Research Questions:

- How does the numerical method of AAD scale as we place significant computational demands on the system ?
- Does the promise of constant time computation still apply ?
- How does the computational performance and memory requirements scale as we increase the number of risk factors considered ?
- What performance increases are obtained when using AAD for the evaluation of higher-order sensitivities ?
- How do the AAD approximations influence numerical stability and accuracy ?

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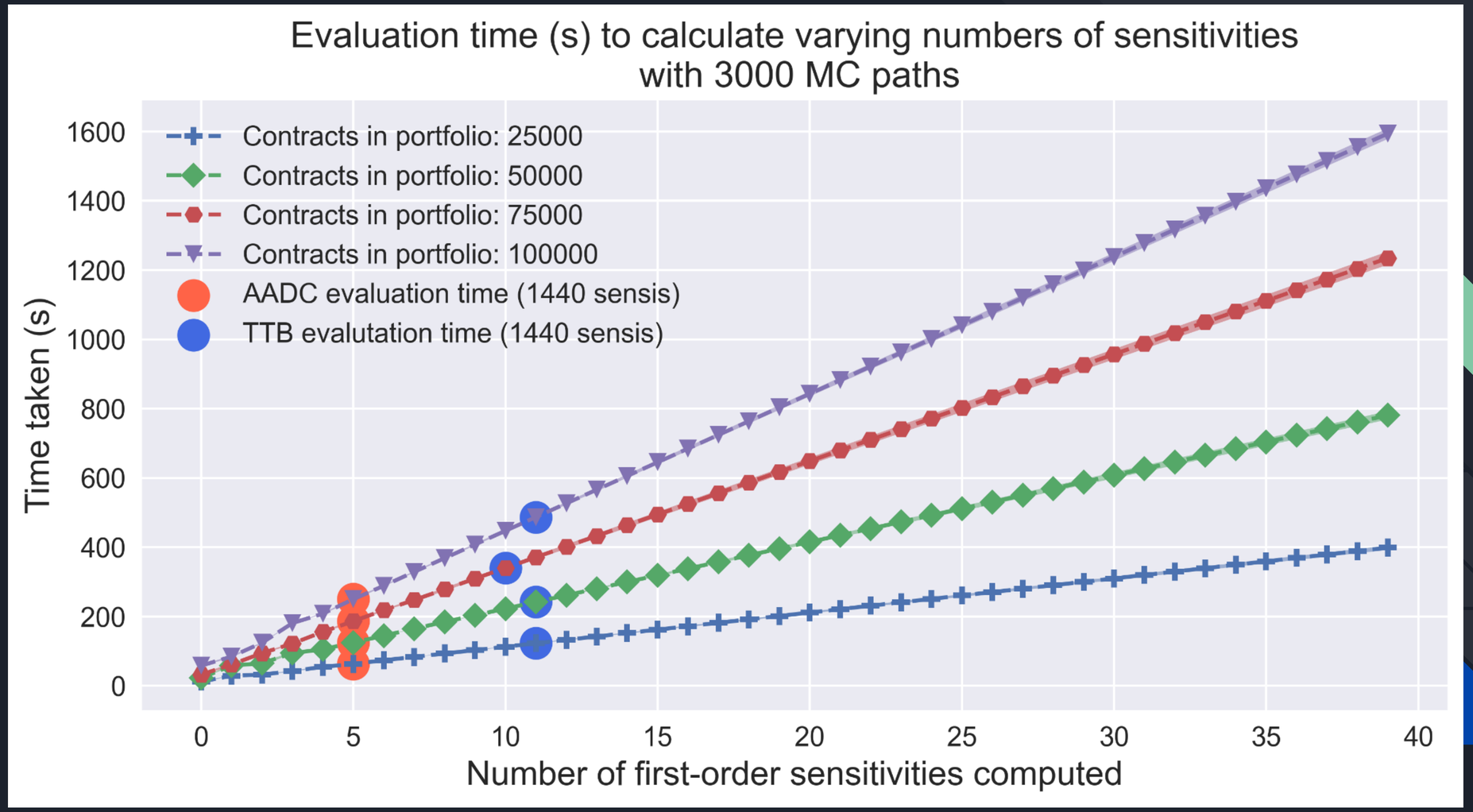
Performance of AAD engines:

But where is the breakeven point ?



