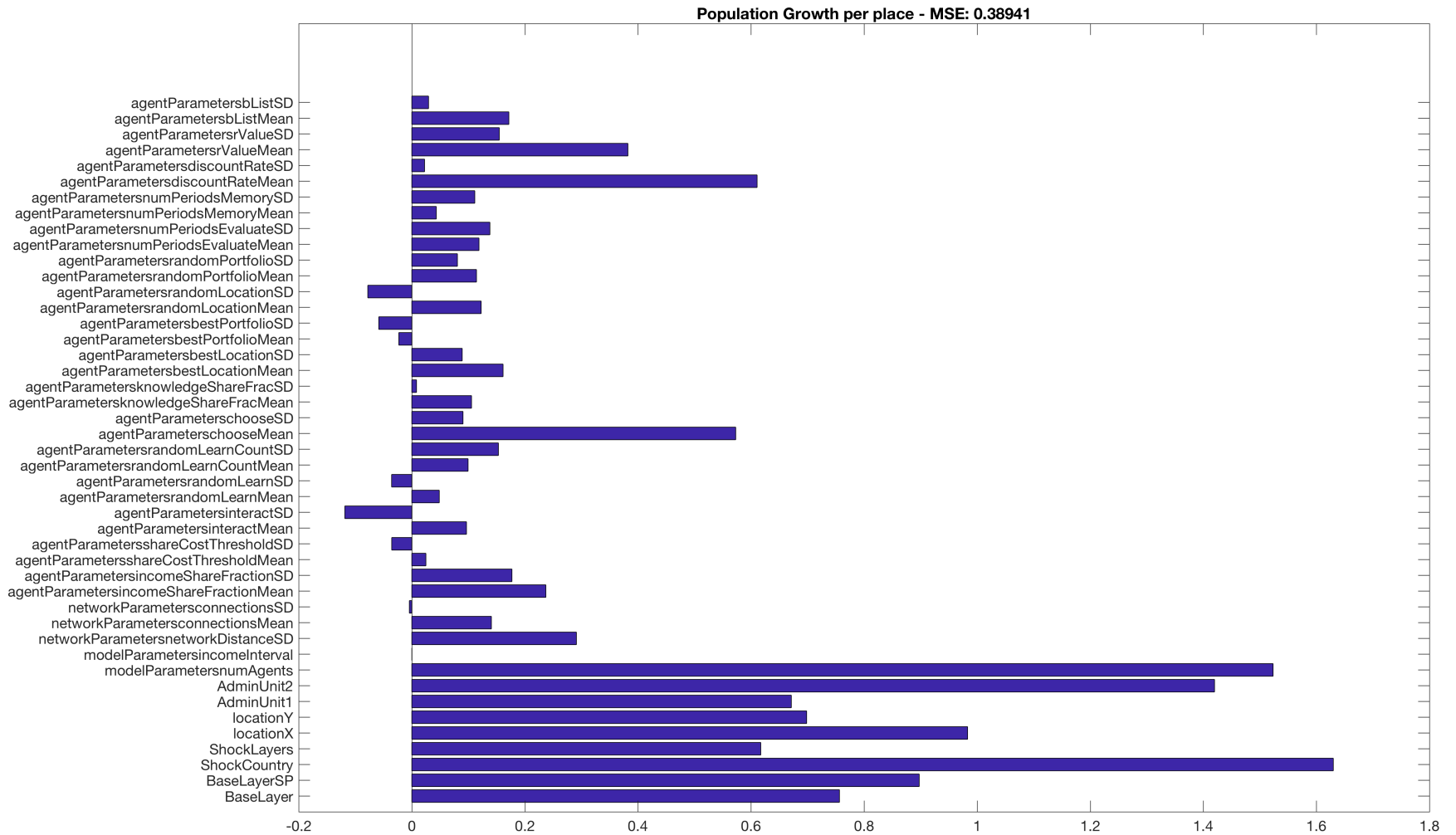


Figure A2-5: Relative variable importance measured by randomForest algorithm in predicting population growth at place scale