The Many-core Fad

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Many-core is a fad.

- It's inferior to the old game.
- There are alternatives.
- Market realities will end the race.

Why *now*?

Not because...

- ...programmers were begging for more cores.
- ...consumers were demanding more cores.
- ...researchers are prepared for many-core.

Why not sooner?

- When transistor density doubles:
- Choice 1 is less size, more speed.
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The Moral: Cores $\times$ 2 $\sqsubseteq$ Hz $\times$ 2

So, why now?

- Doubling clockspeeds melted chips.
- Industry: “Moore’s law must go on.”
- Hardware firms: “Ok, add more cores.”

Why is doubling cores inferior to doubling clockspeeds?

Three Kinds of Computation

- Embarassingly parallel (HTTPD)
- Boundedly parallel (Pipelines, GC)
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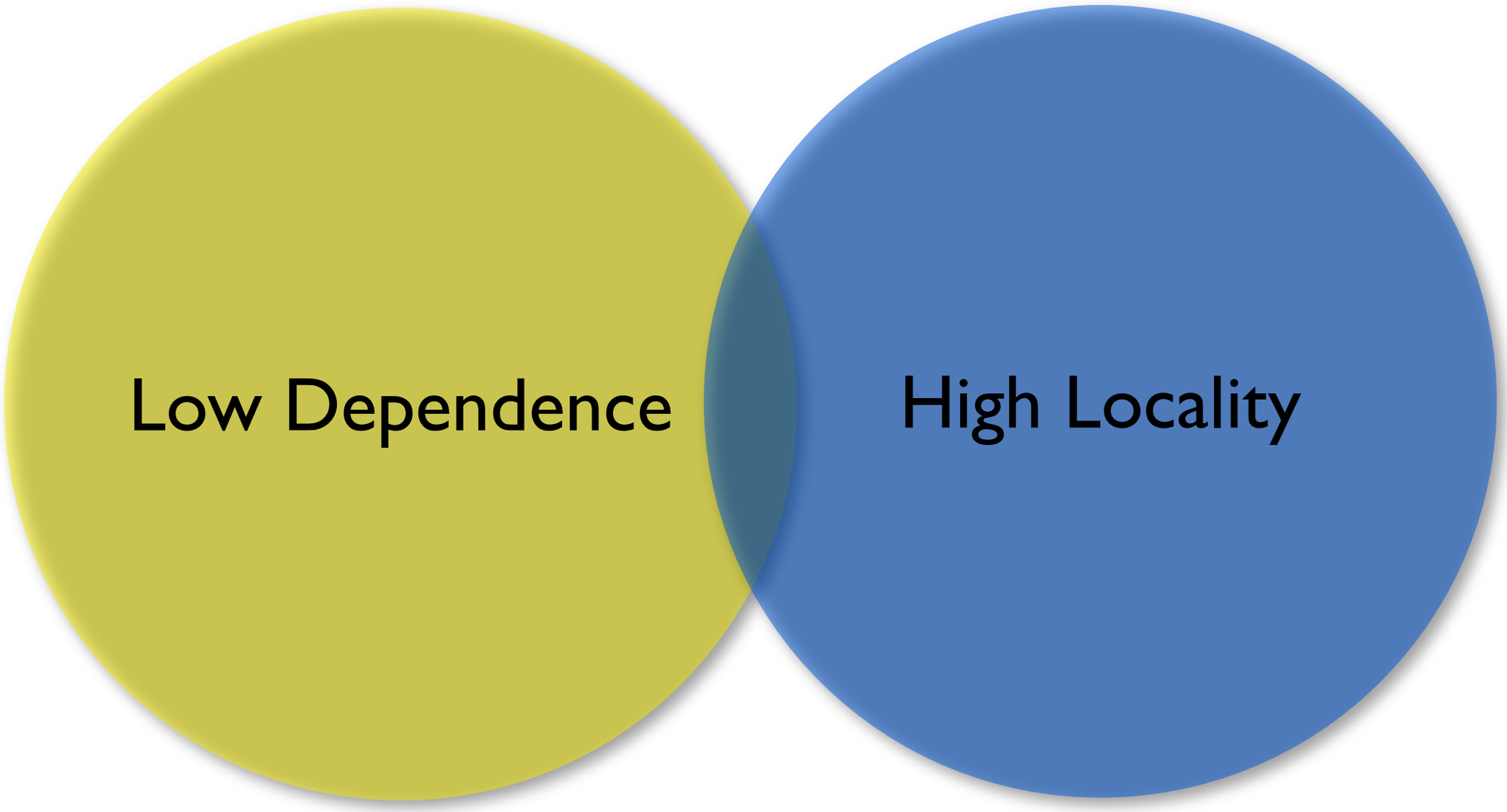