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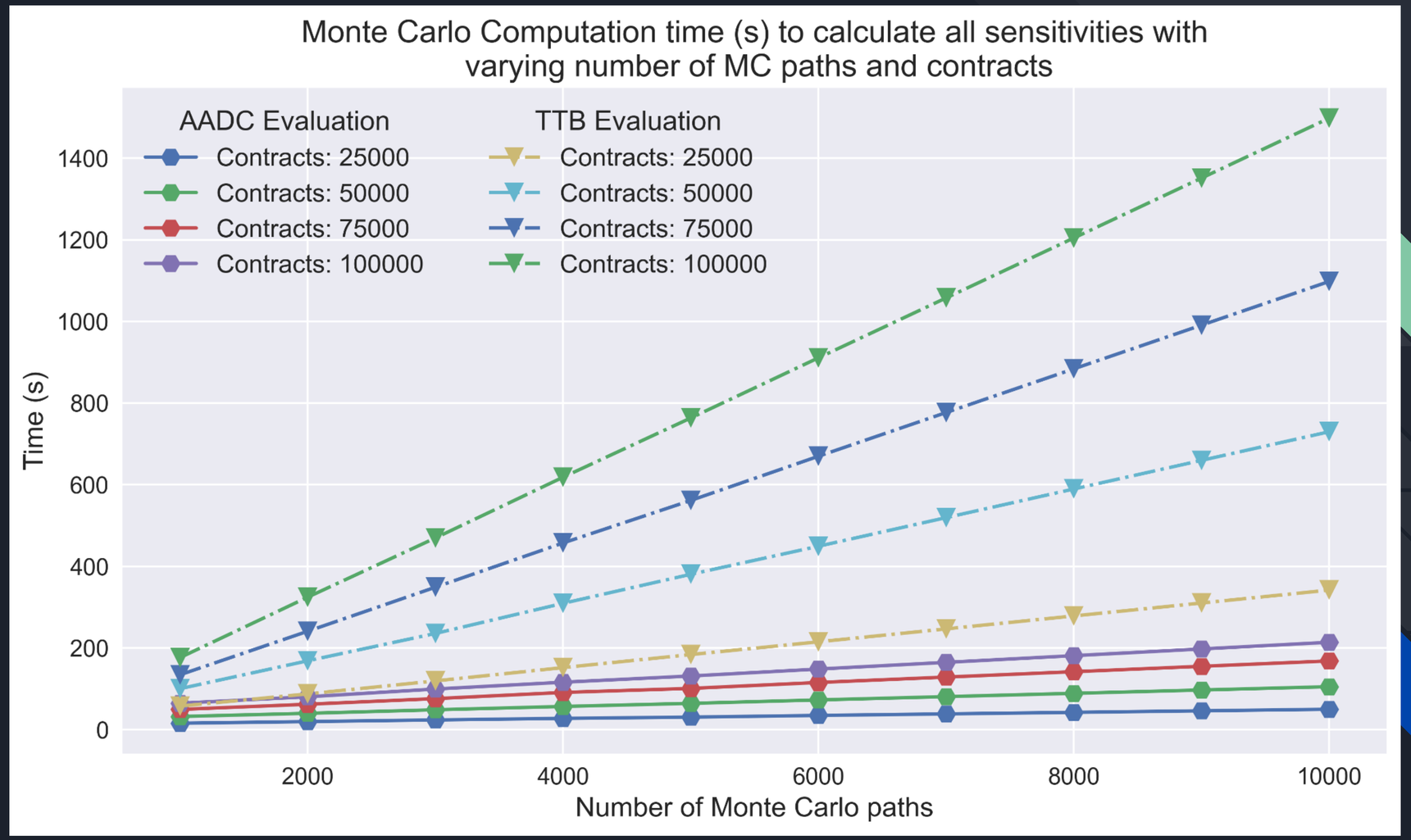
Performance of AAD engines:

So what if we generate the F/R kernel, and then simply run the MC simulations ?



