



## On the optimal timing of capital taxes<sup>☆</sup>

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### Abstract

For many kinds of capital, depreciation rates change systematically with the age of the capital. Consider an example that captures essential aspects of human capital, both regarding its accumulation and its depreciation: a worker obtains knowledge in period 0, then uses this knowledge in production in periods 1 and 2, and thereafter retires. Here, depreciation accelerates: it occurs at a 100% rate after period 2, and at a lower (perhaps zero) rate before that. The present paper analyzes the implications of non-constant depreciation rates for the optimal timing of taxes on capital income. The main finding is that under natural assumptions, the path of tax rates over time must be oscillatory. Oscillatory tax rates are optimal when depreciation rates accelerate with the age of the capital (as in the above example), and provided that the government can commit to the path of future tax rates but cannot apply different tax rates in a given year to different vintages of capital.

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### 1. Introduction

What is the optimal path of taxes for a benevolent government that needs to finance some essential public expenditures? We study this question in a setting where taxation must take the form of proportional levies on capital income and where depreciation rates may vary over time (i.e., non-geometric depreciation). We are particularly interested in the case where depreciation rates increase with the age of capital, since we believe

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