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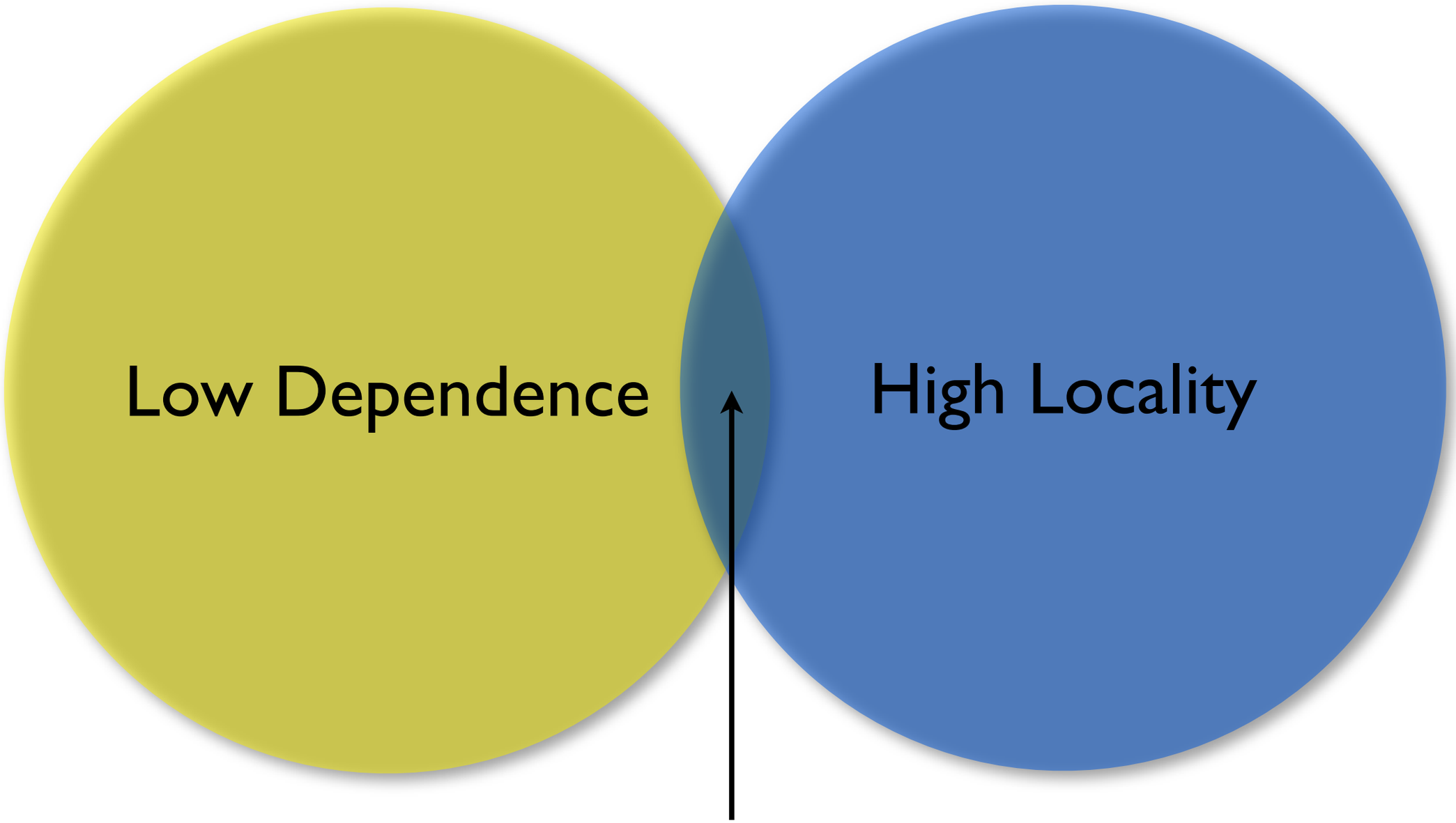