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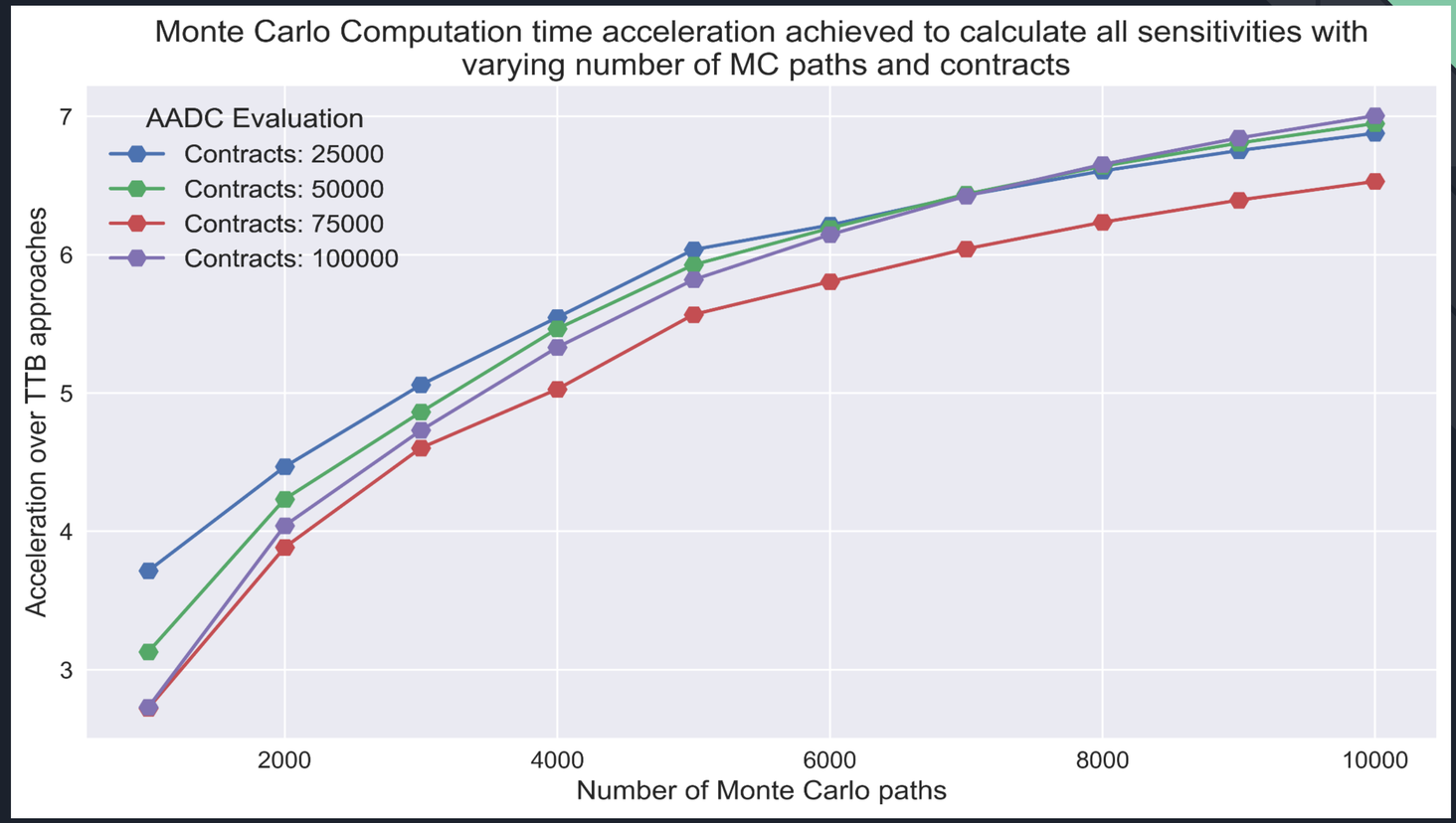
Performance of AADC engine for MC simulations:

But why is this the case ?

- Code based generation of the reverse kernel
- AVX vectorisation

HIGHLY ADVANTAGEOUS FOR STRESS TESTING !



