

Designing efficient economy for continuous production of units in 0 AD

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I have analyzed the economic structure of 0 AD Alpha 25 and searched for the most efficient economic models to continuously produce units in different scenarios. By considering the gathering rate of workers, the cost and production time of different units, I derive a simple formula to calculate how many workers are needed on each resource to sustain the production of units at different batch sizes, with and without the economy upgrades. From the calculation results, I make a number of exemplary economic models to illustrate how to distribute your workers accurately on each resource in different scenarios. The results may be adapted to design other economic models for different strategies, and shall be particularly useful in combination with the auto-queue function of the game.

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Gathering gate, cost, and production time of units

Gathering rate (per second) (with phase-1, phase-2, phase-3 economy upgrades)

	Food	Wood	Stone	Metal
Woman	Berry: 1.0 (1.5) Farm: 0.5 (0.6, 0.72, 0.86) Meat: 1.0	0.7 (0.88, 1.1, 1.37)	0.35 (0.44, 0.55, 0.68)	0.35 (0.44, 0.55, 0.68)
Man	Berry: 0.5 Farm: 0.25 (0.3, 0.36, 0.43) Meat: 1.0	0.75 (0.94, 1.17, 1.46)	0.5 (0.63, 0.78, 0.98)	0.5 (0.63, 0.78, 0.98)
Cavalry	Meat: 5.0			

Cost

	Food	Wood	Stone	Metal
Woman	50			
War dog	100			
Skirmisher, archer	50	50		
Slinger	50	20	30	
Swordsman	50	40		10
Cavalry	100	50		
Mercenary infantry				80
Mercenary cavalry				60
Champion infantry	80	60		80
Champion cavalry	150	80		100
Skiritai commando	50	40		35
Elephant	270			180
Ram		300		150
Catapult		400	250	
Bolt shooter		250		250
Siege tower		500		300

Production time (second)

	1	2	3	4	5	6	8	10
Woman	8	7.0	6.4	6.1	5.8	5.6	5.3	5.0
Man	10	8.7	8.0	7.6	7.2	7.0	6.6	6.3
Cavalry, war dog	15	13.1	12.0	11.4	10.9	10.5	9.9	9.5
Merc. Infantry	7	6.1	5.6	5.3	5.1	4.9	4.6	4.4
Merc. Cavalry	11	9.6	8.8	8.3	8.0	7.7	7.3	6.9
Champion Infantry	20	17.4	16.1	15.2	14.5	14.0	13.2	12.6
Champion Cavalry	25	21.8	20.1	18.9	18.1	17.5	16.5	15.8
Skiritai Commando	15	13.1	12.0	11.4	10.9	10.5	9.9	9.5
Elephant	33	26.8	23.7	21.8	20.4	19.3	17.7	16.5
Ram	30	24.4	21.6	19.8	18.5	17.5	16.1	15.0
Catapult	25	20.3	18.0	16.5	15.4	14.6	13.4	12.5
Bolt shooter	20	16.2	14.4	13.2	12.3	11.7	10.7	10.0
Siege tower	40	32.5	28.8	26.4	24.7	23.4	21.4	20.0

Economy upgrades

Phase 1:	Food	Wood	Stone	Metal	Threshold # gathers
Berry +50%		100			3
Farm +20%		200		100	17 (~3 fields)
Wood +25%		200		100	13
Stone +25%	200		100		10
Metal +25%	200		100		10
Phase 2:					
Farm +20%		300		200	28 (~6 fields)
Wood +25%		400		200	20
Stone +25%	400		200		20
Metal +25%	400		200		20
Phase 3:					
Farm +20%		400		300	40 (8 fields)
Wood +25%		600		300	30
Stone +25%	600		300		30
Metal +25%	600		300		30

Note: Threshold # gathers suggests that the upgrade is economically worthy if the number of gathers reaches this number.

Batch production

If you train the units with a batch size, the total production time follows this formula:

$$\text{Production_time} = \text{Base_time} * (\text{\#Units} \wedge \text{Modifier})$$

The modifiers are:

- **1.0** for house (meaning, Batch training in houses does not reduce the training time)
- **0.8** for Civic Centre, Barrack, Stable, Carthage Embassies, Fortress.
- **0.7** for Corral, Market, Siege Workshop, Elephant Stable, Special Buildings.