The future?

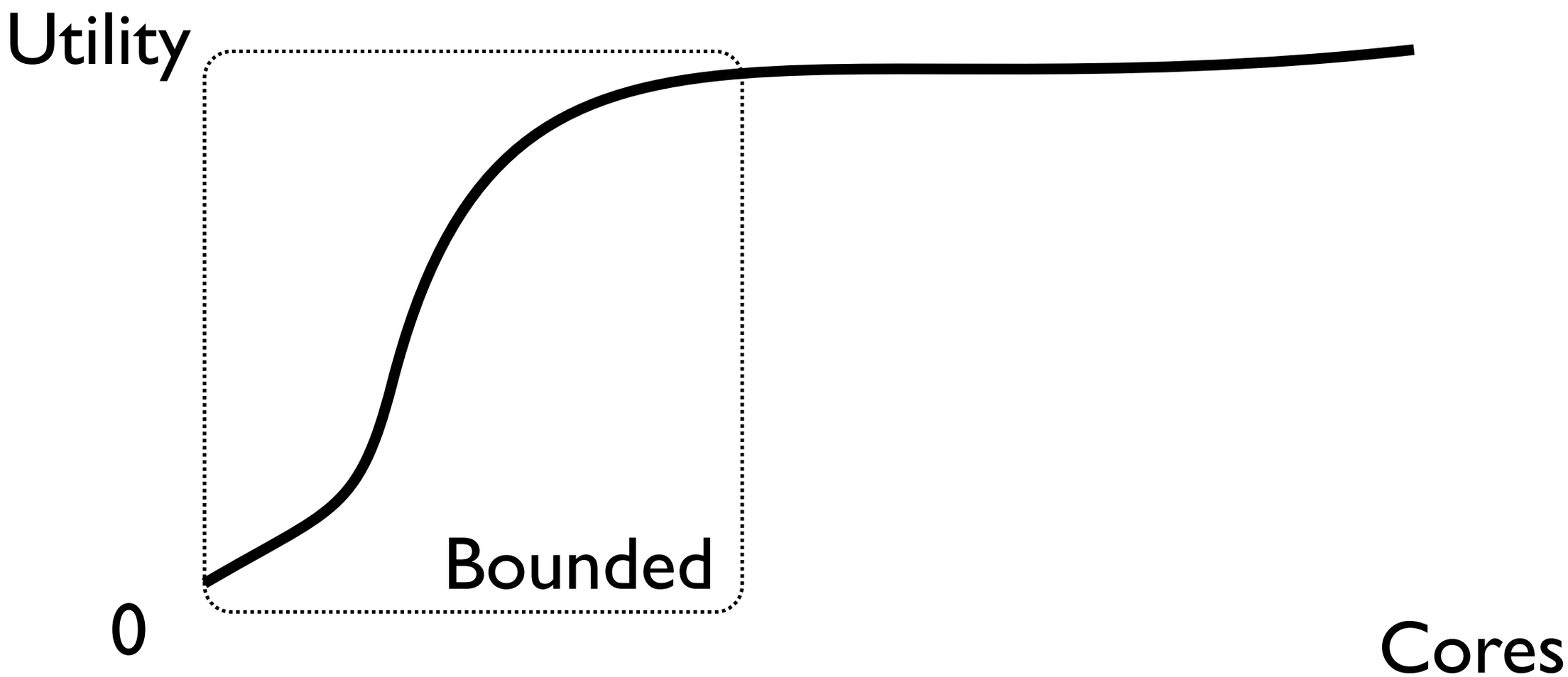
Diminishing Returns

Utility