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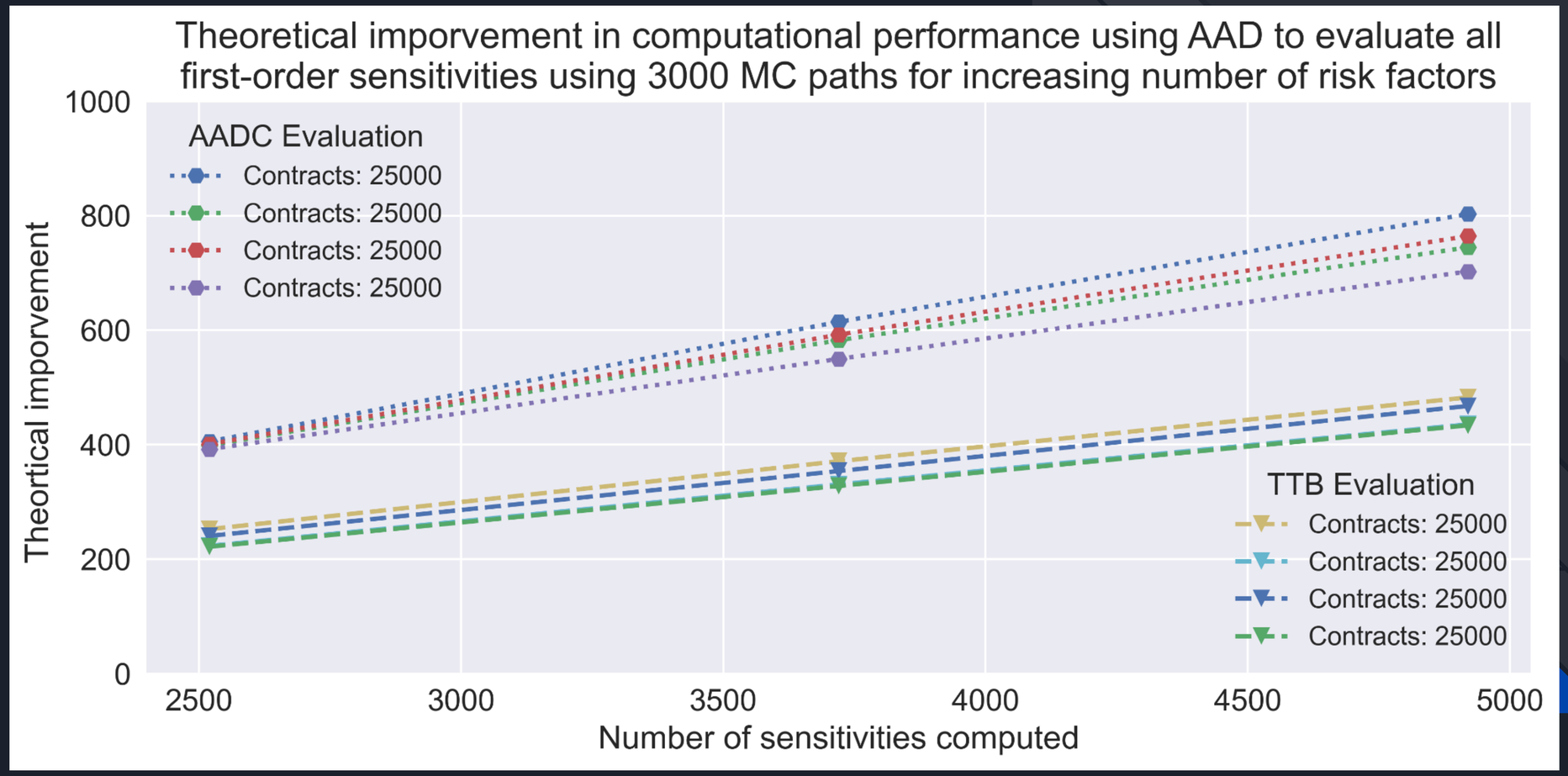
Increase in computational performance for varying number of risk factors :

