

Supplementary material for

Pasture-based livestock economics under joint production of commodities and private amenity self-consumption: testing in large non-industrial privately-owned *dehesa* case studies in Andalusia-Spain

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Supplementary texts for

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S1. Estimation of capital of building and equipment per livestock species

In [21], the livestock species with which the building and equipment capital (inanimate capital) is associated is not described in all cases, instead indicating its general purpose for use in the livestock farming activity. To estimate the distribution of the building and equipment capital per livestock species, in these case studies we firstly calculated a coefficient ω_i based on the total forage units¹ consumed by each of the livestock species i in each of the studied farms according to eq. ST1.

$$\omega_{i,j} = \frac{FU_{i,j}}{FU_{Total,j}} \quad (\text{eq. ST1})$$

Where $\omega_{i,j}$ is the coefficient for species i on farm j , $FU_{i,j}$ are the forage units consumed by species i on farm j and $FU_{Total,j}$ are the total forage units consumed by all the livestock on farm j .

Based on coefficient $\omega_{i,j}$ it is possible to estimate the opening capital of buildings ($Cig_{co,i}$) and equipment ($Cig_{e,i}$) associated with livestock species i through the product between this coefficient and the total capital of constructions (Cig_{co}) or equipment (Cig_e) destined to the livestock activity (eq. ST2 and eq. ST3, respectively). This same criterion is used for inputs, withdrawals, closing capital, revaluation and consumption of fixed capital.

$$Cig_{co,i} = \omega_{i,j} \cdot Cig_{co} \quad (\text{eq. ST2})$$

$$Cig_{e,i} = \omega_{i,j} \cdot Cig_e \quad (\text{eq. ST3})$$

References

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¹ Forage unit: refers to the energy content of a kilogram of barley with a humidity content of 14.1% and totals 2,723 kcal [18].

Supplementary tables for

Pasture-based livestock economics under joint production of commodities and private amenity self-consumption: testing in large non-industrial privately-owned *dehesa* case studies in Andalusia-Spain

Table S1. Livestock races by species on large privately-owned *dehesa* case studies in Andalusia (2010).

Dehesa	Cattle	Sheep	Goats	Pigs	Horses
Dehesa 1	Fighting bulls				Andalusian, <i>Hispano-Árabe</i> , mules and unspecified half-breed horses
Dehesa 2	<i>Retinta</i> , <i>Charolais</i> , <i>Limousin</i> and half-breed cattle				Unspecified half-breed horses
Dehesa 3	<i>Retinta</i> , <i>Charolais</i> and <i>Limousin</i>				Andalusian
Dehesa 4	<i>Charolais</i> , <i>Limousin</i> and half-breed cattle			<i>Iberico</i>	
Dehesa 5				<i>Iberico</i>	
Dehesa 6	<i>Retinta</i> , <i>Limousin</i> and Fighting bulls			<i>Iberico Negro entrepelado</i>	Andalusian and unspecified half-breed horses
Dehesa 7		<i>Segureña</i>		<i>Iberico Negro entrepelado</i>	
Dehesa 8		<i>Segureña</i>	Unspecified half-breed goats		
Dehesa 9		<i>Segureña</i>	<i>Granaina</i> and <i>Malagueña</i>		
Dehesa 10	<i>Charolais</i> and half-breed cattle				Andalusian, mule and Anglo-Arabian with Andalusian
Dehesa 11	Unspecified half-breed cattle	<i>Merina de Grazalema</i>	<i>Murciano-Granadina</i>	<i>Iberico Negro lampiño del guadiana</i>	
Dehesa 12		<i>Ile de France</i> with <i>Merina</i>		<i>Iberico Negro lampiño del guadiana</i>	
Dehesa 13	<i>Retinta</i> , <i>Charolais</i> , <i>Limousin</i> and half-breed cattle			<i>Iberico</i>	Anglo-Arabian
Dehesa 14	<i>Berrenda en negro</i>	<i>Segureña</i>	<i>Blanca andaluza</i> and <i>Serrana</i>		Unspecified half-breed horses, unspecified half-breed donkeys and ponys
Dehesa 15			<i>Malagueña</i>		
Dehesa 16	<i>Simmenthal-fleckvieh</i>				
Dehesa 17					Unspecified half-breed horses
Dehesa 18	<i>Retinta</i> , <i>Limousin</i> and half-breed cattle				
Dehesa 19	<i>Retinta</i> , <i>Berrenda colorada</i> , <i>Berrenda en negro</i> , <i>Limousin</i> and half-breed	<i>Merina</i> half-breed		<i>Iberico</i> with Duroc	
Dehesa 20	Unspecified half-breed cattle		Unspecified half-breed goats	<i>Iberico</i> with Duroc	
Dehesa 21		Unspecified half-breed sheep		<i>Iberico</i> with Duroc	

Table S2. Meat cattle physical indicators of large privately-owned *dehesa* case studies in Andalusia (2010).