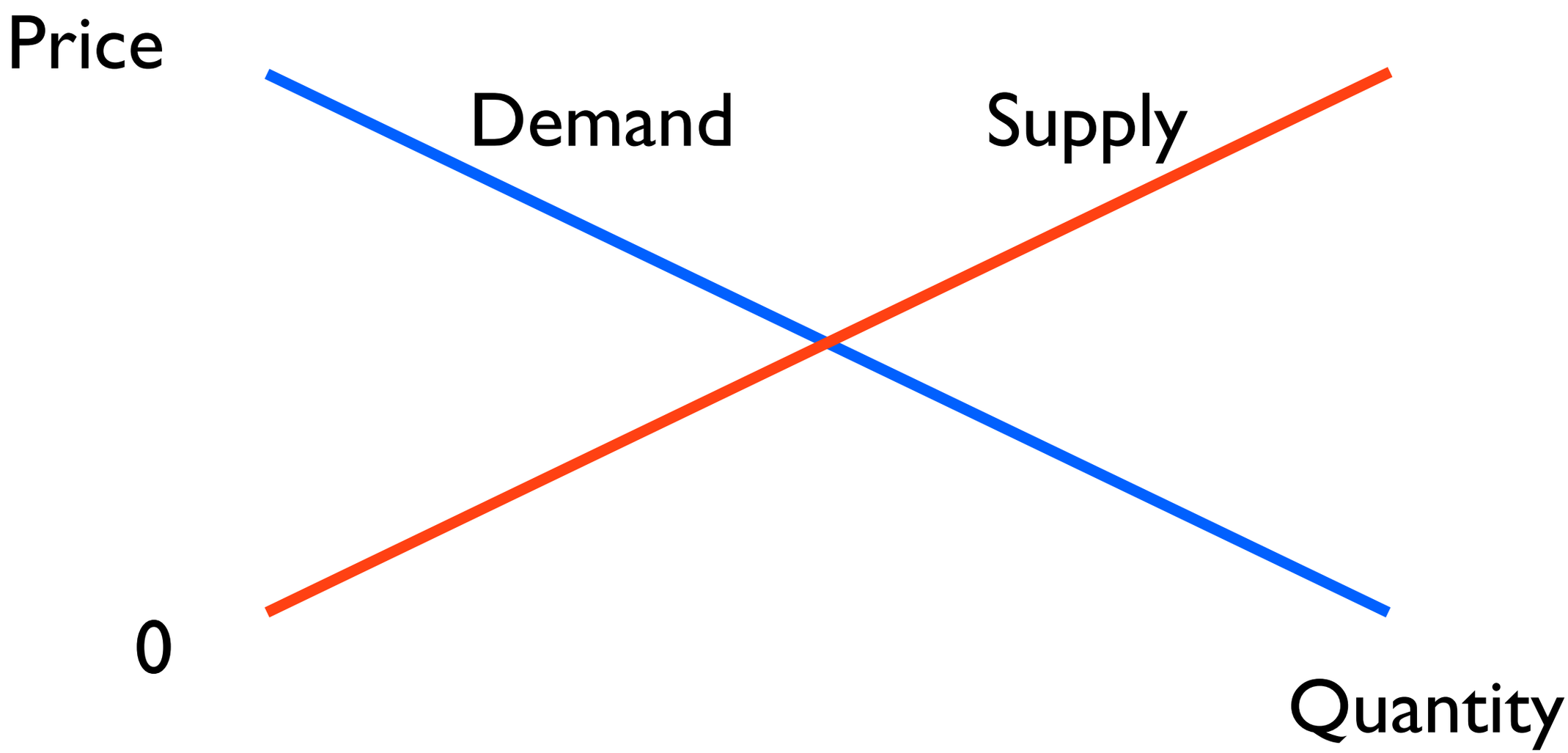
0

Cores

Diminishing Returns



Supply & Demand



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