Sources of growth

Background

In endogenous growth models, models tend to distinguish between growth due to the increase in varieties ("Romer") versus growth due to improved quality of existing varieties ("Schumpeterian" or "creative destruction"). What is not clear from the theory is the importance of these two kinds of growth.

Table 6: Sources of Growth, 2003–2013

	Entrants	Incumbents	
Creative destruction	12.5%	6.4%	18.9%
New varieties	0.3%	4.1%	4.4%
Own-variety improvements	-	76.7%	76.7%
	12.8%	87.2%	

Figure 1: Sources of Growth

Garcia-Macia, Hsieh, and Klenow (2016) try to provide an empirical breakdown of the types of growth, by using information from the Census on firms in the US. Their table shows the decomposition they arrive at. By creative destruction, they mean the replacement of an existing product by a new product (as in a Schumpeterian model), *and* that replacement is done by a different firm. The iPhone replacing the Blackberry might be a good example.
By new varieties, they mean entirely new products (as in a Romer model). The iPod might be a good example of that. And by own-variety improvements, they mean the replacement of an existing product by a new product, but this is done by the same firm. Here, the iPhone 7 versus the iPhone 6 is an example.
While the role of new products does not appear to be a big factor, both kinds of innovation matter.

Project

Write down a model of endogenous growth that allows for *both* an expansion of varieties and the improvement of the quality of each individual variety. You should be able to use this model to discuss what parameters would lead towards a dominant role for product quality improvments versus product variety expansion in growth.

Rules

You can work on this project in groups of 2-3. I'll grade and assist each group as a whole.