The production time is reduced by the following factor for different batch size:

	1	2	3	4	5	6	8	10
Reduction (0.8 mod.)	1	0.871	0.803	0.758	0.725	0.699	0.660	0.631
Reduction (0.7 mod.)	1	0.812	0.719	0.660	0.617	0.584	0.536	0.501

The production rate is enhanced by the following multiplier (*i.e.* 1/reduction_factor)

	1	2	3	4	5	6	8	10
Multiplier (0.8 mod.)	1	1.149	1.246	1.320	1.380	1.431	1.516	1.585
Multiplier (0.7 mod.)	1	1.231	1.390	1.516	1.621	1.712	1.866	1.995

The number of workers needed to support the continuous production of units is calculated with this formula:

$$\text{\# workers} = (\text{cost} * \text{multiplier}) / (\text{production_time} * \text{gathering_rate})$$

Economy needed for continuous production

Batch size 1; no economy upgrade (with phase 1, phase 2, phase 3 economy upgrades)

	Food (# fields)	# Wood cutters	Stone (# men)	Metal (# men)
Woman	2.5 (2.1, 1.8, 1.5)			
War dog	2.7 (2.3, 1.9, 1.6)			
Skirmisher, archer	2.0 (1.7, 1.4, 1.2)	8 (6, 5, 4)		
Slinger		3 (3, 2, 2)	6 (5, 4, 4)	
Swordsman		6 (5, 4, 3)		2 (2, 2, 2)
Cavalry	2.7 (2.3, 1.9, 1.6)	5 (4, 4, 3)		
Swords Cavalry		4 (4, 3, 2)		2 (2, 1, 1)
Merc. Infantry				18 (14, 11, 9)
Merc. Cavalry				15 (12, 10, 8)
Champion Infantry	1.6 (1.4, 1.2, 1.0)	5 (4, 4, 3)		8 (7, 6, 5)
Champion Cavalry	2.4 (2.0, 1.7, 1.4)	5 (4, 3, 3)		8 (7, 6, 5)
Skiritai Commando	1.4 (1.2, 1.0, 0.8)	4 (4, 3, 2)		5 (4, 3, 3)
Elephant	3.3 (2.8, 2.3, 1.9)			11 (9, 7, 6)
Ram		15 (12, 10, 8)		10 (8, 7, 6)
Catapult		23 (19, 15, 12)	20 (16, 13, 11)	
Bolt shooter		18 (15, 12, 10)		25 (20, 16, 13)
Siege tower		18 (15, 12, 10)		15 (12, 10, 8)

Batch size 2; no eco. upgrade (with p1, p2, p3 economy upgrades)

	Food (# fields)	# Wood cutters	Stone (# men)	Metal (# men)
Woman	2.9 (2.4, 2.0, 1.7)			
War dog	3.1 (2.6, 2.2, 1.8)			
Skirmisher, archer	2.3 (2.0, 1.6, 1.4)	9 (7, 6, 5)		
Slinger		4 (3, 3, 2)	7 (6, 5, 4)	
Swordsman		7 (6, 5, 4)		3 (2, 2, 2)
Cavalry	3.1 (2.6, 2.2, 1.8)	6 (5, 4, 3)		
Sword Cavalry		5 (4, 3, 3)		2 (2, 1, 1)
Merc. Infantry				20 (16, 13, 11)
Merc. Cavalry				17 (14, 11, 9)
Champion Infantry	1.9 (1.6, 1.3, 1.1)	5 (4, 4, 3)		10 (8, 6, 5)
Champion Cavalry	2.8 (2.3, 2.0, 1.6)	6 (5, 4, 3)		10 (8, 6, 5)
Skiritai Commando	1.6 (1.3, 1.1, 0.9)	5 (4, 3, 3)		6 (5, 4, 3)
Elephant	4.1 (3.4, 2.8, 2.4)			14 (11, 9, 7)
Ram		18 (15, 12, 10)		13 (10, 8, 7)
Catapult		29 (23, 18, 15)	25 (20, 16, 13)	
Bolt shooter		22 (18, 15, 12)		31 (25, 20, 16)
Siege tower		22 (18, 15, 12)		19 (15, 12, 10)

Batch size 3; no eco. upgrade (with p1, p2, p3 eco. upgrades)