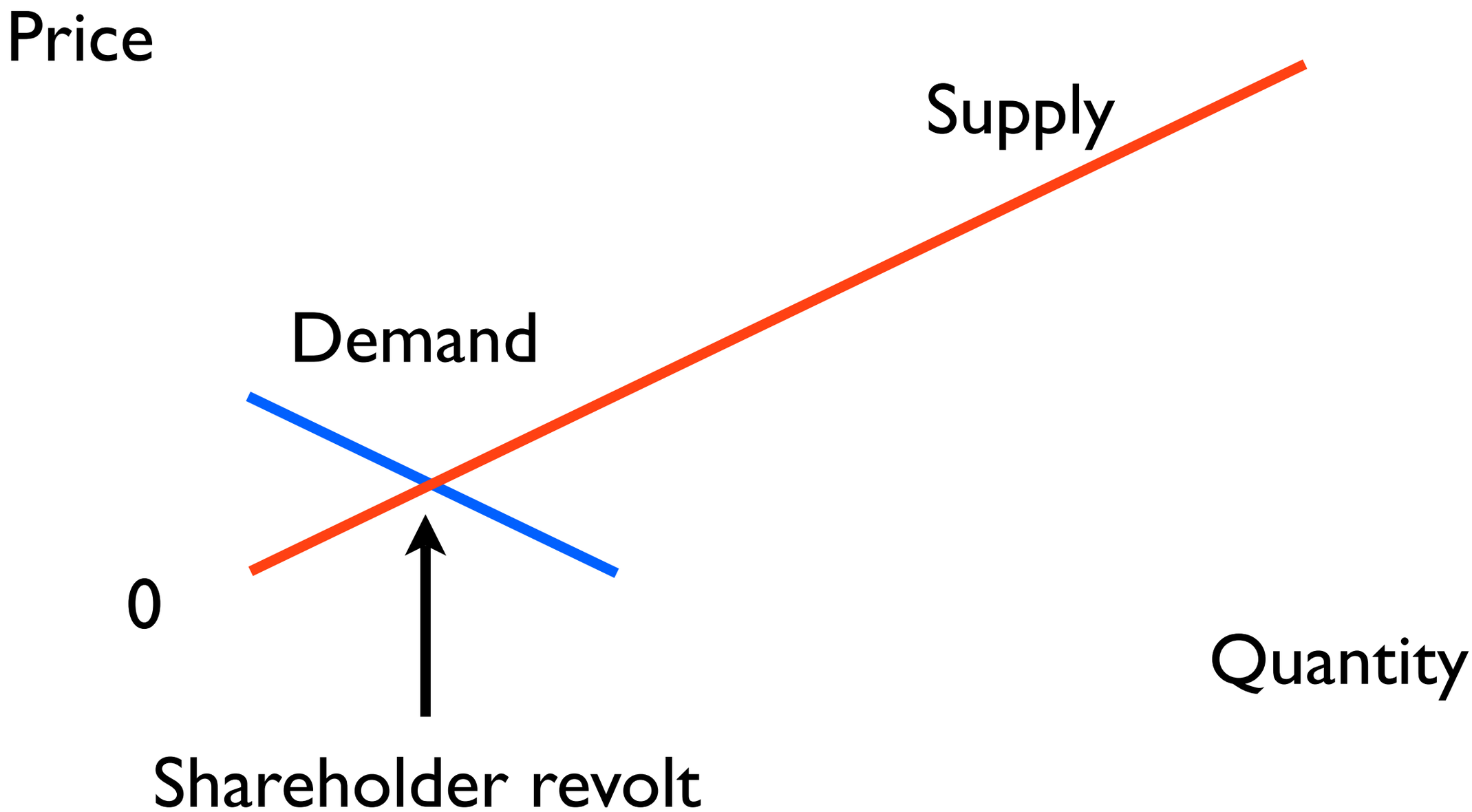


Alternatives

A new Moore's law?