Linear scalability as we increase the number of sensis computed



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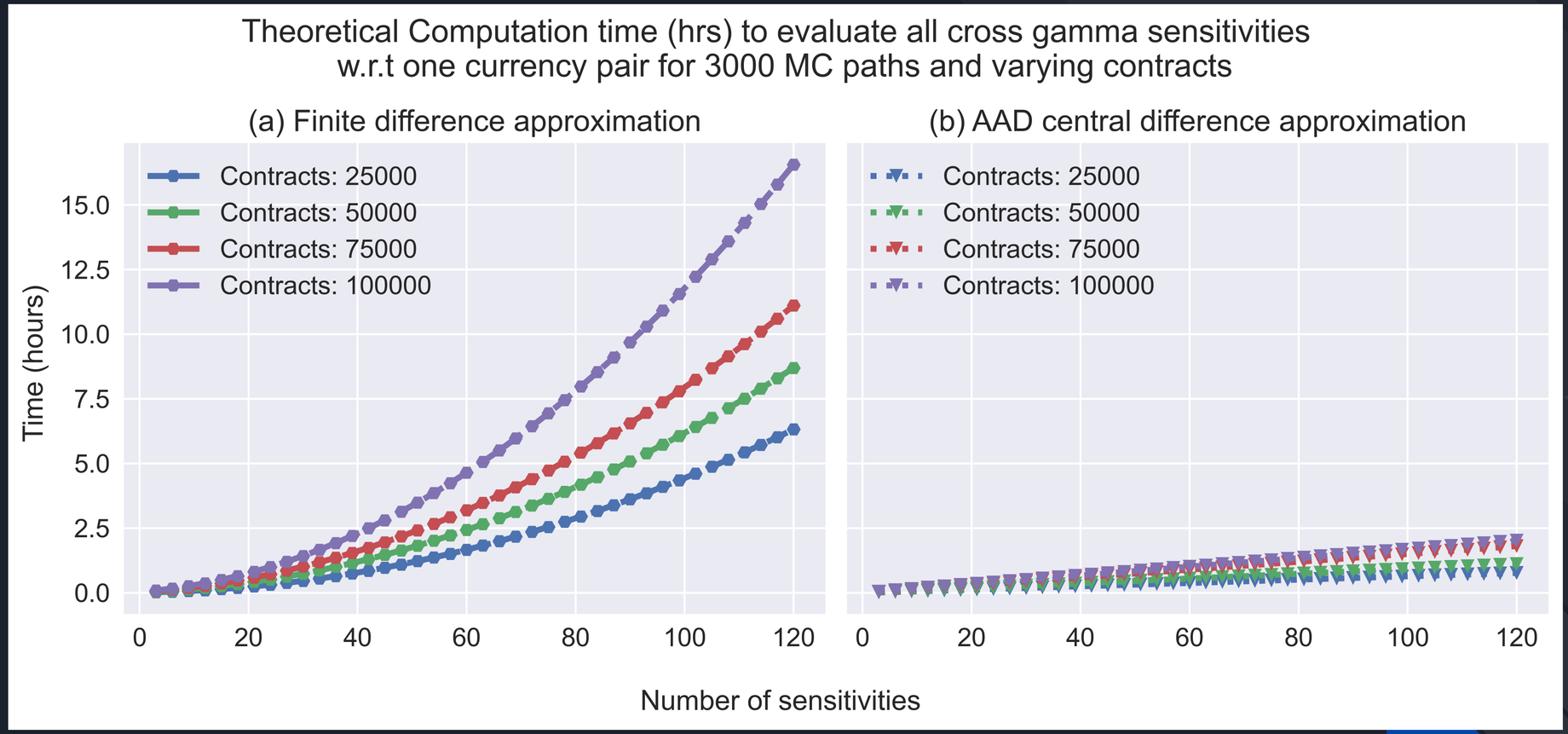
Scaling behaviour of both engines:

Quadratic vs linear scalability



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Memory and scaling for Monte-Carlo

Method	Number of contracts in the respective portoflios		
	100,000	200,000	300,000
	memory(GB) for a single tape generation(TTB) or Reverse kernel generation ($AADC$)		
TTB	0.988	1.866	2.798
$AADC$	2.482	4.895	7.985
	memory(GB) required during runtime		
TTB	21.154	39.354	60.073
$AADC$	16.413	32.759	49.215

Method	Number of contracts in the respective portoflios		
	100,000	200,000	300,000
	Theoretical Scaling Factor ($\mathcal{C}$)		
TTB	1.3494	1.318	1.3418
$AADC$	0.0808	0.0804	0.0806

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