	Food (# fields)	# Wood cutters	Stone (# men)	Metal (# men)
Women	3.2 (2.7, 2.2, 1.9)			
War dog	3.4 (2.8, 2.4, 2.0)			
Skirmisher, archer	2.5 (2.1, 1.8, 1.5)	9 (8, 6, 5)		
Slinger		4 (3, 3, 2)	8 (6, 5, 4)	
Swordsman		8 (6, 5, 4)		3 (2, 2, 2)
Cavalry	3.4 (2.8, 2.4, 2.0)	6 (5, 4, 4)		
Sword Cavalry		5 (4, 4, 3)		2 (2, 2, 1)
Merc. Infantry				22 (18, 14, 11)
Merc. Cavalry				19 (15, 12, 10)
Champion Infantry	2.0 (1.7, 1.4, 1.2)	6 (5, 4, 3)		10 (8, 7, 6)
Champion Cavalry	3.0 (2.5, 2.1, 1.8)	6 (5, 4, 3)		10 (8, 7, 6)
Skiritai Commando	1.7 (1.4, 1.2, 1.0)	5 (4, 4, 3)		6 (5, 4, 3)
Elephant	4.6 (3.8, 3.2, 2.7)			16 (13, 10, 8)
Ram		19 (16, 13, 11)		14 (12, 9, 8)
Catapult		32 (26, 21, 17)	28 (23, 18, 16)	
Bolt shooter		25 (20, 16, 13)		35 (28, 23, 18)
Siege tower		25 (20, 16, 13)		21 (17, 14, 11)

Batch size 4; no eco. upgrade (with p1, p2, p3 eco. upgrades)

	Food (# fields)	# Wood cutters	Stone (# men)	Metal (# men)
Women	3.3 (2.8, 2.3, 2.0)			
War dog	3.6 (3.0, 2.5, 2.1)			
Skirmisher, archer	2.7 (2.2, 1.9, 1.6)	10 (8, 7, 5)		
Slinger		4 (4, 3, 2)	8 (7, 6, 5)	
Swordsman		8 (7, 5, 4)		3 (3, 2, 2)
Cavalry	3.6 (3.0, 2.5, 2.1)	7 (6, 5, 4)		
Sword Cavalry		6 (5, 4, 3)		2 (2, 2, 1)
Merc. Infantry				23 (19, 15, 12)
Merc. Cavalry				20 (16, 13, 10)
Champion Infantry	2.2 (1.8, 1.5, 1.3)	6 (5, 4, 3)		11 (9, 7, 6)
Champion Cavalry	3.2 (2.7, 2.2, 1.9)	7 (5, 4, 4)		11 (9, 7, 6)
Skiritai Commando	1.8 (1.5, 1.3, 1.1)	6 (5, 4, 3)		7 (5, 4, 4)
Elephant	5.0 (4.2, 3.5, 2.9)			17 (14, 11, 9)
Ram		22 (18, 14, 12)		16 (13, 10, 8)
Catapult		35 (28, 23, 18)	31 (25, 20, 16)	
Bolt shooter		28 (22, 18, 14)		38 (31, 25, 20)
Siege tower		28 (22, 18, 14)		23 (19, 15, 12)

Batch size 5; no eco. upgrade (with p1, p2, p3 eco. upgrades)

	Food (# fields)	# Wood cutters	Stone (# men)	Metal (# men)
Women	3.5 (2.9, 2.4, 2.0)			
War dog	3.7 (3.1, 2.6, 2.2)			
Skirmisher, archer	2.8 (2.3, 2.0, 1.6)	10 (8, 7, 6)		
Slinger		4 (4, 3, 3)	9 (7, 6, 5)	
Swordsman		8 (7, 6, 5)		3 (3, 2, 2)
Cavalry	3.7 (3.1, 2.6, 2.2)	7 (6, 5, 4)		
Sword cavalry		6 (5, 4, 3)		2 (2, 2, 1)
Merc. Infantry				24 (19, 16, 13)
Merc. Cavalry				21 (17, 13, 11)
Champion Infantry	2.3 (1.9, 1.6, 1.3)	6 (5, 4, 4)		12 (9, 8, 6)
Champion Cavalry	3.4 (2.8, 2.3, 2.0)	7 (6, 5, 4)		12 (9, 8, 6)
Skiritai Commando	1.9 (1.6, 1.3, 1.1)	6 (5, 4, 3)		7 (6, 5, 4)
Elephant	5.4 (4.5, 3.7, 3.1)			18 (15, 11, 9)
Ram		23 (19, 15, 12)		17 (13, 11, 9)
Catapult		38 (30, 24, 19)	33 (26, 21, 17)	
Bolt shooter		29 (24, 19, 15)		41 (33, 26, 21)
Siege tower		29 (24, 19, 15)		25 (20, 16, 13)