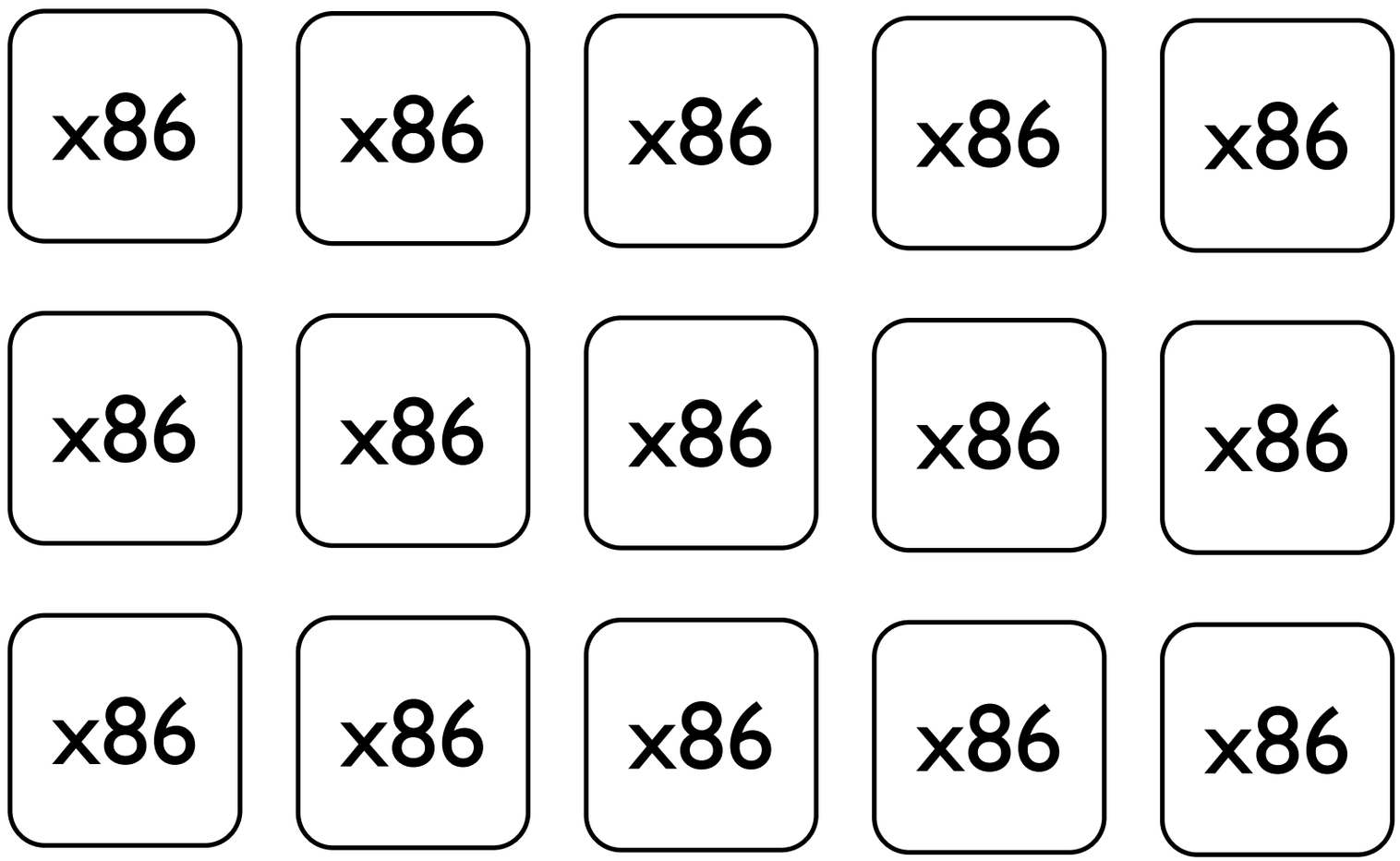
How about, every 18 months:

- Halve power
- Halve size
- Halve cost
- Double security
- Double robustness
- Double productivity

Alternatives

- Better caches!
- On-chip RAM! (32 MB)
- Smarter instructions!
- Tagged words!