Dehesa	Number of livestock species (n)	Female breeders (fb)	Births (he/fb)	Sales (he/fb)	Labor (AWU)			Fodder consumption (%)		
					Employee	Self-employed	Total	Grazing	Supplements	Total
Dehesa 2	2	73	0.7	0.6	0.9		0.9	85.2	14.8	100.0
Dehesa 3	2	132	0.3	0.5	1.6		1.6	0.0	100.0	100.0
Dehesa 4	2	89	0.8	0.3	0.9		0.9	60.3	39.7	100.0
Dehesa 6	4	130	1.0	1.0	2.0		2.0	72.6	27.4	100.0
Dehesa 10	2	28	0.6	0.5	0.1		0.1	77.0	23.0	100.0
Dehesa 11	4	38	0.6	1.0	0.7		0.7	48.7	51.3	100.0
Dehesa 13	3	66	0.7	0.3	1.1	0.0	1.1	75.4	24.6	100.0
Dehesa 14	4	7	0.6		0.1	0.0	0.1	95.6	4.4	100.0
Dehesa 16	1	16	0.4		0.2		0.2	94.2	5.8	100.0
Dehesa 18	1	83	0.7	0.3	1.7		1.7	67.0	33.0	100.0
Dehesa 19	3	87		0.4	0.1	0.1	0.2	88.7	11.3	100.0
Dehesa 20	3	64	0.6	0.6		1.3	1.3	87.3	12.7	100.0

Source: Own elaboration.

Abbreviations: n is the number of livestock species with presence for more than 6 months at year; he are the livestock heads of this specie; fb are female breeders; AWU is annual work unit.

Notes: Annual work unit is equivalent to 1,826 hours worked per year [23].

Table S3. Fighting bulls physical indicators of large privately-owned *dehesa* case studies in Andalusia (2010).

Dehesa	Number of livestock species (n)	Female breeders (fb)	Births (he/fb)	Sales (he/fb)	Labor (AWU)			Fodder consumption (%)		
					Employee	Self-employed	Total	Grazing	Supplements	Total
Dehesa 1	2	188	0.6	0.7	9.0		9.0	47.6	52.4	100.0
Dehesa 6	4	229	0.6	0.1	4.9		4.9	46.9	53.1	100.0

Source: Own elaboration.

Abbreviations: n is the number of livestock species with presence for more than 6 months at year; he are the livestock heads of this specie; fb are female breeders; AWU is annual work unit.

Notes: Annual work unit is equivalent to 1,826 hours worked per year [23].

Table S4. Sheep physical indicators of large privately-owned *dehesa* case studies in Andalusia (2010).

Dehesa	Number of livestock species (n)	Female breeders (fb)	Births (he/fb)	Sales (he/fb)	Labor (AWU)			Fodder consumption (%)		
					Employee	Self-employed	Total	Grazing	Supplements	Total
Dehesa 7	2	183	0.5	0.5	0.5		0.5	75.5	24.5	100.0
Dehesa 8	2	690	1.0	0.8			1.1	29.0	71.0	100.0
Dehesa 9	2	20	1.3	1.3			0.1	3.7	96.3	100.0
Dehesa 11	4	89	0.3	0.1	0.1		0.1	67.9	32.1	100.0
Dehesa 12	2	161	1.2	1.3	0.3		0.2	72.0	28.0	100.0
Dehesa 14	4	544	0.6	0.6	0.3		0.2	79.1	20.9	100.0
Dehesa 19	3	31	0.3	0.7	0.0		0.0	100.0		100.0
Dehesa 21	2	1,279	1.4	1.3	1.4		1.4	37.8	62.2	100.0

Source: Own elaboration.

Abbreviations: n is the number of livestock species with presence for more than 6 months at year; he are the livestock heads of this specie; fb are female breeders; AWU is annual work unit.

Notes: Annual work unit is equivalent to 1,826 hours worked per year [23].

Table S5. Goats physical indicators of large privately-owned *dehesa* case studies in Andalusia (2010).

Dehesa	Number of livestock species (n)	Female breeders (fb)	Births (he/fb)	Sales (he/fb)	Labor (AWU)			Fodder consumption (%)		
					Employee	Self-employed	Total	Grazing	Supplements	Total
Dehesa 8	2	19	0.9	1.7		0.0	0.0	29.0	71.0	100.0
Dehesa 9	2	254	1.2	1.0		2.5	2.5	3.7	96.3	100.0
Dehesa 11	4	231	0.8	1.2	1.4		1.4	50.5	49.5	100.0
Dehesa 14	4	45	0.4		0.0	0.0	0.1	81.6	18.4	100.0
Dehesa 15	1	730	1.0	0.5	2.5		2.5	5.1	94.9	100.0
Dehesa 20	3	353	0.4	0.5		0.8	0.8	82.0	18.0	100.0

Source: Own elaboration.

Abbreviations: n is the number of livestock species with presence for more than 6 months at year; he are the livestock heads of this specie; fb are female breeders; AWU is annual work unit.

Notes: Annual work unit is equivalent to 1,826 hours worked per year [23].