Exemplary economic models

Below are some examples of economic models to efficiently sustain the continuous productions of units. These examples only consider the economy for the unit production. In a real game, you will need more workers for making buildings, upgrades, and phasing up.

Example 1 – Standard booming

- **1 civic center producing the women (batch size 2)**
- **1 barrack producing the spearmen, pikemen, skirmishers or archers (batch size 2)**

	Food (# fields)	# Wood cutters	Stone (# men)	Metal (# men)
Women	2.9 (2.4, 2.0, 1.7)			
Spearmen, pikemen skirmisher, archers	2.3 (2.0, 1.6, 1.4)	9 (7, 6, 5)		
Total:	5.2 (4.4, 3.6, 3.1)	9 (7, 6, 5)		

Conclusion: You need 5.2 farms and 9 wood cutters to sustain the continuous production women from the civic center and men from the barrack with batch size 2. If you have the phase-1 upgrades on farming and wood cutting, you only need 4.4 fields and 7 wood cutters. If you have the phase-2 economy upgrades, you only need 3.6 fields and 6 wood cutters. If you have the phase-3 economy upgrades, you only need 3.1 fields and 5 wood cutters.

Example 2 – Booming for the Ptolemies (or the Britons, Athenians)

- 1 civic center producing the women (batch size 2)
- 1 barrack producing half pikemen (or spearmen) and half singers (batch size 2)

	Food (# fields)	# Wood cutters	Stone (# men)	Metal (# men)
Women	2.9 (2.4, 2.0, 1.7)			
Pikemen (x 0.5)	2.3 (2.0, 1.6, 1.4)	9 (7, 6, 5)		
Slingers (x 0.5)	2.3 (2.0, 1.6, 1.4)	4 (3, 3, 2)	7 (6, 5, 4)	
Total:	5.2 (4.4, 3.6, 3.1)	7 (5, 5, 4)	4 (3, 3, 2)	

Conclusion: You need to have 5.2 farms, 7 wood cutters, and 4 stone miners to sustain the continuous production. If you have the phase-1 upgrades on farming, wood cutting, and stone mining, you only need 4.4 fields, 5 wood cutters, and 3 stone miners. If you have the phase-2 economy upgrades, you need 3.6 fields, 5 wood cutters, and 3 stone miners. If you have the phase-3 economy upgrades, you only need 3.1 fields, 4 wood cutters, and 2 stone miners.

Example 3 – Booming for the Gauls, Spartans, Kushites ...

- 1 civic center producing the spearman (batch size 2)
- 1 barrack producing the skirmishers or archers (batch size 2)

	Food (# fields)	# Wood cutters	Stone (# men)	Metal (# men)
Infantry (x 2)	2.3 (2.0, 1.6, 1.4)	9 (7, 6, 5)		
Total:	4.6 (4.0, 3.2, 2.8)	18 (14, 12, 10)		

Conclusion: You need 4.6 farms and 18 wood cutters to sustain the continuous production. If you have phase-1 economy upgrades, you only need 4.0 fields and 14 wood cutters.

Example 4 – Booming for the Romans

- 1 civic center producing the skirmishers (batch size 2)
- 1 barrack producing the swordsmen (batch size 2)
- 1 barrack producing the skirmishers (batch size 2)

	Food (# fields)	# Wood cutters	Stone (# men)	Metal (# men)
Skirmisher (x 2)	2.3 (2.0, 1.6, 1.4)	9 (7, 6, 5)		
Swordsmen (x 1)	2.3 (2.0, 1.6, 1.4)	7 (6, 5, 4)		3 (2, 2, 2)
Total:	6.9 (6.0, 4.8, 4.2)	25 (20, 17, 14)		3 (2, 2, 2)

Conclusion: You need 6.9 farms, 25 wood cutters, and 3 metal miners to sustain the continuous production. If you have the phase-1 economy upgrades, then you only need 6 farms, 20 wood cutters, and 2 metal miners. If you have the phase-2 economy upgrades, then you only need 4.8 farms, 17 wood cutters, and 2 metal miners. If you have the phase-3 economy upgrades, then you only need 4.2 farms, 14 wood cutters, and 2 metal miners.