Dump x86!



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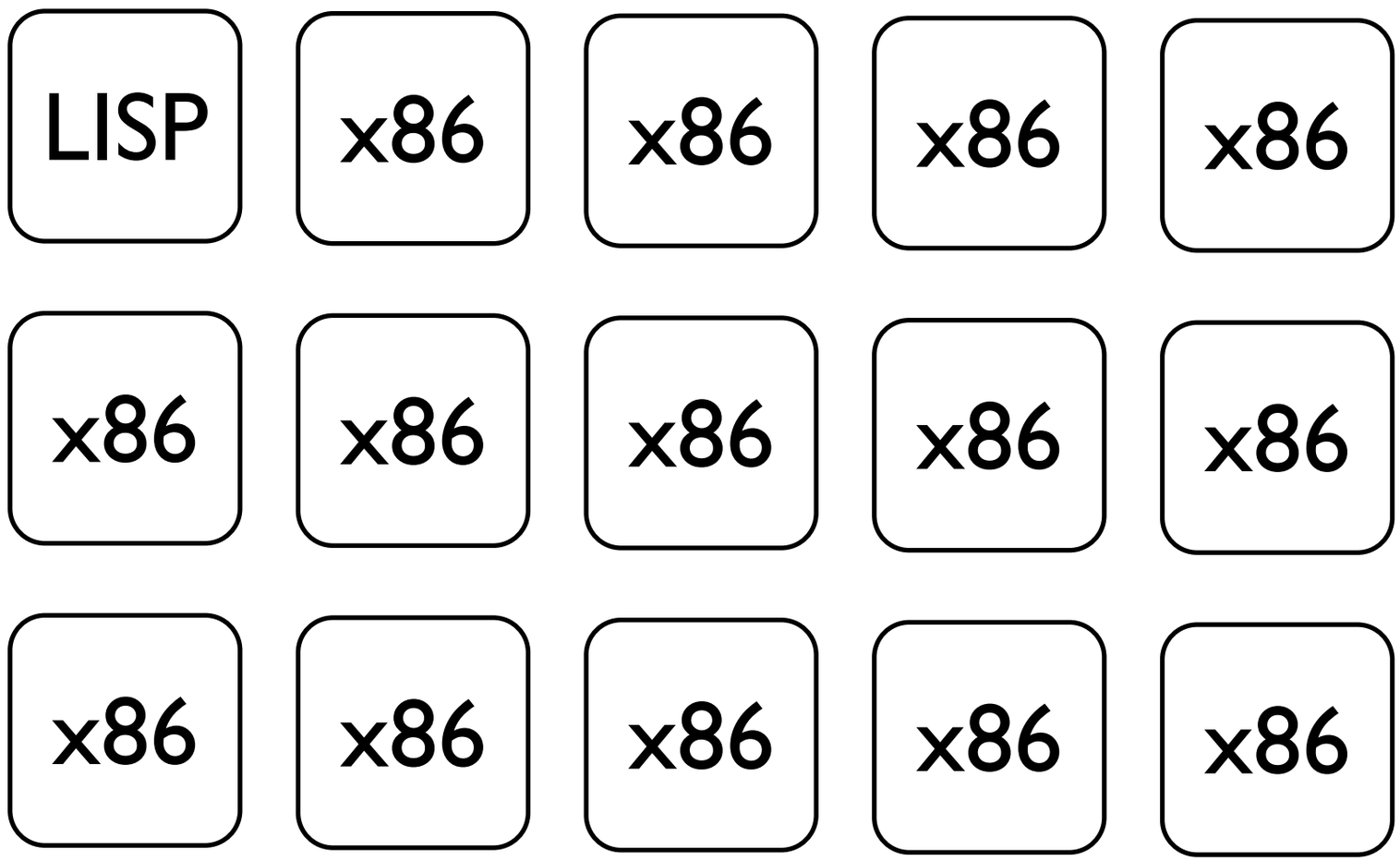

Yeah, it’s a fad.