Table S6. *Montanera* Iberian pigs physical indicators of large privately-owned *dehesa* case studies in Andalusia (2010).

Dehesa	Number of livestock species (n)	Iberian pigs in <i>montanera</i> (he)	Labor (AWU)			Fodder consumption (%)		
			Employee	Self-employed	Total	Grazing	Supplements	Total
Dehesa 4	2	62	0.4		0.4	43.0	57.0	100.0
Dehesa 5	1	292	0.1		0.1	72.1	27.9	100.0
Dehesa 6	4	1,172	0.7		0.7	45.3	54.7	100.0
Dehesa 11	4	132	0.4		0.4	25.5	74.5	100.0
Dehesa 12	2	97	0.5	0.3	0.8	27.4	72.6	100.0
Dehesa 13	3	143	1.4	0.0	1.4	5.4	94.6	100.0
Dehesa 19	3	182	2.2	0.3	2.5	4.2	95.8	100.0
Dehesa 20	3	13		0.0	0.0	91.3	8.7	100.0
Dehesa 21	2	665	1.8		1.8	42.7	57.3	100.0

Source: Own elaboration.

Abbreviations: n is the number of livestock species with presence for more than 6 months at year; he are the livestock heads of this specie; AWU is annual work unit.

Notes: Annual work unit is equivalent to 1,826 hours worked per year [23].

Table S7. *Montanera* Iberian pigs grazing season on large privately-owned *dehesa* case studies in Andalusia (2010).

Dehesa	Weight of Iberian pigs in <i>montanera</i> (arrobas ⁽¹⁾ /he)		Grazing consumption (FU/he per day)	<i>Montanera</i> period (months)	Iberian pigs in <i>montanera</i> fattening (he)
	Entries in <i>montanera</i>	Withdrawals of <i>montanera</i>			
Dehesa 4	10.1	14.6	2.6	4	62
Dehesa 5	7.0	15.0	2.8	5	292
Dehesa 6	9.5	14.2	2.7	4	1,172
Dehesa 11	9.0	14.0	2.9	4	132
Dehesa 12	9.0	14.0	2.3	5	97
Dehesa 13	10.2	14.0	2.2	4	143
Dehesa 19	7.2	9.3	1.6	3	182
Dehesa 20	8.5	14.3	2.4	5	13
Dehesa 21	9.0	14.5	2.5	5	665
Mean value	8.8	13.8	2.5	4	306

Source: Own elaboration.

Abbreviations: FU is forage units; he are livestock heads of this specie.

Notes: ⁽¹⁾ 1 arroba is 11.5 kilograms.

Table S8. Extensive piglets physical indicators of a large privately-owned *dehesa* case study in Andalusia (2010).

Dehesa	Number of livestock species (n)	Sales (he)	Labor (AWU)			Fodder consumption (%)		
			Employee	Self-employed	Total	Grazing	Supplements	Total
Dehesa 7	2	93	0.6		0.6	15.7	84.3	100.0

Source: Own elaboration.

Abbreviations: n is the number of livestock species with presence for more than 6 months at year; he are the livestock heads of this specie; AWU is annual work unit.

Notes: Annual work unit is equivalent to 1,826 hours worked per year [23].

Table S9. Horses physical indicators of large privately-owned *dehesa* case studies in Andalusia (2010).

Dehesa	Number of livestock species (n)	Breeders (he)	Labor (AWU)			Fodder consumption (%)		
			Employee	Self-employed	Total	Grazing	Supplements	Total
Dehesa 1	2	14	0.1		0.1		100.0	100.0
Dehesa 2	2	3	0.0		0.0	71.3	28.7	100.0
Dehesa 3	2	68	5.3		5.3	14.8	85.2	100.0
Dehesa 6	4	37	1.1		1.1		100.0	100.0
Dehesa 10	2	11	1.0		1.0		100.0	100.0
Dehesa 13	3	2	0.1	0.0	0.1	75.6	24.4	100.0
Dehesa 14	4	7	0.0	0.0	0.0	87.8	12.2	100.0
Dehesa 17	1	150	0.2		0.2	45.8	54.2	100.0

Source: Own elaboration.

Abbreviations: n is the number of livestock species with presence for more than 6 months at year; he are the livestock heads of this specie; AWU is annual work unit.

Notes: Annual work unit is equivalent to 1,826 hours worked per year [23].

Table S10. Bees physical indicators of large privately-owned *dehesa* case studies in Andalusia (2010).

Dehesa	Hives (hi)	Honey (kg/hive)	Labor (AWU)		Total
			Employee	Self-employed	
Dehesa 2	80	0.3		0.1	0.1
Dehesa 11	20	4.2		0.0	0.0
Dehesa 14	160	12.9	0.0	0.7	0.8
Dehesa 16	80	15.9		0.2	0.2
Dehesa 21	350	15.4		0.2	0.2

Source: Own elaboration.

Abbreviations: hi is the number of bee hives; AWU is annual work unit.

Notes: Annual work unit is equivalent to 1,826 hours worked per year [23].