Example 5 – Massing cavalry while booming

- 1 civic center producing the spearmen (batch size 3)
- 1 barrack producing the skirmishers or archers (batch size 3)
- 2 stables producing the ranged or spear cavalry (batch size 3)

	Food (# fields)	# Wood cutters	Stone (# men)	Metal (# men)
Infantry (x 2)	2.5 (2.1, 1.8, 1.5)	9 (8, 6, 5)		
Cavalry (x 2)	3.4 (2.8, 2.4, 2.0)	6 (5, 4, 4)		
Total:	11.8 (9.8, 8.4, 7)	30 (26, 20, 18)		

Conclusion: You need 11.8 fields and 30 wood cutters to sustain the continuous production. If you have the phase-1 economy upgrades, you only need 9.8 fields and 26 wood cutters. The phase-2 economy upgrades reduce them to 8.4 fields and 20 wood cutters; The phase-3 upgrades reduce them to 7 fields and 19 wood cutters.

Example 6 – Massing camels while booming (for the Ptolemies)

- 1 civic center producing the women (batch size 2)
- 1 barrack producing half pikemen and half slingers
- 2 stables producing the camels (batch size 2)

	Food (# fields)	# Wood cutters	Stone (# men)	Metal (# men)
Women (x 1)	2.9 (2.4, 2.0, 1.7)			
Pikemen (x 0.5)	2.3 (2.0, 1.6, 1.4)	9 (7, 6, 5)		
Slingers (x 0.5)	2.3 (2.0, 1.6, 1.4)	4 (3, 3, 2)	7 (6, 5, 4)	
Camels (x 2)	3.1 (2.6, 2.2, 1.8)	6 (5, 4, 3)		
Total:	11.4 (9.6, 8, 6.7)	19 (15, 13, 10)	4 (3, 3, 2)	

Conclusion: You need 11.4 fields, 19 wood cutters, and 4 stone miners to sustain the continuous production. The phase-1 economy upgrades reduce them to 9.6 fields, 15 wood cutters, and 3 metal miners; the phase-2 upgrades reduce them to 8 fields, 13 wood cutters, and 3 stone miner.

Example 7 – Massing mercenary cavalry (for the Carthaginians, Macedonian, Kushites ...)

- 1 civic center producing the infantry (batch size 4)
- 2 buildings producing the mercenary cavalry (batch size 4)

	Food (# fields)	# Wood cutters	Stone (# men)	Metal (# men)
Infantry (x 1)	2.7 (2.2, 1.9, 1.6)	10 (8, 7, 5)		
Merc. Cavalry (x 2)				20 (16, 13, 10)
Total:	2.7 (2.2, 1.9, 1.6)	10 (8, 7, 5)		40 (32, 26, 20)

Conclusion: You need 2.7 fields, 10 wood cutters, and 40 metal miners to sustain the production. The phase-1, phase-2, phase-3 economy upgrades reduce the number of metal miners to 32, 26, and 20, respectively.

Example 8 – Massing mercenary infantry (for the Ptolemies, Carthaginians, Macedonian, ...)

- 1 civic center producing the infantry (batch size 4)
- 2 buildings producing the mercenary infantry (batch size 4)

	Food (# fields)	# Wood cutters	Stone (# men)	Metal (# men)
Infantry	2.7 (2.2, 1.9, 1.6)	10 (8, 7, 5)		
Merc. Infantry (x 2)				23 (19, 15, 12)
Total:	2.7 (2.2, 1.9, 1.6)	10 (8, 7, 5)		46 (38, 30, 24)

Conclusion: You need 2.7 fields, 10 wood cutters, and 46 metal miners to sustain the continuous production. The phase-1, phase-2, phase-3 economy upgrades reduce the number of metal miners to 38, 30, and 24, respectively. Compared to the previous example, you actually need more metal miners to sustain the production of mercenary infantry than mercenary cavalry, because although the mercenary infantry is cheaper (60 vs 80 metal), their production time is shorter (7 vs 11 seconds).

Suggestion: If you plan to do a phase-2 rush with the mercenary infantry or cavalry, you may make four fields (assuming no extra food). 2.7 fields are for the production of metal miners; 1.3 fields are for advancing to phase 2 and making the phase-1 and phase-2 metal mining upgrades.

Example 9 – Naked fanatic rush (for the Gauls)

- 1 civic center producing the cavalry (batch size 2)
- 1 temple producing the fanatics barrack (batch size 2)

	Food (# fields)	# Wood cutters	Stone (# men)	Metal (# men)
Cavalry	3.1 (2.6, 2.2, 1.8)	6 (5, 4, 3)		
Naked fanatic	1.9 (1.6, 1.3, 1.1)	5 (4, 4, 3)		10 (8, 6, 5)
Total:	5.0 (4.2, 3.5, 2.9)	11 (9, 8, 6)		10 (8, 6, 5)

Conclusion: You need 5 fields, 11 wood cutters, and 10 metal miners to sustain the continuous production of the cavalry and fanatics. If you have the phase-1 economy upgrades, then you only need 4.2 fields, 9 wood cutters, and 8 metal miners.

Example 10 – War dog rush (for the Britons)

- 1 civic center producing women (batch size 2)
- 2 stable producing war dogs (batch size 2)

	Food (# fields)	# Wood cutters	Stone (# men)	Metal (# men)
Women (x 1)	2.9 (2.4, 2.0, 1.7)			
War dogs (x 2)	3.1 (2.6, 2.2, 1.8)			
Total	9.1 (7.6, 6.4, 5.3)			

Conclusion: You need 9.1 fields sustain the continuous production. If you have p1 farming upgrades, then you only need 7.6 fields.

Example 11 – Massing mercenary units with the Ptolemy I hero (35% cost reduction)

- **6 barrack or colony producing the mercenary infantry (batch size 1)**

	Food (# fields)	# Wood cutters	Stone (# men)	Metal (# men)
Merc. Infantry (x 6 x 65%)				18 (14, 11, 9)
Total:				71 (55, 43, 36)

Conclusion: If you have the phase-3 metal mining upgrades and the Ptolemy I hero, you only need 36 metal miners to continuously produce mercenary infantry from six barracks or colonies.

- **3 military colonies producing the mercenary cavalry (batch size 5)**

	Food (# fields)	# Wood cutters	Stone (# men)	Metal (# men)
Merc. cavalry (x 3 x 65%)				21 (17, 13, 11)
Total:				41 (34, 26, 22)

Conclusion: With the phase-3 metal mining upgrades and the Ptolemy I hero, you only need 22 metal miners to continuously produce mercenary cavalry from three colonies with batch size 5.

Example 12 – Massing the fire cavalry (for the Iberians)

1 civic center and 2 barracks producing the swordsmen (batch size 2)

4 stables producing the fire cavalry (batch size 2)

	Food (# fields)	# Wood cutters	Stone	Metal (# men)
Swordsmen (x 3)	2.3 (2.0, 1.6, 1.4)	7 (6, 5, 4)		3 (2, 2, 2)
Fire cavalry (x 4)	2.8 (2.3, 2.0, 1.6)	6 (5, 4, 3)		10 (8, 6, 5)
Total:	18.1 (15.2, 12.8, 10.6)	45 (38, 31, 24)		49 (38, 30, 26)
Total (with hero):	19.3 (16.2, 13.6, 11.3)	48 (41, 33, 26)		52 (41, 32, 28)

Conclusion: If you don't have any economy upgrades, you will need 18.4 fields (92 women), 45 wood cutters, and 52 miners to sustain the production (i.e. totally 189 workers). This is quite heavy for a 300-pop game. So, you will certainly need the economy upgrades. With the phase-2 economy upgrades, you only need 12.8 fields (64 women), 31 wood cutters, and 30 metal miners (totally 125 workers, which is more reasonable).

Note that with the Iberian hero Indibil, you actually need a slightly stronger economy to sustain the production, because although the hero reduces the cost for 15%, he also reduces the production time for 20%.

Iberians has a very strong end game if you take the phase-3 economy upgrades and make the hero. With 12 field, 26 wood cutters and 28 metal miners, you can sustain the continuous production of swordsmen from three buildings and fire cavalry from four stables, which can form an unstoppable army.